

Technical Information

PALETTE 70

Resistant Colours for Porcelain, Earthenware,
Bone china and Vitreous china

Reference no.	Colour shade	Normal firing 850-920° C	Fast firing		Pantone® code
			850-920° C	950- 1050°C	
11 870	linden green	+	+	+	7495 c
11 886	blue green	+	+	+	3155 c
11 887	reed green	+	+	+	329 c
11 888	chrome green	+	+	+	364 c
12 815	new blue	+	+	+	660 c
12 870	light blue	+	+	+	2975 c
12 872	blue	+	+	+	7455 c
13 871	yellow	+	+	+	7404 c
13 884	cadmium yellow	-	+	-	7405 c
13 886	cadmium yellow	+	-	-	7405 c
14 871	black	+	+	+	426 c
15 870	dark grey	+	+	+	black 7 c
15 872	mouse grey	+	+	+	415 c
15 885	grey	+	+	+	7543 c
15 886	blue grey	+	+	+	7544 c
16 870	antique gold	+	+	+	131 c
16 871	ochre	+	+	+	723 c
16 872	brown	+	+	-	483 c
16 873	red brown	+	+	+	499 c
16 875	chocolate brown	+	+	+	black 5 c
17 1871	cadmium orange	+	+	-	144 c
17 1872	cadmium red, light	+	+	-	166 c
17 1874	cadmium red, dark	+	+	-	1805 c
17 875	iron red	+	+	-	174 c
17 893	cadmium red, dark	-	+	-	1805 c
17 894	cadmium red	+	+	-	173 c

Reference no.	Colour shade	Normal firing 850-920° C	Fast firing		Pantone® code
			850-920° C	950-1050°C	
19 870	mixing white	+	+	+	
19 872	opaque white	+	+	+	
77 465	intensive purple	+	+	+	505 c
77 466	dark purple	+	+	+	506 c
77 467	medium purple	+	+	+	195 c
77 468	carmine rose	+	+	+	507 c
77 477	maroon	+	+	+	697 c
77 478	maroon	+	+	+	7420 c
77 479	purple	+	+	+	7433 c
77 480	carmine	+	+	+	7431 c
77 481	rose purple	+	+	+	702 c
78 811	cobalt blue	+	+	+	5265 c
10 117	mixing and coating flux	+	+	+	
10 140	mixing and coating flux	+	+	+	

+ recommended

- not recommended

The above mentioned **Pantone®** code is only a guide line for the colour shade.

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Miscibility

Palette 70 colours are generally intermixable

Exceptions

The cadmium containing brilliant yellow and red colour shades 13 884, 13 886, 17 1871, 17 1872, 17 1874, 17 893, 17 894 can only be mixed with one another.

According to our experience mixings with up to 5 % of green, blue, black or flux 10 117 are possible without any problems. Extreme firing conditions or very thin colour deposits can negatively influence the stability of mixing colours.

The colours 16 873 red brown and 17 875 iron red, containing iron oxide, are compatible with all other completely intermixable colours. Combinations with these both colours should not contain less than 50 % of 16 873 red brown or 17 875 iron red.

Only the recommended colours should be mixed for fast firing process. Please refer to the recommendations in our colour chart.

Creating pastel tones

We recommend adding 19 870 mixing white to obtain pastel tones.

These mixtures must, however, be tested under individual processing conditions before use.

To lighten and to overprint

To lighten and to overprint purple colours we recommend transparent flux 10 140, for all the other colours we recommend transparent flux 10 117.

Overprinting with transparent flux 10 117 improves resistance and gloss of all **Paletto 70** colours

Application

The Palette 70 colours have excellent processing characteristics in all conventional decorating methods including:

Screen printing (direct and indirect)

Spraying

Machine lining and banding

Hand painting

Screen printing**Cadmium colours**

13 884, 13 886, 17 1871, 17 1872, 17 1874, 17 893 and 17 894:

Polyester screen 73-90 threads/cm (= 185-230 mesh/inch)

Purple colours

77 465, 77 466, 77 467, 77 468, 77 477, 77 478, 77 479, 77 480, 77 481 and iron red 17 875:

Polyester screen 120-140 threads/cm (= 300-355 mesh/inch)

All other colours:

Polyester screen 77-120 threads/cm (= 195-300 mesh/inch)

Machine lining and banding

Colour suspensions that are applied via brushes, steel- or neoprene-rollers are generally based on water-soluble media. We supply colour pastes which should be adjusted on the correct processing viscosity by adding distilled water and/or alcohol.

Spraying

Colour suspensions for spraying application can be produced with oil-based media as well as with water-soluble media.

Manufacture of colour pastes and colour dispersions

For all traditional application processes please refer to our leaflet [Manufacture of colour pastes and colour dispersions](#). This covers decoration by screen printing, machine banding and lining and spraying.

Media

Ferro offers suitable media and covercoats for all standard applications.
For further detailed information please refer to our [CerDePrint Media Guide](#).

Firing

Normal firing

Porcelain
800-850 °C / 3-10 h
Optimum firing temperature: 830 °C

Earthenware
Minimum 770 °C
Optimum firing dependant on glaze type

Fast firing on porcelain in continuous kiln (roller kiln)

- a) 850-920 °C
firing cycle 60-120 min.
- b) 950 -1050 °C
firing cycle 60-120 min.

Colour Deposit

The maximum colour deposit depends on

- composition of the colour
- sintering grade with the glaze
- firing cycle
- body
- glaze
- shape of the decorated surface.

Too thin colour deposits obtain uneven or matt colour surfaces. If the colour deposit is too thick the colours tend to crack and lose resistance.

Recommended Colour Deposit (after firing)

a) Porcelain

(linear thermal expansion approx.: $40-45 \cdot 10^{-7}/K$)

up to 15 μm (fired colour layer)

for the colours 11 870, 12 870, 15 870, 15 872, 16 872, 16 873 and 16 875.

up to 20 μm (fired colour layer)

for all other colours as well as for the fluxes 10 117 and 10 140.

On heavily curved bodies with a lower linear thermal expansion ($<40-45 \cdot 10^{-7}/K$) the colour deposit should be well below the above mentioned values.

b) Bone China, Earthenware and Vitreous China

(linear thermal expansion: $> 55 \cdot 10^{-7}/K$)

If body and glaze are highly compatible, the above mentioned values can be exceeded

Iron red 17 875 develops its characteristic colour shade when printed in a thin layer.

The total colour deposit (including coating flux) should not exceed the recommended values.

Resistance

The **Palette 70** colours have been tested for lead and cadmium release, and dishwasher resistance.

Heavy metal release

Heavy metal release is primarily influenced by glaze composition, firing cycle, kiln atmosphere and colour deposit. Therefore each user is required to test all products manufactured under their own production conditions to verify that they conform to the appropriate standards.

If colour deposits are too thin, firing temperatures are too high, or firing goes on too long at peak temperature, heavy metal release can be higher.

The colours are tested according to DIN 1388.1/2.

Results: Release values are considerably below the values stipulated by DIN EN 1388.1/2

Dishwasher and Acid Resistance

The resistance of fired **Palette 70** colours to acidic foods and dishwasher attacks is influenced by colour deposit, firing conditions and glaze.

The colours are tested according to DIN EN 12875.1-2.

Storage

Powder colours should be stored in a dry place. In order to ensure that the colours have not absorbed any humidity, we recommend drying the powder colour at approx. 130 °C prior to mixing.

Safety Data Sheets

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

Quality

All Ferro products are manufactured according to stringent specifications, and thoroughly tested before leaving our premises. Ferro's quality control procedures are warranted by DIN EN ISO 9001, and certification is carried out annually.

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