HOLLIDAY PIGMENTS

Ultramarine and Manganese Violet for Powder Coatings

Quality Pigments for the Powder Coatings Industry

The rise in the use of powder coatings for applications has led to an increase in demand for pigments with high durability. Holliday Pigments has undertaken a comprehensive testing programme to study the durability of ultramarine and manganese violet in exterior grade powder coatings.

The results of the durability tests confirm that ultramarine and manganese violet pigments are the ideal choice for the coloration of powder coating systems. Their performance was shown to be comparable to that of other widely used pigments in powder coating applications.

Outstanding features of the Holliday Pigments' range are:-

- Excellent colour consistency
- Exceptional heat stability and lightfastness
- Non migratory
- Easy to disperse
- Worldwide food contact approval
- Completely safe for toys

Durability of Ultramarine and Manganese Violet Pigments in Powder Coatings

Durability Tests

The tests compared the performance of different grades of Holliday Pigments' ultramarine blue, ultramarine violet and manganese violet with that of phthalocyanine, a blue pigment widely used in exterior grade powder coating applications. A control panel with titanium dioxide was also included.

Summary of Results

- Confirmed the excellent durability of Holliday Pigments' ultramarine blue and violet.
- Ultramarine and manganese violet performance is comparable to that of phthalocyanine.
- Industry standards of performance were met in both the deep and the pale shade panels after 1000 hours of exposure.
- The durability of ultramarine blue is further improved when used in a super durable resin system.
- Ultramarines are ideal for use in the colour correction of powder coating systems.

Experimental Detail

Formulation

The testing programme investigated the durability of the pigments in two different polyester/TGIC (Triglycidylisocyanurate) resin systems, a standard resin and a super durable resin.

The grades of pigment used were as follows:

Premier RX - a fine particle size ultramarine blue

Premier RM - a medium particle size ultramarine blue

Premier AR - an acid resistant ultramarine blue

Premier VU - Ultramarine violet

Premier VT - a red-shade manganese violet

ß-phthalocyanine blue

All pigments were tested at two depths of shade.

Pale Shade

The pale shades were prepared at approximately 1/9 Standard Depth and these formulations contained 20 parts of titanium dioxide.

Deep Shade

The deep shade formulations contained 1 part of titanium dioxide.

In order to maintain the same pigment loading in all formulations a filler pigment, blanc fixe, was included to give a total pigmentation of 35 parts.

A control panel containing only titanium dioxide/blanc fixe was produced. Premier RM and Premier VU were formulated at colour correction levels.

Exposure Tests

Accelerated testing was carried out using an Atlas Ci 3000 Weatherometer. Panels were exposed under the following conditions for 1000 hours:

Irradiance	0.47 w/m^2
Relative humidity	65%
Wet/dry cycle	18 min. wet/102 min. dry
Temperature	65°C dry bulb

Any change in colour of the exposed panels was monitored at 200 hour intervals.
The colour difference (DE) compared to a corresponding unexposed panel was measured at each time interval. The graphs overleaf illustrate the results obtained after 1000 hours exposure.

Results - standard resin system

The results are summarised as follows:
All the pigments give excellent performance in the standard resin system. A level of 3 units DE colour change is the benchmark figure generally acceptable in the powder coating industry.

There is little difference, within experimental error, between the performance of the respective pigments at either depth of shade.

Pale Shades

These gave a total colour difference after 1000 hours exposure of less than 3 units
(See Fig. 1 overleaf).

Deep Shades

The deep shade panels showed a slightly higher degree of colour change, but still within the 3 unit mark
(See Fig. 2 overleaf).

Results - super durable resin system

This test was carried out using Premier RX which gave a superior performance in the super durable resin system compared with the standard system, especially in deep shade. Fig. 3 (overleaf) compares the results obtained in the two resin systems, for both pale and deep shade.

The Use of Ultramarines in the Colour Correction of Powder Coating Systems

Ultramarine pigments are ideal for the toning of whites to give more aesthetically pleasing shades. Ultramarine blues tend to produce "cold" whites whereas the violets give "warmer" tones. Such use of blue and violet pigments for the toning of white is often referred to as "colour correction".

Fig. 4 overleaf illustrates the excellent colour stability of ultramarine blue (Premier RM) and ultramarine violet (Premier VU) when incorporated into powder coating formulations at the low addition levels necessary for colour correction. The graph also illustrates the performance of the titanium dioxide panel which exhibited little colour change.

Conclusion

- The results show that the durability of Holliday Pigments' ultramarine and manganese violet pigments is excellent.
- After 1000 hours exposure the colour change in both the deep and pale shade panels remained within fully acceptable limits.
- The performance of all the inorganic pigments was similar to that of phthalocyanine blue.
- Excellent performance at the low levels of addition necessary for colour correction.
- The durability of ultramarine blue is further improved when used in a super durable resin system.

Ultramarines and manganese violets also offer additional benefits to formulators with their unique colour, excellent heat stability and lightfastness, non-toxicity, and ease of dispersibility. These advantages combine together to make them the ideal choice for the coloration of powder coatings, whether in deep or pale shades, or for the colour correction of whites.

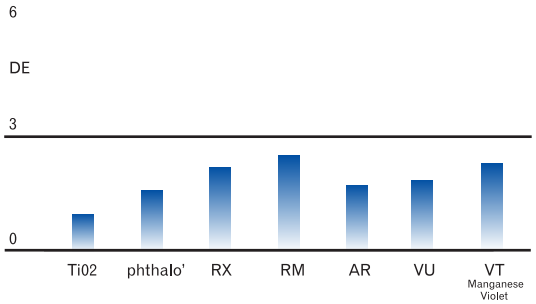

Fig. 1: Pale Shade
- standard resin system.

Colour difference results after 1000 hours exposure

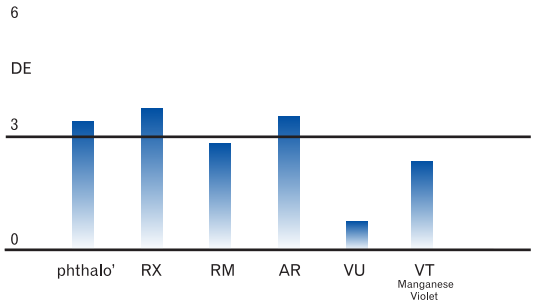

Fig. 2: Deep Shade
- standard resin system

Colour difference after 1000 hours exposure

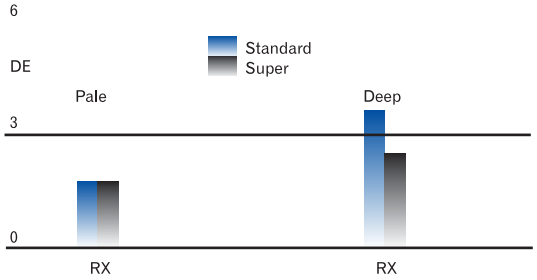

Fig. 3: Performance of Premier RX in standard and super durable systems

Colour difference after 1000 hours exposure

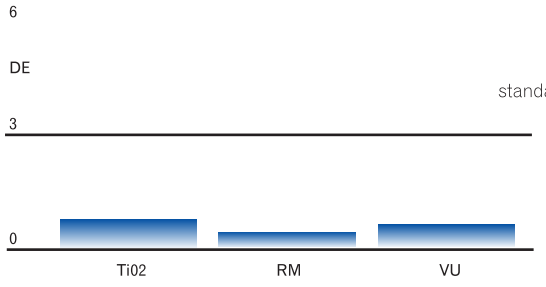

Fig. 4: Colour correction of standard resin system

Colour difference after 1000 hours exposure

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Or from your Holliday Pigments' agent

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