

Lead-Containing System Technical Data

Performance Colors & Glass

VR System

Main Market Use

These enamels are recommended for decoration of soda-lime glass packaging, more particularly single-trip and multi-trip bottles.

This System can also be used for special applications, such as color-break enamels for pharmaceutical borosilicate glass ampoules.

Chemical Composition

Colors in this System contain lead and cadmium. We guarantee a lithium content of maximum 30 ppm.

| COLOR | REFERENCE | Pantone |
|-------------|-----------|---------|
| DARK GREEN | VR 99.59 | 342 C |
| GREEN | VR 231 | 370 C |
| BLUE | VR 209 | 2935 C |
| COBALT BLUE | VR 208 | 2735 C |
| YELLOW | VR 241 | 109 C |
| YELLOW | VR 242 | 116 C |
| RED | VR 270 | 1795 C |
| DARK RED | VR 272 | 186 C |
| ORANGE | VR 261 | 1505 C |
| BROWN | VR 280 | 175 C |
| WHITE | VR 290 | |
| FLUX | VR 725 | |
| BLACK | VR 285 | |
| ETCH | VR 296 | |

The Pantone references and color prints are provided as an indication of the shade only.

The above mentioned references are randomly selected color shades, please contact your respective Ferro Technical Service to get more information on further available colors.

The above mentioned references refer to the powder form only. If you want the thermoplastic paste, liquid paste or spraying form, make sure to add the suitable name of the medium – mentioned on page 5 – at the end of the reference.

These colors are intermixable. We recommend performing preliminary tests before launching production with color mixtures from this System.

Additional colours are available on demand.

Our technical service teams also offer a full custom-color matching service.

Expansion Coefficient (C.o.E.)

This system is suitable for most chemical compositions used in the production of soda-lime glass bottles.

Recommended Firing Conditions

600°C to 630°C in a cycle of 1 h-1.5 h, with a soaking period of 1 approx. 10 min, dependent on both the type of furnace and the volume of ware fired.

It is also possible to fire the VR System at a temperature of 600°C-700°C in short cycles, such as used for pharmaceutical glass bottles. Tests are recommended.

Chemical Resistance

Norm EN 1388-2 (tests on the basic flux system in laboratory conditions)

- Lead release is < 10 mg/dm² of the decorated surface.
- Cadmium release is < 1.5 mg/dm² of the decorated surface.

Acid resistance: 4

Alkali resistance: 4

Limitation of Warranty and Liability

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