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### General information

Diffusion colours (yellow stains) are silver containing materials, of which the effective components - during temperature treatment, while producing metal colloids – penetrate the neighbouring und upper glass layers, staining them from yellow, dark yellow to red-brown, depending on their composition. Diffusion Colours have a very high resistance against acids and alkali.

Besides the composition of the yellow stain also the structure of the glass is important for the intensity of dyeing. Components inside the glass such as arsenic, antimony and alkaline promote dark yellow tints.

The production process of the glass is another factor, which influences the dyeing: Glasses having been blown out in wooden moulds are more absorbing than the pieces having been manufactured in metal ones.

The following products are available:

<b>Indication number:</b>	<b>Content:</b>	<b>Type:</b>
<u>Silber-Ätze</u> (Silver Etch Stain)	<u>medium content of silver</u>	<u>P 73 021</u>
<u>Silber-Ätze</u> (Silver Etch Stain)	<u>high content of silver</u>	<u>P 73 028</u>
Rotbraun-Ätze (Redbrown Etch Stain)	high content of silver	P 76 050
Silberdiffusionsfarbe (Silver Etch)	very high content of silver	P 76 060

### Processing

Diffusion colours are suitable for application by brush, for spraying and for screen process printing for decals.

They are suppler than the glass enamels and can be applied by brush smoothly and evenly. In this process, the use of hard combustible resinous varnish does not play a role, because the stain material remains on the surface during burning and does not merge with the basic glass. After firing, the brown supporting material must washed off with water from the decorated pieces.

With a second firing of the decoration – without taking off the supporting material – you can intensify the colour shade essentially.

All stains must disperse with oily media.

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Water containing printing oils or grind media are only suitable for the types P 70021 and P 73028. Red brown etch stain P 76050 and P 76060 contains water soluble components and can be mixed with water friendly mediums only if they contains no water. Use alcohol or glycol for thinning.

**Silver Etch Stain P 73021**  
**Silver Etch Stain P 73028**

With both products, decorations can be performed on leaded crystal, glass of normal use and coloured glass windows.

On soft glasses, containing lead and pot ash richly, as well as on glasses having a low lead content, you can achieve a dark yellow amber tone with those colours on hard soda-chalk glasses the staining will be considerably lighter.

**Red Brown Stain P 76050**

This stain was developed especially for glasses of chemical apparatuses. (for example duran) and shows a dark red-brown tinting on the surface.

This stain is mainly applied to the graduation of ampoules, to measuring cylinders, heat resistant cooking utensils and so on.

The application to glass of normal use is also possible.

**Silver Etch Stain P 76060**

P 76060 is specially conceived for borosilicate glass.

When using float borosilicate flat glass, that side of the glass, which is turned away from the dip, should be used for decorating. Otherwise faults can arise by disturbed firing because of sticking residues of tin particles.

**Decorating Auxiliaries:**

**Brush Application:**

a) Turpentine oil and 0000/3 Dammarcoat or 21 new Bodied oil  
Mixed with 0405 Printing medium, oily

b) 0509 Printing medium, water compatible

(here used as painting oil)

c) Paste for screen printing (based on oil 0405)  
to be thinned with turpentine oil to paintable consistency

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**Direct Screen Print Process:**

- a)0405 Screen printing medium, oily
- b)0509 Screen printing medium, compatible with water

**Indirect Screen Print Process (Decals):**

- a) 0465 Screen printing oil for transfers  
for manual and semi-automatically printing
- b) 0728 Screen printing oil for transfers  
for fully automatic printing
- c) 0782 or 0782 thix Screen printing oil for transfers

**Covercoats:**

0601 and 0601 thix Covercoats for manual and automatic printing

Recommended screen: 30 mesh/cm

**Resistance**

Stain decorations have the advantage, that they have the same mechanical and chemical solidity as the basic glass.

For example coloured window glass decorations f.e. sacral glass decoration becomes weatherproof and graduations on chemical and medical glasses are resistant to acids, alkali and sterilisation liquids.

Silver Stains are free of lead and cadmium.

**Firing**

Depending on the kind of glass the burning-in temperature should be adjusted as high as possible and in no case below 580 ° C.

An extended soak time (depending on the type of glass and type of kiln) guarantees complete diffusing of the silver ions into the glass, this means: the higher/ longer is the temperature/ soak time, the darker will be the decoration.

In each case you have to adjust the firing temperature, object temperature and firing cycle to the items to be decorated and to the type of kiln.

In the temperature range up to about 450 ° C – in which organic media and covercoats decompose – the kiln should have a very effective ventilation.

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Defected appearances in the form of a metallic lustrous film after firing are caused by oversaturation; they can be taken away by the help of a 10 % nitric acid.

### Storage

Colour powders have the advantage of unlimited durability, if stored in dry condition.

The powders are a little bit of water-attracting (hygroscopic).

Before being processed with oily media, they should by all means be dried at a temperature of about 120 ° C, because a content of little more than 0,1 % water will lead to „cheesy“ pastes. In this case they can no longer be perfectly printed because they become thick.

Please take care to disperse the colour powder with the medium homogenously. In mixing the powder with the medium, small colour lumps will still remain. Therefore please use a three roll mill or dissolver.

Even in closed vessel the pastes for screen process printing have only a limited shelf-life. We advice you to store the pastes under cool conditions.

### Security Advices

Because ceramic colours are chemical products specific security advices have to be respected during processing.

The labels give notice about the respective dangers („R“- and „S“- sentences).

While processing it is most important to obey the hygienic precautions such as:

- Do not eat, drink or smoke while being at work.
- Do not inhale dust.
- Keep it away from food-stuff, beverage and fodder.
- In case of contact with skin: Wash off and rinse with water and soap.
- If having inhaled: Rinse mouth with cold water.

For more information please contact us or ask for a Material Safety Data Sheet.

### Forms of Delivery

Powder: Minimum purchase quantity per colour shade: 1kg

Screen printing paste: Minimum purchase quantity per colour shade: 1 kg

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