

<p>Techn. Information</p> <p>Version: March 2016</p>	<p>Resistant Onglaze Colour-Range "D" for Porcelain, Stoneware, Bone China, Vitreous China, Tiles</p> <p>Firing Range: 750°C – 900°C</p>	<p>Page: 1/6</p>
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General information

The "Range D" palette is suitable for normal firing (750 – 830 ° C / 3 h cycle and more) as well as for the conditions of fast - firing.

The fast-firing is performed in a 60 – 120 minutes cycle at temperatures from 850°C to 900°C.

Resistance

The decorations produced with the colours of the palette „ Range D" are fairly resistant to fruit acids.

The "Range D" colours are currently tested according to DIN 51031/32 (4 % acetic acid 24 hours at 22 + 2° C)

The determined values of lead and cadmium of different quality controls are generally far below the standard (DIN 51 032) being in force in Germany and in many European countries.

Dishwasher-Resistance

The usability of decorations in dishwashers is just as important as low release of heavy metals. However, up till today an obliging standard for durability tests in dishwasher machines does not exist. As accelerated test, EN 12875-4 can be used.

The resistance in dishwasher machines is good, as far as the decorations have been produced under best conditions. The colours do have a moderate dishwasher resistance under normal firing conditions.

Miscibility

The colours of the palette „ Range D " – except cadmium containing – are intermixable among each other.

Low additives of about 5 % of a non-cadmium colour to a cadmium colour are possible, but not ideal. The usage of higher admixing percentages will destroy the cadmium red colours.

Pastel tones can be achieved by admixing with Mixing-White D 9 T 1001.

Diluting with flux D FC 1000 will result in lighter colour tints.

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This flux can also be used as a covering flux for top printing the colours (improving the resistance).

The precious metal containing Purple Colours (Marking „DP 7 A 100X“) should only be intermixed among each other but not with other colours. Admixtures with White and / or Blue are possible.

Matt decorations can be achieved by adding Matt Additive RG 24. Depending on the desired matt effect, an addition of 10 – 30 % Matt Additive is recommended, for example:

Colour powder Range D:	80 weight units
Matt Additive RG 24:	20 weight units

By intermixing with Matt Additive the colours will appear lighter approximately according to the percentage of the mixing proportion.

The addition of Matt Additive does not affect the resistance of the colours, if processed optimally

Processing

„ Range D “ colours are generally suitable for nearly all kinds of applications, such as:

- direct screen printing
- indirect screen printing
- application by brush
- spraying and
- lining

Porcelain has got a lower expansion coefficient than the colours used for decoration; thus thick colour layers may crack or exfoliate after the firing process.

As a recommendation, the individual layer should not exceed 20µm thickness.

The layer thickness results from the processing conditions of the colour such as mixing rate, screen type, printing system etc.

In the case that several colours will be applied one above another, the total layer should not be thicker than 40 µm.

On ceramic bodies as per earthenware, Vitreous China or Bone China with a relatively high coefficient of thermal expansion than porcelain the given maximal values can be exceeded.

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Brush Application:

a)

Turpentine oil and 0000/3 Dammar Coat or 21 New Bodied oil

May be mixed with printing 0405 printing medium, not water-mixable.
Addition according to the need

b)

Screen printing paste (based on 0405)

To be thinned with turpentine oil to painting consistency
Addition according to the need

c)

0509 Screen printing oil, compatible with water

Addition according to the need
To be thinned with water

Lining:

0513 Lining medium, compatible with water

Orientation recipe:

Colour: 100 g
Oil 0513: 32 g
Water: 60 g

Spraying:

0000/2 Spraying oil

Preparation:

Colour powder: 55 – 65 % in weight
Spraying oil: 45 – 35 % in weight

To be ground finely, a ball mill must be used for 5h minimum.

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For preparing oily mixtures, the colour powder has to be completely dry. Even little moisture having been attracted during storage, will lead to „cheesy“ pastes, which can no longer be processed perfectly. Thus, we recommend drying the colour powders at 120 ° C before preparing. The usage of a triple roller mill is highly recommended.

Direct Screen Print Process:

a)
0405 Screen printing medium, oily

Ratio of pasting:
 Colour powder: 60 – 70 % in weight
 Printing oil: 40 – 30 % in weight

b)
0509 Screen printing medium, compatible with water

Ratio of pasting:
 Colour powder: 60 – 70 % in weight
 Printing oil: 40 – 30 % in weight

Recommended screen:

Polyester: 77 – 130 threads/ cm
 Steel: 200 – 350 threads / inch

Decals

a)
0721 or 0782 thix 2.5 Screen printing oils for transfers
for manual, semi-automatic and fully automatic screen printing

b)
Ratio of pasting:
 Colour powder: 100 parts in weight
 Oil 0721 and thix versions : 50 parts in weight
 Oil 0782 and thix versions : 45 parts in weight

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Recommended screens :

Polyester: 77 – 130 threads/ cm
Steel: 220 – 350 threads / inch

Covercoats:

a)
0601 and 0601 thix (fluid and thixotropic)

for manual or automatic screen process printing

b)
0693 Antiblock covercoat

Recommended screens :
Polyester 21 to 30 threads/ cm

Firing

„ Range D “ colours do require a certain minimum temperature, in order to melt up to a homogenous glossy layer.

The firing temperature depends on the factors:

- objects to be decorated (softening point of the glaze),
- thickness of applied layer of colour
- type of kiln

The softer the glazes, the lower the temperature can be adjusted.

A higher temperature is required for the flowing of the enamels at shorter peak times.

A short peak time is optimal, because in this case the flux will not dissolve the colour particles too much; nevertheless, here you should observe a good temperature equalization of the fired goods.

If the firing temperature is too low, it will affect the release of lead unfavourably. Cadmium colours are sensitive to high temperatures and to a bad atmosphere inside the kiln (depending on the layer thickness).

In the temperature up to about 450 ° C – in which organic medias and covercoats decompose – the kiln should exhaust very effective.

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Security Advices

Ceramic colours are chemical products. For processing these, you have to consider specific security advices.

The labels give notice about the respective dangers (health and safety advices). The colours contain lead.

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. (MSDS).

Forms of Delivery

Colour powder: Minimum purchase quantity per colour shade: 5 kg

Screen printing paste: Minimum purchase quantity per colour shade: 5 kg

Storage

Colour powder grants the advantage of unlimited durability; if stored in dry condition.

The powders are a little bit hygroscopic. Before being processed with oily media; they should absolutely be dried at a temperature of about 120°C, because a content of little more than 0,1 % water leads to „cheesy“ pastes. In this case, they can no longer be perfectly printed, as 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 remain. Therefore, please use a three roller mill or a dissolver.

Even in closed vessels, the colours pasted with screen printing oil have only a limited shelf-life. We advice you to store the pastes under cool conditions.

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