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General Informations

Screenprinting Media are used to prepare color pastes of ceramic colors in powder form, which are ready for screen-printing. They are solutions of thermoplastic resins in solvents. The resins decompose during the firing process without residue.

The condition for a successful processing of the color pastes is the selection of optimized printing media. The most important criteria for a suitable printing medium are:

- Printing properties (areas or halftone)
- Wetting properties
- Pigment dispersion
- Elasticity
- Drying time
- Block resistance of stored decals
- Re-solubility when overprinted with covercoat
- Burn-off properties

There is no perfect screenprinting medium for all types of applications. It is necessary to select the most suitable product for specific usage conditions.

Application:

We distinguish between printing media for direct screen-printing and indirect screen-printing (decals).

Most media can be used for porcelain as well as glass colors and can be processed by hand- and automatic printing.

Pasting ratio:

The mixing proportion between color powder and printing medium has a significant influence for the quality of the firing result.

The optimum mixing ratio is between 100 weight parts of color powder and 50 – 100 weight parts of screen printing medium.

In case of a lower proportion of screen printing medium firing faults in form of pinholes may occur.

If the proportion of screen-printing medium is too high, there is a risk that decals may stick together during storage.

Important parameters are the specific weight and the particle size distribution of the color powder, as well as the desired intensity of the color, as the mesh size of the screen as the type of motive to be printed.

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Critical Volume Ratio of Color Powder/Binder:

Ceramic colors are made from pigments and fluxes. Due to the different types of pigments and fluxes they may have a different specific weight. Especially leadfree colors show lower density compared to lead-containing colors. To achieve the same viscosity a higher proportion of printing medium will be necessary.

Also the particle size of the colors influences the pasting ratio. Smaller particle size results in a higher specific surface and more printing medium is needed. Colors like inclusion pigments and purple cannot be grinded as fine and need different pasting ratio.

To guarantee a perfect firing result it is necessary to achieve a good dispersion so that the color powder is completely coated by the binder resin. This is only possible, if the volume relation of color powder/(color powder+binder) does not exceed the critical value of approx. 0,5.

Examples:

100 g of a lead-containing color powder of density 4 have a volume of $100/4 = 25$ ml.
70 g of a screen-printing medium (Density approx. 1) with a binder content of 40% have a binder volume of 28 ml.

The volume ratio color powder/(color powder+binder) is in this case:

$$25/(25+28) = 0,47$$

For a leadfree color powder of density 2 the result is for the same mixing ratio:

$$50/(50+28) = 0,64$$

In this case the binder content is far too low to ensure an optimum firing result.

Pasting

Colors are normally supplied by us as powders and can be stored under dry conditions for unlimited time.

The color powders are slightly hygroscopic. Before preparing a color paste it is recommended to dry them at 120°C. Even a content of only about 0,1% water can lead to "cheesy" like pastes which cannot be printed well.

For optimum pigment dispersion color and printing medium are mixed with a kneading machine and homogenized with a three-roll-mill.

If printing media with very good wetting properties are used, the homogenization of color powder and printing medium with a stirrer may be sufficient.

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Printing:

For the printing process polyester and steel fabric may be used. Steel fabric is giving less trouble with electrostatic charging during the printing.

The screen-opening of steel fabric is larger than of polyester screens of same mesh size, so it is possible to print with steel meshes a higher volume of color.

Depending on the kind of printing machine, the design and drying conditions liquid or thixotropic printing media have to be selected. The more half tone, the higher thixotropy is recommendable. As a compromise thix 2.5 has performed best.

The given drying times in a continuous dryer are approximate values because the drying times depend very much from the climatic conditions. In drying racks the necessary times will be longer.

The squeegee for ceramic printing should have a minimum hardness of 65 shore A. The more half tones the harder the squeegee up to 95 shore A. A very good solution is the "RKS"-squeegee.

Thinner:

The addition of thinners to printing media can be only recommended in case of strongly thickened products. Otherwise uncontrolled thinning may cause faulty printing and/or firing results, especially in case of decal printing.

The same is valid for color pastes. It is recommended to determine the solvent loss before replacing it by addition of new solvent.

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Products:

Printing-Media for indirect screen-printing (Decals)

Product-No.	Thixotropy	Solid-content %	Drying time in hours	Application	Comments
0465	no	46	1 - 4	Glass Porcelain	
0483	no	30	1 - 4	Glass Porcelain	
0721	no	45	1	Glass Porcelain	Standard oil
0721 thix	no	45	1	Glass Porcelain	Standard oil
0728	no	41	1 - 2	Glass Porcelain	
0729	no	28	1,5 - 2,5	Porcelain	
0729 thix	yes	28	1,5 - 2,5	Porcelain	
0782	no	45	1 - 3	Glass Porcelain	Best pigment wetting
0782 thix	yes	45	1 - 3	Glass Porcelain	Best pigment wetting
0738	no	40	Over night	Porcelain	Spezial medium for 1-Fire Gold unterlayers

Suitable Standard Thinner: 0468

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Printing Media for Direct Screenprinting

Product-No.	Thixotropy	Solid Content %	Drying time in hours	Application	Comments
0405	No	18	1 – 3	Glass Porcelain	Standard for direct printing
0480	No	16	1 – 3	Glass Porcelain	Breaking colors
0492	No	100	immediately	Glass, Porcelain	Thermoplastic, high viscous
0508	No	100	immediately	Glass, Porcelain	thermoplastic antistatic
0509	No	12	1	Glass, Tiles, Porcelain	Water-friendly
0551	No	5	1,5	Glass, Tiles, Porcelain	Water-friendly
0553	No	7	1,5	Glass, Tiles, Porcelain	Water-friendly
0564	Yes	100	immediately	Glass, Porcelain	Thermoplastic, low viscous

Firing

Colors can be fired at temperatures between 480 – 1400°C.
In the temperature range until approx. 400°C, when the organic components are decomposing, the kiln should be well ventilated.

Storage

Screenprinting Media should be stored in closed containers under dry and cool conditions. Partly used containers should be closed well. Rest quantities should not be poured back into the original containers.

When stored in closed containers the printing media are stable for minimum 2 years.

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Rüger & Günzel GmbH
Keramische Farben-Lacke-Siebdruckmedien
Ceramic Color-Covercoats-Printing-Media

Cabro
Edelmetallchemie
Precious Metals Chemistry



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Packing Sizes

5 kg, 10 kg, 25kg One way drums and 175 kg drums

Safety recommendations:

Printing media are chemical products which must be handled according to safety regulations.

During processing the following safety precautions have to be followed:

- Do not eat, drink or smoke while being at work.
- Do not inhale vapours
- Keep away from food-stuff, beverage and fodder.
- In case of contact with skin: Wash off and rinse with water and soap.

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

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