COLOUR ACCURACY

COLOUR ACCURACY WHEN TINTING DIFFERENT PAINT TYPES

PROPRIETY COLOUR SYSTEMS

Major paint manufacturers and suppliers market their own standard colour range. They present their colour range in the form of various colour charts, fan decks, folders or in-store colour chip displays. Each standard colour is formulated for specific products, tinted according to a unique tint formula.

For example, Dulux has the “Dulux Colour Specifier,” which is quite specific to the Dulux Premium decorative brands such as Wash & Wear 101 (gloss, semi gloss low sheen and flat), Aquanamel (gloss and semi gloss) and Weathershield (gloss, semi gloss and low sheen). All these products are “tint strength aligned” which means that the colour will be a Class 1 match if tinted accurately according to the Colour Specifier Formula Book. The Colour Specifier formulae only refer to the Decorama decorative paint tint system, and only for Dulux Premium decorative brands.

There are also standard colour systems, such as British Standard BS 4800 Colours, British Standard BS381C Colours, the European RAL Colours, and the Standards Australia AS 2700 colours.

The AS2700 colour range consists of around 200 standard colours designed for Specifiers to select colours for pipeline identification, line marking, safety demarcation and other engineering purposes. [The AS2700 colour standards are the intellectual property of SAI Global and available from their on-line shop.]

DOES COLOUR VARY WITH GLOSS LEVEL?

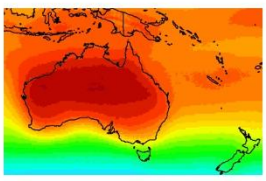
Yes. There is a perceived variation in colour between flat, low sheen, semi gloss and gloss surfaces; the glossier a product is, the darker the colour appears. This is because at lower gloss levels (i.e. flatter surfaces), light directed onto the surface is scattered to a greater extent, and so the colour appears lighter. To prove this, apply a drop of clear, colourless oil on a flat, coloured surface; it will immediately appear to darken the colour. Clear nail polish will achieve the same thing. Both the oil and the clear nail polish serve to increase the gloss of the surface and reduce light scatter.

DOES COLOUR VARY WITH DIFFERENT BRANDS?

Yes. When a tint formula for a given colour is used in another brand of product, the end colour is likely to appear somewhat different. Even if the product was tint-strength aligned to a specific tinter system, slight variations may still occur due to differences in paint formulae.

For example, the same tint formula used in a Dulux Professional product will result in a very slightly different colour from that of the Dulux Premium product of the same gloss level due to different pigments present in the formula.

While colour fan decks are useful tools for choosing colour, a sample of the specified product matched to the desired colour must be signed off by the project manager before the application of the coating system commences to avoid colour disputes later. Do not rely on fan decks or colour cards for quality control, as these can dramatically fade or change over a short time, especially if stored on window sills or in hot cars! Keep your colour standards cool, dry and away from sunlight.



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DOES COLOUR VARY WITH LIGHT SOURCE?

Yes. Another complication with colour is a weird science thing called "**metamerism**" –a shift in colour depending on light source.

A surface absorbs light of a broad range of wavelengths, and emits only specific wavelengths of light. These **specific wavelengths** characterise the **colour** of the surface.

Different light sources (sunlight, incandescent or fluorescent), produce different wavelength profiles, and therefore the coloured surface will emit differing wavelengths accordingly. This is called "**metamerism**." Therefore, a particular colour may appear slightly yellow toned under one light source, and slightly pink toned when viewed under another light source. You may have experienced **metamerism** yourself when trying to match items of clothing in a shop, only to find that in natural light they don't match at all!

WHAT LIGHT SOURCE DOES DULUX USE?

Dulux uses natural daylight to match colours. If a particular colour is to be used on an area of high public scrutiny in artificial light, the colour must be matched using the specified product and under the same type of light source that will be used to illuminate the space.

DOES COLOUR VARY WITH TINTER SYSTEM?

Yes. For example, the Dulux Decorama decorative paint tint system is a specially formulated low VOC tint system that is fully compatible with Dulux Premium decorative brands.

Dulux Protective Coatings products, namely the two-pack solvent borne systems, are only compatible with the Colorfast Tinter System.

Close colour matches using different types of products and different tinter systems are heavily dependent on the skill of the colour matcher and the specific light source used, however there are certain colours (such as extra clean, bright colours in the Pantone Matching system that are simply not achievable using paint and tinter.

DOES COLOUR VARY WITH RESIN TYPE?

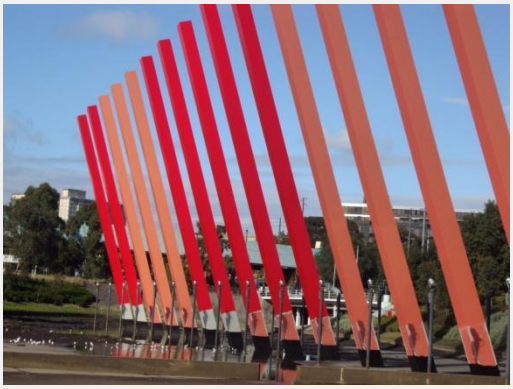
Yes. Most colour systems are based on acrylic latex formulations because most decorative paints are of this type. Coatings based on different resin/binder systems such as vinyl acetates, enamels, epoxies or polyurethanes, can cause wide colour variation. Water borne emulsion paints are also very different from solvent borne paints because in water borne paints the binder is emulsified in water, whereas in solvent borne paints, the binder is dissolved in solvent. Powder coatings differ significantly from liquid coatings, and different powder resins, such as polyesters and fluoropolymers, will also appear different. Single pack and two pack coatings may also differ from each other in colour, even if the resin type is the same.

Coloured pigments and tinters will therefore behave very differently in each. Slight differences in the colour of the resin also affect the final colour of the paint.

DOES COLOUR CHANGE WITH TIME?

Yes. Different resin systems have differing resistance to fading or changing colour with time and with exposure to UV light.

Colour is delivered by either grinding the coloured pigment into the base paint at manufacturing stage or by adding tinter to the product at point of sale.



Melbourne's CityLink Gateway is a case study in pigment and resin colour stability. The brightly coloured Red Sticks are shown with a high durability polyurethane specially formulated with a new, UV stable red pigment. All the CityLink Gateway red sticks have now been painted in this new Weathermax HBR "CityLink Cherry Red"

After four years expsoure, this new formula Weathermax HBR "CityLink Cherry Red" has held up remarkably well, dramatically outperforming previous coatings.

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CHALKING AND YELLOWING OF ENAMELS

Enamels are well known to **fade** and **chalk** on exterior exposure, especially in dark colours. The darker the colour, the greater the absorption of UV light, and the faster the chalking occurs. The chalky material is also more noticeable on darker colours. Enamels also strongly yellow with aging, particularly if exposed to ammonia (present in common cleaning products). Oddly, enamels yellow if protected from UV, such as behind wall hangings and in door jambs.

CHALKING AND YELLOWING OF EPOXIES

Epoxies are widely known to **yellow** with time whether exposed to UV or not. On exterior exposure, however, epoxies also chalk, as UV light breaks down the epoxy resin. Yellowing can occur within a few weeks or months of application, but can be accelerated by:

- Insufficient induction time
- High air humidity or condensation
- Hardener –cold cure hardeners yellow faster than standard hardeners
- Exposure to chemicals such as carbon carbon dioxide and ammonia
- Poor air circulation
- Higher film builds

Epoxy coatings provide excellent barrier protection and are therefore specified as primers and intermediate coats. They are also used as topcoats in industrial situations where function is more important than aesthetics. Yellowing can be masked by choosing colours with a yellow tone (eg. greens, yellows, oranges, and browns).

Industrial coating manufacturing processes generally do not manage tint strength as closely as those of decorative products. Steel primers are not colour adjusted, as these are rarely used without a topcoat.

If colour is important, then **polyurethane topcoats** are essential to provide long term colour and aesthetics.

DO FAN DECKS AND SWATCHES FADE?

While colour fan decks are useful tools for choosing colour and very handy for taking to clients or building sites, a specifier must be extremely careful when using them. The pigments used in colour fan decks are highly sensitive to heat and moisture, and should be kept cool and dry, and replaced every couple of years. **Never** leave your fandecks or sample swatches in a car, on a window sill or anywhere where **heat** or **moisture** may dramatically **affect the colour**.

To ensure colour accuracy in any Dulux Protective Coatings topcoat, a sample of the specified product in the specified colour must be signed off by the project manager before application of the coating to avoid any colour disputes later. Keep the sample clean, dry and cool. Do not use any other colour sample – use only your agreed and signed off product and colour sample for colour matching.

An acceptable colour match is one where there is no perceived colour difference when the agreed sample is held one finger width away from the painted surface.

For more information, please contact the Dulux Protective Coatings Technical Sales Executive in your state.

Freshly mixed zinc phosphate epoxy primer was applied over the same product applied only a couple of weeks earlier. Yellowing is clearly visible. As mentioned in the product's data sheet, this yellowing is expected, but will not detract from the protective properties of the product.

Colour samples in the specified product and signed off by the project manager avoids disputes about expected colour later.Fan decks should not be relied upon for colour checks.