

## LEAD-FREE SYSTEMS TECHNICAL DATA

### VNR Plus System

#### Main Market Use

These lead-free enamels are recommended for decoration of soda-lime glass packaging, more particularly **multi-trip bottles**. They are the most durable of the lead-free systems for packaging glass on the market.

#### Chemical Composition

Colors in this System do not contain voluntary additions of heavy metals – Pb, Cd, Hg and Cr<sup>6+</sup>.

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	Coca-Cola/Pepsi Cola	REFERENCE	Pantone
GREEN	VNR 1431 *	349	White	VNR 9407	
BLUE	VNR 2414	2985	Coke Red 2000	VNR 7418 *	186
BLUE	VNR 2419	640	Sprite Blue	VNR 2416	293
YELLOW	VNR 3414 *	102	Sprite Yellow	VNR 3417	107
RED	VNR 7424 *	485	Fanta Blue	VNR 2439	661
ORANGE	VNR 7408 *	021c	Fanta Green	VNR 1412	360
BROWN	VNR 6407	490	Pepsi Red	VNR 7452	174
WHITE	VNR 9407		Pepsi Blue	VNR 2417	293
BLACK	VNR 4403		Montain Dew Red	VNR 7452	174
FLUX	VNR 401		Montain Dew Green	VNR 1427	380
AcE IMITATION ETCH	VNR 9426		Teem Yellow	VNR 3434	107
			Coke Zero Black	VNR 4403	
			Mirinda Green	VNR 1415	347

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

These colors are intermixable. We recommend performing preliminary tests before launching production with color mixtures from this System, especially for combinations of red or yellow cadmium-containing colors (marked \*) with any other colors.

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 630°C to 650°C (1165-1200°F) in a cycle of 1 h -1.5 h or more with a soaking period of approx. 10 min, dependant 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 : 4

Alkali resistance : 5