

Colour Oxide Pigments

List of 'abilox[®]' Colour Pigments

# Black Iron Oxide CAF-X2	Cinnamon Buff	Aged Copper
Premium Special Black	* Yellow CAC ('920' Type)	Champagne
Midnight Black ('318' Type)	* Yellow DBJ ('420' Type)	Aubergine
Granite Rose	Creamstone	Moonlight Grey
Baron Brown FFJ ('660' Type)	Muscatel	Gumleaf
Dark Brown FHF('686' Type)	Wedgewood	Lichen
Tan FAJ ('610' Type)	Beacon Cove	Granny Smith Green
Riverblend Beige	Illumin-Ite White	Olive Drab Base
* Light Marigold HF-15 ('960' Type)	Mushroom	Everbright [®] Chromium Oxide Green TP5608
* Deep English Marigold Terra Cotta	Light Sandy Beige PAS	Green Slate
Light Red 109 ('110' Type)	Glo Peach	Green Earth
Mid Red ACJ ('130' Type)	Cherry Red	Foxglove
Red BBB-A1 ('222' Type)	Inca Gold	Cobalt Blue
	Almond	Mornington Peninsula
	Auburn	

NB:

1. Please note that packing in sizes and types other than that indicated in our price lists may be arranged.
2. The 'abilox[®]' range of inorganic, UV resistant mineral oxide colouring pigments are packed in 'CONCRETE FRIENDLY[®]' biodegradable bags. When thoroughly mixed into plastic premixed concrete containing the typical amount of 20mm aggregate for 10 minutes at the transit mixers mixing barrel speed, the bags disintegrate completely.

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Suitable UV-resistant pigments to permanently colour concrete, mortars, grouts, etc., are those known as inorganic mineral (metal) oxide pigments. The man-made synthetic versions of this pigment type are usually preferred because they are invariably cleaner, brighter, tinctorially stronger, more uniform from lot to lot and purer than the native variety. Mineral oxide pigments - native or man-made - are the most permanent and durable of all pigment types. Most may be regarded as immutable.

To keep this permanent colouring process easy and simple, and because mineral oxide pigments vary in bulk density, a fixed quantity **by weight** of pigment, often expressed as a percentage, is added to a fixed quantity **by weight** of Portland cement — or, if

supplementary cementitious materials are used, the weight of the total cementitious material.

Pigment dose rates:

Pigment dose rates of 5% to 10% pigment by weight of the cementitious weight in concrete are typical.

Example: 200kg of cement binder per production batch of concrete is found to require 10kg of pigment for the required ultimate (28 day) colour shade and intensity. Thus, the dose in this case is 5% pigment by weight of the weight of cementitious material.

Lower percentages produce less-saturated colour shades; e.g., 2% will result in a **much** weaker colour shade which is unlikely to be uniform in colour and opacity from one load of concrete to the next*. As a starting point average for evaluation, Ability recommends 8.3%. This percentage is represented by the addition of one standard (25kg net) bag of pigment to one cubic metre of pre-mixed plastic concrete containing a minimum of 300kg of cementitious material.

*Low pigment to cement dose rates allow the occurrence of colour **variation** in hardened concrete products from one unit to the next. Colour variation in terms of 'greys' often occurs in plain, **unpigmented** concrete. A non uniform grey colour in unpigmented concrete may be caused by variations in the size, colour and shape of sand, variations in water:cement ratio; use of curing vs. non-curing etc. Dose rates of a **minimum** of 4% pigment by weight of the cementitious material weight invariably overrides this problem to ensure easy-to-obtain colour uniformity of coloured concrete and coloured concrete products from batch to batch.

Pigmenting the cement binder in concrete, mortars, etc.:

Quality inorganic mineral oxide type colouring pigments, like 'abilox®', do not detract from the qualities, characteristics and durability of the hardened concrete or reduce its mechanical strength. In fact, they tend to enhance these qualities just as they enhance the qualities of UV-light resistance, weathering resistance and durability of a clear organic resin binder in a paint or ink film.

Efflorescence on unpigmented plain or pigmented coloured concrete and coloured concrete products:

Efflorescence is a white or light-coloured crystalline salt bloom which may occur on exposed surfaces of virtually any type of cement concrete, mortar, concrete product, etc., either those coloured with recommended pigments or non-pigmented. It may not be noticeable to any great extent on plain unpigmented concrete, and if it does occur on cast-in-place concrete for pavements, it is usually worn off by foot or vehicle traffic in a short while. Efflorescent defacement is usually variegated and unsightly, sometimes resulting in

a hideous architectural expression, and is difficult to remove permanently. Efflorescent salts are usually much more noticeable on coloured the exposed surfaces of concretes and coloured concrete products — particularly those incorporating dark colours. The problem occurs spasmodically and irregularly. It should **not** generally occur if a 'tight', **detailed** concrete specification intended for the production of dense, watertight, quality hardened and cured concrete in-place, designed for durability and environmental resistance and which is strictly adhered to by the contractor. An effective chemical admixture is available which can also be specified to control the occurrence of efflorescence.*

Both efflorescence and laitance will usually mask the effect of pigments at the surface, giving the apparent effect of colour fading. The truth is that the particular colour beneath these surface impediments, if an adequate and satisfactory amount of a suitable pigment has been added, is effective, non-fading and **permanent**.

If the specifier or customer wishes to be certain about this, we suggest the incorporation of Ability's '**Efflorein®**' Powder admixture into the concrete or mortar mix according to their published recommendations for use.

PLEASE READ THESE IMPORTANT NOTICES:

ALL INFORMATION IS GIVEN IN AND THE ABILITY (THE MANUFACTURER) PRODUCT(S) ARE SUPPLIED WITH, GOOD FAITH BUT WITHOUT WARRANTY FOR THE FINAL COMPOSITE PRODUCT OR MATERIAL IN WHICH IT/THEY IS/ARE USED AS THEIR USE IS BEYOND THE MANUFACTURER'S CONTROL. THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY LOSS OR DAMAGE ARISING FROM FAILURE TO FOLLOW THEIR RECOMMENDATIONS FOR USE

IT IS THE USER'S/PURCHASERS' RESPONSIBILITY TO ENSURE THAT COMPLETE SUITABILITY OF THESE PRODUCTS, FOR ANY USE, BE COMPLETELY CONFIRMED BY THOROUGH PRIOR TESTING AND EVALUATION. THE INFORMATION SUBMITTED IN THIS AND OTHER SPECIFIC PRODUCT PUBLICATIONS IS BASED ON CURRENT KNOWLEDGE AND EXPERIENCE. IN VIEW OF THE MANY FACTORS WHICH MAY AFFECT PROCESSING AND APPLICATION, THIS DATA AND OTHERS DO NOT RELIEVE PROCESSORS AND USERS FROM THE RESPONSIBILITY OF CARRYING OUT THEIR OWN TESTS AND EXPERIMENTS; NEITHER TO THEY IMPLY ANY LEGALLY BINDING ASSURANCE OF CERTAIN PROPERTIES OR SUITABILITY FOR A SPECIFIC PURPOSE. IT IS ALSO THE RESPONSIBILITY OF THOSE OF WHOM WE SUPPLY OUR PRODUCTS, TO ENSURE THAT ANY PROPRIETARY RIGHTS AND EXISTING LAWS AND LEGISLATION ARE OBSERVED. **TEST FIRST. COMPREHENSIVE TRIALS BEFORE ACTUAL USE ARE ESSENTIAL.**

For those interested, reference can be made to Ability's published article: "ACHIEVING COLOUR PERMANENCY IN THE MANUFACTURE OF MACHINE MADE SEMI-DRY MIX, NO-SLUMP CONCRETE PRODUCTS - A SUGGESTED CHECK LIST". This is available upon request.

*To **really** make sure, Ability's '**EFFLOREIN®**' powder — an anti-efflorescent and multi-functional concrete enhancing admixture may be specified - with or without an '**abilox®**' mineral oxide colouring pigment(s) - at the dose rate of 1.5kg. per 100kg of cementitious material. (15 % by weight).

**The use of Ability's 'DURO-SEEL' liquid membrane curing compound and combined surface 'sealer' coating ('Same-day sealer') for concreting available in translucent clear and a range of 24 colours including 'White' and 'Concrete Grey' - is highly recommended.

EXPRESSED AS A PERCENTAGE, THE RECOMMENDED OPTIMUM PIGMENT DOSE IS 8.3% 'abilox[®]' WEIGHT OF THE CEMENTITIOUS BINDER WEIGHT.**

For example: iron oxide reds, red-browns and light 'charcoal' colour shades (using black pigments) are the lowest in cost. Buffs, yellows, 'beiges' and 'sandstone' shades are generally only slightly higher. These are followed by terra cotta's, light-reds and browns. Light browns ('tans'/'cinnamons'), depending on the degree of colour saturation or intensity required, cost slightly more than dark or mid browns.

It should be pointed out that green pigments, based on Chromium Oxide and **particularly** blue pigments, based on Cobalt have a definite extra on-cost over the prices/costs indicated above. This is because suitable permanent pigments of these colours are considerably more costly to produce.

The cost of integrally coloured concrete pavements and precast products also varies according to their colour intensity or degree of colour saturation. This is based on the actual amount, by weight, of pigment used with a fixed amount (by weight) of cement or cementitious binding material.

Obviously, 4% pigment by weight of the cementitious binder weight will cost less than 8%. However, at 8%, the colour will usually not only be more intense, or 'saturated', but tend to be more uniform from section to section or panel to panel.