**'abil-strength' POLYMER MODIFIER INFORMATION BULLETIN**

# ABILITY'S MULTI-FUNCTIONAL, SUPERPOLYMER POWDER ADMIXTURE FOR CONCRETE

abil-strength

**TEST FIRST BEFORE USE. TRIALS ARE ESSENTIAL.**

'abil-strength' is a non set-retarding strength-increasing cement hardener, improver, flexibiliser, supplementary polymer modifier, binder and reinforcer, for all kinds, types and classes of Portland cement-bound concrete. It is also a polymer 'glue' based, **adhesion promoter** and **water reducer** or flow inducing agent at a given consistency for all cast-in-place (in-situ) concrete, mortar, grout and terrazzo, as well as for concrete products, including terrazzo and other thin section tiles, pavers, polymer asphalt etc It is an excellent flexibilising and bond-increasing admixture for easy-to-use one step - 'just add water' factory compounded cement and hydrated lime-based dry mixed products.

Unique, cost-effective 'abil-strength' re-dispersible superpolymer admixture powder may be used at an **optimum dose** rate in each particular case (to be established by prior testing) for such items as **thin section,** high performance more ductile concrete, **thinner** pavers, tiles, other concrete products and as **durability insurance.**

The product may be added at various dose rates and **well** mixed into all properly designed and **prepared** wet plastic Portland cement-based mixes **having about 20% less water** than normal for achieving the following benefits:

☑ -**increased mechanical strengths** resulting in increased durability and higher impact and abrasion resistance which means less 'wear and tear'. These benefits result from the use of less water without compromising ideal consistency and workability and tough, strong flexible 100% acrylic polymer reinforcement when 'abil-strength' powder is added into a prepared plastic concrete mix at an optimum dose which will not usually cause a substantial increase in concrete/mortar setting time at a given mix temperature.

☑ **increased** flexibility, tensibility, ductility and bond strength of **all** types grades and classes of concrete - especially **thin** section and/or **high strength** high performance flexible concrete.

☑ -the manufacture of cost-effective **thinner** and therefore **lighter** concrete products, thinner section **flexible** concrete floors and screeds or self levelling toppings as well as more flexible thinner, lower weight tilt-up, or factory made architectural precast panels; pavements; beams; columns and other concrete building components.

☑ Greater weight reduction may be achieved with the use of 'abil-strength' in the mix **in conjunction with** Ability's 'E-SPHERES®'# lightweight aggregate. 'E-SPHERES®'# are strong, opaque white, hollow ceramic microspheres which **maintain** the mechanical strengths of concrete (or mortar) whilst reducing its density.

☑ for potentially obtaining superpolymer modified concrete, mortars, cement patching compounds, cement-based (cementitious) paints etc Having **high** hardness, crack resistance, shrinkage resistance, water penetration resistance, adhesion failure resistance and longevity.

- ☑ -**substantially improved adhesion** to the substrate and/or of the internal hydrated cement paste bond to the aggregate(s) - especially in 'no fines' pre-mixed concrete, in-situ terrazzo, polymer/cement slurry asphalt, dry-mix floor levelling compounds, as well as both interior and exterior cement renders and 'plasters'.
- ☑ normal setting time and higher **earlier** strength for all cast-in-place concrete to allow **faster** removal ('stripping') of formwork/ moulds/shuttering and **earlier** use and trafficking of concrete pavements, concrete toppings, decorative cement-based pavements coatings, repair compounds etc
- ☑ absolutely **watertight** concrete, concrete products, special purpose masonry mortars, grouts and polymer asphalt.
- ☑ -for cement concrete and bitumen/polymer/ cement bituminous asphalt/concrete pavements, with considerably higher resistance to sulphates, other chemical corrosion, erosion, freeze-thaw conditions, impact and wear.
- ☑ 'abil-strength' super-polymer powder is completely compatible with most other chemical admixtures for concrete - all of which are to be added **separately** to prepared wet **plastic** concrete/mortars with about 20% **less water than normal.** Compatible admixtures include 'abilox®'**** oxide cement colours, Super Plasticising/Super Water Reducers*, normal Water Reducers, Silica fume, Ground Slag**, setting time Retarders and Accelerators*** etc However, 'abil-strength' powder is not normally recommended for use with air entrained concrete where air entraining admixtures (AEA'S) have been incorporated unless the mechanical strength of the concrete is maintained on prior test by the addition of more cement and/or cementitious material. 'abil-strength' assists in making concrete more ductile to withstand deformation under load without fracture.
- ☑ for improved dry oxide cement colour particulate powder**** holding/binding properties in concrete to result in **long term** colour retention as well as colour stability and permanence of integrally coloured brick, block or other masonry mortars.
- ☑ improved **colour development** of cement pigments to give more cost-effective, brighter stronger integral colouration at a given dose rate by weight of the cement weight for integrally through-coloured concrete, concrete products, engineering cement bound grouts masonry jointing mortars for pavers, applied finishes and dust-on (colour 'hardener') dry-mix surface shakes for the surface colouration of cast-in-place concrete pavements.
- ☑ **uniform** coloured as well as more uniform **unpigmented** natural grey, off-white or white concrete which with uniform finishing is more consistent and even in colour and appearance.

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** Ability offers its 'COSMOTRON®' DPU-AC superplasticiser high range water reducing admixture powder.*

*** Ability offers its high quality GROUND GRANULATED BLAST FURNACE SLAG POWDER ('silica flour' available in nominal 40Kg bags/sacks or by prior arrangement in 1 tonne bulker bags.*

**** Ability offers its 'CEM-SWIFT' MT set accelerating admixture powder for concrete.*

***** Ability offers its 'abilox®' range of UV resistant ultra-fine mineral oxide particulate powder pigments for the integral permanent colouration of concrete, mortars and grouts- to obtain virtually any permanent colour.*

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*Forty eight (48) standard colours are available ex stock for immediate shipment/delivery. Virtually any other colour can be made by arrangement on firm, advance order.*

- ☑ improved **surface finishes** for off-form, fair and well-faced, in-situ cast-in-place concrete with or without aesthetic off-the-form profiles using plastic (or other types of) form liners.
- ☑ for 'softer' **quiet ride,** open graded, **flexible** polymer modified Portland cement bound concrete road and highway pavements and durable, abrasion-resistant, **flexible** screeded thin section polymer modified concrete topping **repair** formulations for same.
- ☑ as a **pumping aid** for improved concrete pumping and as an initial and ultimate strength gain **adhesion promoter** (less re-bound) for sprayed 'Gunite' and 'Shotcrete' concrete mixes.
- ☑ Also for easier site handling and finishing, better wet plastic mix rheology, consistency and workability as well as improved extrudability and sprayability of plastic unset concrete and mortar mixes. Additionally, for the densest, most **non-porous** sand/grit blasted and other textured concrete after finishes.
- ☑ for **easy dosing** and dispensing of 'abil-strength' admixture in its **free-flowing** 100% active solids **powder** form (no non-active fillers/extenders and we try not to sell water!) which is packed on firm, advance order in convenient **bio-degradable 'Concrete-Friendly®'** paper sacks for easier, cleaner handling and simpler addition to prepared pre-mixed plastic concrete.
- ☑ as a bonding agent slurry mix - for use (_ volume part 'abil-strength') with fresh **cement** (1_ volume parts) concrete **sand** (1_ volume parts) and **water** (approximately 1 part) as a high performance, liberally broom-applied, **water resistant bonding agent**/fluid slurry 'grout' **adhesive** mix.

This polymer modified cement slurry 'grout' adhesive slurry mix is used to effectively and permanently **stick** new cast-in-place concrete to old (existing) concrete slabs/ pavements/floors, as well as for new cement renders to existing masonry, other wall/substrate types etc That is, for the establishment of a **permanent** bond that does **not** re-emulsify when later saturated with water! Example: for high performance cement rendering of below-ground swimming pools, caverns, tunnels, cellars etc as well as for decorative or normal cement renders.

With 'abil-strength' powder and provided that the water content of the mix is kept low in relationship to the cement content only a _ of the amount of 'old hat' "PVA" poly vinyl acetate (more correctly - PVA's) cement sticking adhesive products such as 'Bondcrete', 'Lockcrete', 'Cemstick', etc is required - so the cost to you is **less!**

☑ for fast, easy-to-make superpolymer modified mortars for on-site repairs to concrete, factory prepared dry-mix patching mortars, cement-based topping, filling, and with the use of Ability's **'Microcells' SLG, self-levelling** floor mixes etc which cost **far** less and usually perform better than epoxy resin mix systems.

☑ -as a flexibilising and adhesion promoting reinforcing/binding additive (formulation component) added in manufacture or just prior to on-site use into site prepared lime-wash and for site mixed cementitious (cement-based) mineral **paints** and **coatings.**

## DOSE RATES

Dose rates for 'abil-strength' are **variable** - depending on the performance levels of modified mixes required. The average dose is 10% 'abil-strength' powder by weight of the cementitious powder weight of the mix.

## PACKING AND RECOMMENDED STORAGE

Ability's 'abil-strength' superpolymer powder is packed in 15Kg net. multi-ply paper sacks. The product has a very long shelf life. It is a non-sticking **free-flowing** (highly flowable) powder which can be dispensed easily by hand or by suitable powder flow meters/dispensers. On firm, advance order the product can be supplied in degradable 'Concrete Friendly'®' bags. 'abil-strength' does not normally deteriorate in storage, provided that sacks containing it are stacked **under cover** on pallets **off** the ground.

For **further** information, a free trial sample for **your** evaluation and copies of Ability's comprehensive 'abil-strength' **Product Data**, which should be carefully read **prior to initial testing** and subsequent use, please contact Mr. Peter Gray, Manager, Ability Building Chemicals Company for assistance and guidance.

**TEST FIRST BEFORE ACTUAL USE. TRIALS ARE ESSENTIAL.**

## ADDITION SEQUENCE

Apart from its use in factory blended on-step **dry mix** ('just mix well with water') granular or powder products which should always be **well** mixed before use, 'abil-strength' is usually added **last** to **prepared**, well-mixed wet **plastic** concrete or mortar mixes **having about 20% less water** than normal for a given slump. The concrete or mortar mix is then mixed **well** again to ensure its uniform distribution and dispersion whereupon the consistency and slump **increases** to what it would have been without the 20% cut in normal water content.

Compared with plain, unmodified Portland cement-based mixes, **'abil-strength'** modified concretes, mortars and grouts last longer, offer the advantage of far greater hardness and wear resistance as well as the ability to be cast/applied in **thinner** sections for the same load bearing characteristics - therefore resulting in lighter weight and some savings associated with the use of less material components.

Also, 'abil-strength' provides cement-bound mixes with increased service life in their hardened state - particularly under adverse exposure conditions - as well as providing improved handling and processing characteristics in their plastic, pre-set state.

**PLEASE NOTE:** A Similar but lower cost material to 'abil-strength' acrylic superpolymer powder is available as a thick **liquid** (fairly viscous 'paste') under the trade name **'ADMIX 2000®'.** Please enquire.

**FOR OPTIMUM RESULTS NEITHER PRODUCT SHOULD BE USED AT AIR TEMPERATURES BELOW 14ºC AND ABOVE 30ºC.**

All pre-mixed concrete should be manufactured to Australian Standard AS 1379-1997 and placed/site processed according to Australian Standard AS 3600-94 'Concrete Structures' **including** that intended for modification with 'abil-strength' or 'ADMIX 2000®' admixtures for concrete.

## IMPORTANT - PLACING AND SITE PROCESSING OF ALL PRE-MIXED, WET PLASTIC CONCRETE.

We draw the reader's attention to the necessity, according to Australian Standard AS 3600-94 'CONCRETE STRUCTURES' for the provision by the concreter or contractor or both of:-

1. Correct and adequate **compaction** of **all** freshly placed plastic concrete to remove **all** air voids to densify it with adequate vibration techniques/practices - such as with poker vibrators, vibrating screed equipment or in the case of thin toppings, spiked rollers.

   This site processing procedure should, with continuous curing, (water retention) ensure that the f/c characteristic **design** strength grade and class of concrete as ordered for the particular job **will** be achieved when hardened **in place.**

**NOTE::** Hardened concrete in place containing air voids that make up only 10% of its volume will usually have **lost about 50%** of its ultimate mechanical strength and abrasion resistance.

2. Adequate continuous **curing*** (a processing procedure used to ensure the **retention** of the concrete's mix water. This procedure is always commenced **very** soon after and **on the same day** as the finishing process - usually **immediately** the concrete has set.

**Ability offers its '**DURO-SEEL'** liquid film-forming/membrane curing compound/ sealing material for the curing procedure.*

*This is available in translucent clear and a range of 24 colours including 'White' and 'Concrete Grey' (to match, reasonably closely, the colour of the concrete) '**DURO-SEEL'** applied in a two coat application conforms to AS 3799-1986 'Liquid Membrane-Forming Curing Compounds For Concrete'*

*For curing purposes 'DURO-SEEL' is applied to the surface of freshly finished concrete by suitable airless spray equipment or soft broom **immediately** after the final set of the finished concrete has occurred on the **same** day. Typically, this is only about four (4) hours after placement at a **concrete temperature of 20ºC.***

*If the concrete temperature is 10ºC lower, ie 10ºC, it will typically takes **twice as long** as this to set. Conversely, if the concrete temperature doubles to say 40ºC it will typically take less than **half this time** to set.*