Technical Information

DF71

Performance Coatings

Carnival*100* Lead Free Onglaze Colors for Porcelain, Bone China, Vitreous China, and Earthenware

In this Technical Information Vibrantz presents the **Carnival*100*** onglaze colors. This series comprises 23 lead and cadmium free colors as well as four supplementary cadmium colors. Designed for a firing range from 800 °C (normal firing) up to 950 °C (fast firing), these colors reach their optimum regarding brilliance, mechanical and chemical resistance generally at firing temperatures from 850 to 900 °C.

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

Application

The colors of the **Carnival*100*** range have excellent processing characteristics in all conventional decorating methods like screen printing (direct and indirect), spraying, lining and banding as well as hand painting. For cleaning the equipment and screens we recommend cleaning oil 80 452.

Color Deposit

The maximum color deposit depends on the firing cycle, the body, the glaze, and the form of the decorated surface as well as on the sintering grade of the color in combination with the glaze. Too thin layers may result in an uneven, matt surface; too thick layers of color may lead to chipping or cracking.

Screen Printing (Direct and Indirect)

For direct and indirect screen printing, we recommend polyester screens with 77-140 threads/cm (195-355 mesh/inch) or VA with 270-400 mesh/inch.

Spraying

Color suspensions for spraying application can be produced with oil-based media as well as with water-soluble media. Water containing color suspensions with purple colors should be consumed immediately and not be stored for a longer time.

Machine Lining and Banding

Color suspensions applied with brushes, steel- or neoprene-rollers are generally based on water-soluble media.

Media

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

Storage

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

Miscibility and Compatibility

All colors of the **Carnival*100*** range are intermixable, with very few exceptions. The exceptions are the supplementary cadmium colors, these are miscible only with each other. In any case, we recommend to test mixtures under the specific processing conditions prior to use.

Firing Conditions

The firing range for porcelain in fast firing conditions (60 to 90 minutes) is between 850 and 950 °C, in normal firing conditions 800 to 900 °C.

On bone china, the firing temperature ranges in fast firing from 850 to 900 °C, in normal firing from 800 to 880 °C. The cadmium colors are not suitable for fast firing.

It is absolutely necessary to apply lead free colors on lead free glazes. Due to the reactions between color and glaze the surface of lead containing glazes may be altered chemically during firing and considerable amounts of lead can be released. Lead free products should not be fired together with those containing lead as the resulting emissions could have adverse effects on the heavy metal release. Lead free colors could then be contaminated with lead.

Acid and Alkali Resistance

The alkali and acid resistance of fired color layers is influenced by the thickness of the layer, the firing conditions, and the glaze. The colors of the **Carnival*100*** series show in laboratory tests and under industrial conditions no visible acid attack (tested with 3% hydrochloric acid, 20 °C, 5 h). A few colors show a slight alkali attack (tested with 0.5% Calgonite solution, 77 °C, 16 h).

Heavy Metal Release and Heavy Metal Content

The colors of the **Carnival*100*** range are controlled lead and cadmium free, with the following upper limits: 100 ppm Pb and 600 ppm Cd. The cadmium colors are lead free with an upper limit of 100 ppm Pb. However, it is still necessary that the end user tests the heavy metal release according to the relevant standard procedures for all products manufactured under his technical production conditions.

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

Fig. 1: The available Carnival*100* colors


11 57471 Chrome Green


11 57472 Blue Green


11 57473 Apple Green


12 57171 Cyan


12 57172 Light Blue


12 57014 Cobalt Blue


12 57174B Cyan Blue


72 57190 Derby Blue


72 57193 Delft Blue


13 57371 Light Yellow


13 57372 Ochre


14 57871 Black

Fig. 1: The available Carnival*100* colors (continued)


15 57875 Light Grey


16 57871 Light Brown


16 57872 Dark Brown


77 1640 Rose


77 1641 Medium Purple


77 1642 Dark Purple


77 1643 Pink


77 1644 Maroon


77 1645 Dark Maroon


77 1650 Purple


77 1651 Light Purple


13 57301 Yellow


17 57701 Orange


17 57702 Light Red


17 57703 Red

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

Table 1: The Carnival*100* colors

Product-No.	Color Shade	Pantone®-Code[1]
10 57070	Flux Transparent	
11 57471	Chrome Green	364 c
11 57472	Blue Green	569 c
11 57473 [2]	Apple Green	377 c
12 57171	Cyan	314 c
12 57172	Light Blue	2985 c
12 57014	Cobalt Blue	072 c

Product-No.	Color Shade	Pantone®-Code[1]
12 57174B	Cyan Blue	307 c
72 57190	Derby Blue	2746 c
72 57193	Delft Blue	289 c
13 57371	Light Yellow	603 c
13 57372	Ochre	1225 c
14 57871	Black	Black 7c 2X
15 57875	Light Grey	Cool grey 7 c
16 57871	Light Brown	157 c
16 57872	Dark Brown	1685 c
77 1640	Rose	203 c
77 1641	Medium Purple	207 c
77 1642	Dark Purple	208 c
77 1643	Pink	197 c
77 1644	Maroon	702 c
77 1645	Dark Maroon	201 c
77 1650	Purple	7420 c
77 1651	Light Purple	7634 c
19 57071	White	
19 57072	Mixing White	
13 57301[2]	Yellow	116 c
17 57701[2]	Orange	151 c
17 57702[2]	Light Red	172 c
17 57703[2]	Red	1795 c

Pantone® is a registered trade mark of **Pantone Inc.**

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

2 Cadmium colors.