IMPORTANT INFORMATION TO ***ACCOMPANY*** *'abilox®' COLOUR CARD AS WELL AS ABILITY'S SINGLE PAGE SPECIFICATION HELP DATA ENTITLED* 'FOR ALL SPECIFIERS – A SUGGESTED BUILDING SPECIFICATION FOR COLOURED CONCRETE'

EDITION 2 – NOVEMBER 2003

INTEGRAL COLOURS FOR CONCRETE

abilox®
Concrete Colours For Life!

USES:

Ability's 'abilox®' mineral oxide mix-in powder colours are used in all types of cast-in-place, slab-on-grade, precast, tilt-up and ornamental concrete; shotcrete, masonry and rendering mortars, concrete masonry units, pavers, retaining wall units as well as concrete roofing tiles.

'abilox®' 100% active powder colourants can also be used to colour cast 'stone', external 'plastering' and 'bagging' mixes, stucco, interior 'solid' gypsum/lime wall plaster, and other gypsum, cement and/or hydrated lime bound construction materials.

INGREDIENTS:

Pure, concentrated 'abilox®' powder pigments are made of high-quality metal oxides recycled from iron or refined from the earth and are specially processed for mixing into concrete. These UV resistant mineral colourants comply with ASTM C979 - 1999' Pigments for Integral Colouration of Concrete and Mortars', British/European Standard BS EN 12878 - 1999 'Pigments for Portland Cements and Portland Cement Products' and Australian Standard 'Colour Pigments For Use With Portland Cement' ASK54 - 1935. They are lightfast, alkali resistant, weather resistant, durable and long lasting like concrete. Ability's colours are available in a wide spectrum of 40 standard colours and additionally can be custom formulated to match architectural colouring design requirements for concrete, mortars etc.

PACKAGING:

Pre-mixed concrete suppliers use our 'Concrete-Friendly®' degradable disintegrating bags which are added into a concrete mix without opening or pouring. 'Concrete-Friendly®' bags are water sensitive (ie they have LOW wet strength) and disintegrate when *fully* water saturated under *thorough* mixing action, releasing the non-dissolving, ultra-fine particle pigments which with adequate mixing to de-agglomerate (disperse) them uniformly result in uniform and maximum intensity colouration leaving no bags to dispose of into the environment.

INSTALLATION:

Integrally coloured concrete is installed the same way as high quality, un-coloured concrete. If coloured concrete is required, it is suggested that a colour is chosen from those on the inside of Ability's 'abilox®' colour card (or from Ability's coloured concrete/mortar 'biscuits') and specify this colour by colour name, dose rate and the colour of the cement. Example: grey, off-white or white cement – each of which results in a *different* colour with a given pigment at a given dose rate.

With the provision of an adequate mixing action and mixing time, the intensity of colouration is directly proportional to the dose rate of colour added to the mix. Confirm the desired colour and dose with a fully cured***** architectural sample (job site, test panel). Typical dose rates range from 4% to 8% by weight of the cementitious binding material or 6.25kg to 12.5kg per cubic metre of concrete or 2kg to 4kg per nominal 40kg bag of cement or blended cementitious powder binder content. Cementitious binder content includes Portland cement, fly ash, silica fume, ground granulated blast furnace slag powder, lime and other cementitious materials but does not include aggregate or sand.

***** Please note that curing of Portland cement bound concrete or mortar is not a chemical reaction but a *procedure* from several available to be adopted by the concreters to *retain* the water used to mix concrete and prevent it from evaporating – thus ensuring the concrete's full strength development and durability.

Good quality *durable* concrete is made from:

1. A low water content rather than high
2. A procedure adopted to retain this water (*immediately* after setting) over the *many* days of its reaction with the cement or cementitious binding material.

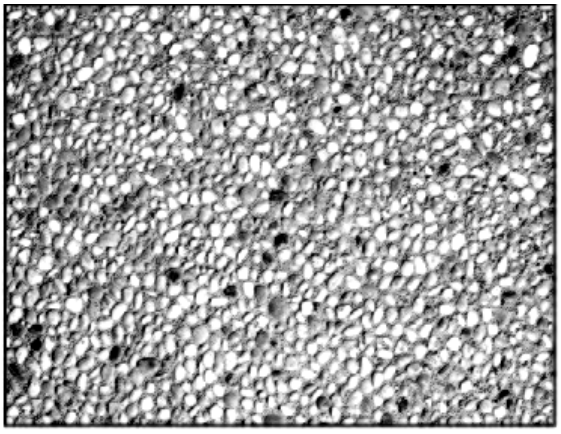
'abilox®' colours have been used successfully in a wide variety of concrete mix designs and are compatible with commercially available admixtures for concrete and mortars. The only known incompatibility is with calcium chloride set accelerator, which may cause blotching, and discolouration as well as the increased likelihood of the occurrence of efflorescence.

FINISHES:

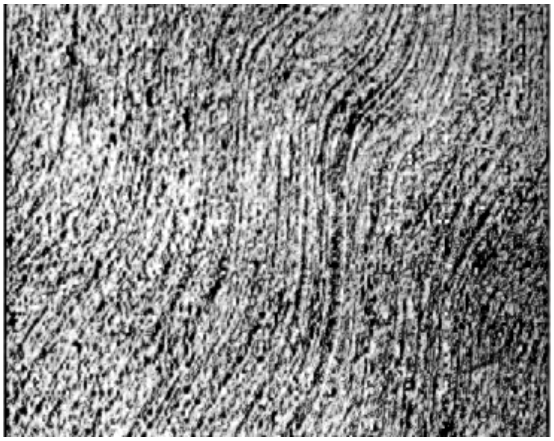
Because unset concrete is such a mouldable, finishability and creatively shape-able material, it may be given different surface effects with the use of special surface textured forms (shutters) or form liners. Paving and floors can be finished with pattern-stamped, broomed, trowelled, exposed aggregate, texture rolled, ceramic motif/tile impressed, art image pressed or many other visually appealing textures and finish effects.

Set and partially hardened, coloured cast-in-place, precast and tilt-up concrete structures can be textured with grit blasting, bush hammering, grinding and honing/polishing. The combinations and possibilities are almost endless.

Here are just a few:

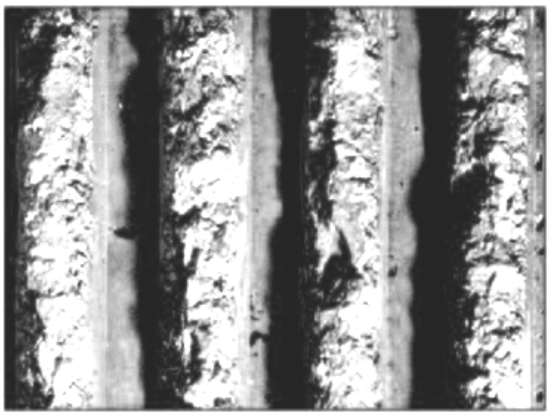


EXPOSED AGGREGATE



LIGHT BROOM (WAVY)

STAMPED/PATTERNED



FORM LINER

CURING & SEALING:

Ability's 'Duro-Seel' clear is a non-clouding, spray-on cure and seal coating that meets and exceeds ASTM C309 and AS 3799 – 1999 'Liquid Membrane Curing Compounds For Concrete' Standards and is specially formulated for coloured paving concrete and decorative exposed aggregate finishes. Other curing procedures, such as water spray curing or the laying of plastic sheets may cause discolouration. Ability's 'Duro-Seel' coloured and the new experimental coloured 'Duro-Pave' coating are optional, film forming, pigmented sealers available in a range of standard colours or that may upon request be tinted to be similar to the shades on Ability's 'abilox®' colour card. When they (or the 'Duro-Seel' clear) are applied over coloured concrete, they help to provide a uniform appearance. Further important printed information about various Ability coatings for concrete is available upon request.

TIPS FOR QUALITY RESULTS:

For best quality results - materials, curing, weather conditions, workmanship – especially the finishing process, should be *uniform* throughout a project. Quality starts with the concrete mix; use a low water content, high performance mix design – preferably a minimum normal class 32MPa compressive strength at 28 days (N32 grade). When planning a project, budget for the cost of craftsmanship.

CONSUMER ADVICE:

Concreting or plastering contractors are independently owned and operated without affiliation to Ability Building Chemicals Co or the supplier of the premixed concrete or the supplier of mortar/plastering materials. Choose a qualified concreting contractor who provides printed information and examples of locatable projects *you can inspect before* you buy. Check the Yellow Pages; ask your local premix concrete or building materials dealer to help find contractors who specialise in the installation of coloured concrete or plasterers, which specialise in the application of coloured rendering mortars or plasters.

SPECIFY ABILITY'S 'abilox®':

Choose a colour from Ability's 'abilox®' colour card or their small disks of through-coloured concrete/mortar called 'biscuits' and specify it by name, dose rate and the colour of the cement to be used. Add these colouring details to plan documents and/or specifications. For complete architectural and guide specification information, visit our web site: www.abilityproducts.com.au, or refer to our architectural Ability Presentation Pack binder available upon request or call, fax or write. Our guide specification entitled 'For All Specifiers - 'A Suggested Building Specification For Coloured Concrete' may be obtained upon request or at www.abilityproducts.com.au.

MIXING GUIDE:

Use the same pigment-to-cementitious binding material ratio, concrete mix design, type, brand and colour of cement and aggregates throughout the project. Changes in cement and aggregate colour and the other items mentioned will affect final colour.

Maintain concrete slump (measurement of liquid consistency) at 80mm or less than 90mm as well as water:cementitious material ratio *uniformity*. High water contents cause the colour of concrete to become pale or appear faded and weakened. If a high slump, highly flowable concrete is required, use a super water reducing (super-plasticising or high range water reducing) admixture instead of added water in Special Class instead of a Normal Class pre-mixed concrete. This admixture will lower the water to cementitious powder ratio at a given degree of consistency or slump, and as a result the stronger the colour will appear to be at a given pigment dose rate.

Calcium Chloride set-accelerator causes discolouration, greater cracking potential and increases the possibility of efflorescent salt bloom occurring. Therefore, do not use it.

Specify a micro (microscopic) air content of 5% ± ½% for improved workability and long-term durability in freeze/thaw climates or use Ability's **'EFFLOREIN®'** anti-efflorescent, waterproofing and multi-functional concrete admixture after testing its performance fully.

Batch loads containing all the concrete materials and arrange for a consistent ten (10) minutes mixing time at the concrete transit mixer's ***mixing (very fast) speed***. Deliver and discharge at average ambient temperatures in less than 1 to 1½ hours. Clean mixer thoroughly between colour changeovers.

Confirm that the 'abilox®' colouring pigment, its name and weight in 'Concrete-Friendly®' bags (or combination of bags) is the *same* required by the *specified* mix design.

Ideally, the professional concrete plant batcher should add half (½) to two thirds (b) of the total batch water into the transit truck barrel. The 'abilox®' 'Concrete-Friendly®' water sensitive bags are added and mixing should then take place at charging speed for at least one (1) minute. Add cement, aggregate and remaining batch water. Continue mixing at the *mixing* speed for at least 10 minutes (and longer***** for 10mm and *much longer****** for 5mm to 7mm and for 'pea-gravel' size coarse aggregate mixes).

NOTICE: *

In mixes with coarse aggregate less than the typical 20mm in size and/or batches with short mixing duration, 'Concrete-Friendly®' water degradable bags may not completely disintegrate.

In small coarse aggregate mixes required for subsequent sand blasted or exposed aggregate finishes, preferably use 'abilox®' in *small* 'Concrete-Friendly®' bag sizes (12.5kg maximum) or open the bag(s) and pour only the colouring oxide powder into the mix.

CONCRETING CONTRACTOR'S GUIDE:

Prepare a well-drained sub-grade over which to cast the concrete. Add a 50mm to 100mm thick layer of suitable sand, gravel or crushed stone depending on the soil condition report. Uniformly compact the sub-grade and moisten evenly and uniformly leaving no puddles, standing water, ice, frost or muddy areas.

If a polyethylene sheet vapour barrier is used, overlap sheets and tape over any holes in the sheet. Depending on the intended thickness of the concrete, place a 75mm layer of granular, self-draining, compactable fill over the sheet to help minimise shrinkage cracking.

Position forms for uniform slab thickness. Follow Australian Standards, Cement & Concrete Association and/or Australian Concrete Institute recommendations for excavation, sub-grade preparation, steel reinforcement and joint placement to control visible cracking.

***** The sequence of proportioning, raw materials and the mixing time at the concrete transit mixer's *mixing* barrel speed (as compared with the much slower transit barrel speed which does NOT mix concrete) for small coarse aggregate mixes to ensure that 'Concrete-Friendly®' bags are wetted fully and disintegrate completely should be determined by your testing.

Refer to Ability printed data 'Using Ability's 'Concrete-Friendly®' Bags'.

Allow *ample* time and staff for placement and finishing work. Finish uniformly, evenly and with care.

Begin trowelling after any surface bleed water evaporates. Late or excessive hard trowelling and edging may cause irregular 'burns' or dark spots.

Water added at the job site to concrete in a transit mixer or when pumping will cause the concrete colour to pale. *Avoid* this or keep additions to a *minimum* and consistent among loads. Don't wet finishing tools or brooms or sprinkle water on the surface.
Do *not* sprinkle pigment or cement onto the surface.

Rotary 'helicopter' power trowel, dry-broom, pattern stamped or rough finishes usually harden to a more uniformly coloured result than very smooth trowelled finishes.

Uneven curing = uneven drying = uneven colour.

Cure coloured concrete with 'Duro-Seel' clear or another good curing compound. Data and free samples of 'Duro-Seel' clear may be obtained by contacting Ability Building Chemicals Co on PH: 03 9457 6488 or email: service@abilityproducts.com.au.

Do not use plastic sheets, water curing or curing products which discolour. Wood and other objects left on set and slowly hardening concrete cause discolouration.

Efflorescence is a 'bloom' of a white crystalline substance that may appear on concrete surfaces. A result of water evaporation, it is more noticeable on coloured surfaces making them look faded or lighter in colour when not removed. Concrete having low water:cementitious ratios, (and/or the use of Ability's unique admixture called 'EFFLOREIN®' Mark 2) the adoption of a suitable concrete curing procedure and protection against water penetration reduces the tendency for efflorescence to occur. Remove with detergent or mild acid cleaning compound formulated to remove efflorescence. Follow cleaning compound instructions and test in a small area to make sure the compound will not unevenly etch or discolour the surface. Always wear rubber gloves and eye protection.

Further helpful information about concreting in general and coloured concrete in particular, is available from the Cement & Concrete Association of Australia: www.concrete.net.au.

ABILITY BUILDING CHEMICALS

SUBSIDIARY OF AUSTRALIAN OXIDES PTY LTD
FINE COLOURS & PRODUCTS FOR

133-135 Northern Road
WEST HEIDELBERG VIC 3081
PH: (03) 9457 6488 FAX: (03) 9458 4683
Email: service@abilityproducts.com.au
Website: www.abilityproducts.com.au

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