

VPS System

Main Market Use

These low expansion lead-free enamels are specially designed for decoration of low expansion borosilicate glasses, such as alkali boro-silicate glass.

Chemical Composition

Colors in this System do not contain voluntary additions of heavy metals – Pb, Cd, Hg and Cr⁶⁺.

Exceptions are the cadmium-containing yellow, reds and oranges (marked * below) which need to use cadmium pigments, to provide the color tones required by the market.

VPS System contains lithium and we do not recommend these enamels for the decoration of pressurised containers.

COLOR	REFERENCE	Pantone
GREEN	VPS 1100	349
EMERALD GREEN	VPS 1101	322
ROYAL BLUE	VPS 2102	2945
ULTRAMARINE BLUE	VPS 2101	302
YELLOW	VPS 3100 *	102
YELLOW	VPS 3130	128
ORANGE	VPS 7101 *	Orange c
RED	VPS 7100 *	485
DARK RED	VPS 7103 *	201
BROWN	VPS 6100	4705
WHITE	VPS 9102	
BLACK	VPS 4100	
FLUX	VPS 857	

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.)

Avg C.o.E. measured on the basic frit System is $60 (\pm 4) \cdot 10^{-7} \text{K}^{-1}$.

The enamels are specially formulated for application onto borosilicate glass and they should be tested for suitability to the expansion of the glass to be decorated. The 'fit' of these enamels is also dependent on application weight and to avoid microcracking or fracture problems, they should not be applied too thickly.

Recommended Firing Conditions

From 630°C to 640°C (1165-1185°F) in a long cycle; from 630°C to 700°C (1165-1290°F) in a short cycle. Enamels from this System are sensitive to overfiring. We recommend an oxidising atmosphere to give optimal fired appearance, gloss 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 : 7

Alkali resistance : 7