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Lead-Free System Technical Data

Performance Colors & Glass

VNS System

Main Market Use
These lead-free enamels are recommended for decoration of soda-lime packaging single-trip non- returnable bottles, where chemical durability is not an issue.

Chemical Composition
Colors in this System do not contain voluntary additions of heavy metals – Pb, Cd, Hg and Cr^{6+}.
Exceptions are the cadmium-containing green, yellow, reds and oranges (marked * below) which need to use cadmium pigments, to provide the color tones required by the market.

COLOR	REFERENCE	Pantone
GREEN	VNS 1600	7483 C
GREEN	VNS 1619	341 C
BLUE	VNS 2600	286 C
BLUE	VNS 2635	624 C
WHITE	VNS 9620	-
RED	VNS 7600 *	711 C
YELLOW	VNS 3601 *	3965 C
ORANGE	VNS 7609*	1375 C
BROWN	VNS 6609	188 C
BLACK	VNS 4600	
FLUX	VNS 849	-
ETCH	VNS 601	-

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
From 600°C to 630°C in a cycle of 1 h-1.5 h with a soaking period of approx. 10 min, dependent on both the type of furnace and the volume of ware fired.
We recommend an oxidising atmosphere to give optimal fired appearance and brightness. It is essential to maintain good ventilation, and an efficient extraction of the combustion gases and the products resulting from decomposition of the medium.

Chemical resistance
Acid resistance: 6
Alkali resistance: 7

Limitation of Warranty and Liability

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