

Technical Information

DF45

35 Series – Lead Free Glass Colours

In this Technical Information Ferro presents the **35 Series**. This series comprises 12 lead free glass colours for the decoration of cosmetic flacons, drinking bottles, giftware etc. by indirect printing. The colours are usually delivered in powder form.

The main properties of the 35 Series colours are their colour intensity and brilliance.

The available colours are listed in table 1 and fig. 1.

Application

The colours of the **35 Series** have excellent processing properties in all common decoration methods like screen printing (direct and indirect), spraying, pad printing and brushing. For cleaning the equipment and screens we recommend cleaning oil 80 452.

Screen Printing (Direct and Indirect)

For direct and indirect screen printing we recommend polyester screens with 68-90 threads/cm (175-230 mesh/inch) or VA steel with 220-300 mesh/inch.

Media

For all standard methods, Ferro offers suitable media and covercoats. Further detailed technical information can be found in our **CerDePrint Media Guide**.

Storage

The colours should be stored in a dry place. Opened containers should be closed carefully. To ensure that the colours have not absorbed any humidity, we recommend drying the colour powder at approx. 130 °C prior to mixing.

According to our experience, pastes can be stored up to 6 months in originally sealed containers. We recommend using pasted colours as soon as possible. If the paste is too thick, the viscosity has to be adjusted by addition of a medium.

Miscibility and Compatibility

All colours of the 35 Series are intermixable. Mixtures that contain cadmium colours and/or purple colours should be tested under production conditions if the firing stability is sufficient.

Firing Conditions

The firing temperature range is between 600 and 650 °C.

The optimum firing result depends on the firing temperature, on the total firing time, the soak time and not least on the properties of the glass. To achieve an optimized firing result, we therefore recommend the user to check under his own individual conditions.

Expansion Coefficient

The expansion coefficient of the colours lies between 82 and 88 x 10⁻⁷/K.

Acid and Alkali Resistance

The alkali and acid resistance of fired colour layers is influenced by the thickness of the layer and the firing conditions. In lab tests and under industrial conditions, the colours of the **35 Series** are not resistant to acids and alkalis (test with 4% acidic acid, 22 °C, 5 h, as well as with 0.5 % Calgonite solution, 77 °C, 16 h).

Heavy Metal Release and Heavy Metal Content

All colours of the **35 Series** are controlled lead free and - with the exception of the three cadmium colours 13 35335, 13 35577 and 17 35776 - cadmium free as well, with the following upper limits: 300 ppm Pb and 200 ppm Cd.

Our safety data sheets, which are available for every product, provide you with useful advice for working with our products.

Fig. 1: The available 35 Series colours



11 35441 Green



12 35113 Blue



72 35195 Cobalt Blue



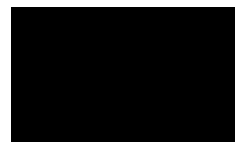
13 35332 Yellow



13 35335 Sun Yellow



13 35577 Tangerine



14 35887 Black



16 35223 Ochre



17 35727 Brown



17 35776 Red



77 35673 Purple

While every attempt has been made to reproduce colours exactly, the samples printed here may differ slightly from the finished ceramic products.

Table 1: The colours of the 35 Series

Product No.	Colour Shade	Pantone® Code ¹
11 35441	Green	3415 c
12 35113	Blue	285 c
72 35195	Cobalt Blue	2718 c
13 35332	Yellow	603 c
13 35335	Sun Yellow	107 c
13 35577	Tangerine	166 c
14 35887	Black	Process Black c
16 35223	Ochre	131 c
17 35727	Brown	181 c
17 35776	Red	1797 c
77 35673	Purple	258 c
19 35006	White	

¹ The above mentioned **Pantone®** code is only a guideline for the colour shade.

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