

## ‘COSMOTRON®’ DPU-AC POWDER ADMIXTURE FOR CEMENT & PLASTER BOUND COMPOSITE PRODUCTS & MATERIALS

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

### Ability's famous ‘Cosmotron®’ DPU-AC Powder

#### DESCRIPTION:

‘Cosmotron®’ DPU-AC is a safe-to-use, non-air-entraining, *normal* set, ‘instantly’ dissolving 100% solids powder admixture and cement improving product. Specifically, it is a high performance surface active dispersing agent for the cementitious binding material of and super water reducer for poured-in-place (‘wet mix’) concrete, mortars, grouts, cement and/or lime renders, gypsum plasters etc, required to be made with **less water** for the *same* consistency, compared with non-modified plain mixes, to result in *normal* slump consistencies. As such, it increases mechanical strength (and the water, chemical, weathering and abrasion resistance) of these materials when fully hardened. In addition ‘Cosmotron®’ DPU-AC is a flow inducing agent (‘super plasticiser’) or viscosity lowering modifier for these wet mix materials typically made with *normal* water contents.

#### **BENEFICIAL EFFECTS FOR MACHINE MADE CONCRETE MASONRY AND PRODUCTS MADE FROM ‘SEMI-DRY’ MIX HIGHLY COMPACTED LOW WATER CONTENT CONCRETE MIXES:**

‘Cosmotron®’ DPU-AC Powder is most suitable for use with ‘semi-dry mix’ concrete products – those made with ‘Besser’/‘Columbia’ type machinery for manufacturing concrete masonry, pavers, crib/‘lock’ blocks etc , as well as for the manufacture of spun concrete pipes,

### Meets and exceeds Australian Standard AS 1478 - 84 ‘Chemical Admixtures for Concrete’

compacted sand, cement product mixes and extruded concrete roofing tiles. These beneficial effects result in better extrusion properties and better unset ‘moulding’ mix consistencies as well as more efficient cement dispersion. The addition of ‘Cosmotron®’ DPU-AC therefore results in these products after setting, efficient curing and subsequent hardening having increased mechanical strengths, reduced porosity/permeability to liquids with increased density, abrasive wear, water and efflorescent salt bloom resistance.

#### **OTHER BENEFITS ARE MENTIONED HEREUNDER:**

##### **ECONOMICAL USE:**

‘Cosmotron®’ DPU-AC Special 96% active 100% solids powder grade super water reducer/plasticiser may be added to virtually any cement-bound mix. It may be pre-dissolved if required in cold or hot water *or* because it dissolves almost instantly during mixing is *preferably* added directly as a powder to a prepared wet plastic mix in convenient ‘Concrete Friendly™’ degradable bags as supplied in a range of contents sizes. Only very low, cost effective dose rates (typically 0.4% by weight of cement and/or hydrated lime or gypsum plaster weight) are required for Cosmotron DPU-AC powder added into freshly mixed concrete, mortar, grouts, as well as virtually all types of factory compounded cement or plaster bound *dry mixes* for obtaining:

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# COSMOTRON® DPU-AC

- **Water reduced** (ie water content cut by 20%-25%) wet plastic poured-in-place slump type concrete, mortar, grout etc for the *same* consistency, slump and setting time and, together with the provision of a proper curing procedure (mix water retention), for easily obtaining increased early and ultimate strengths, hardness, impact abrasion resistance and greater cracking resistance – ensuring greater long-term durability with minimal maintenance costs for these hardened materials.
- **Non-bleeding**, easily placed poured-in-place plastic concrete having considerably less water for a given normal consistency to eliminate the formation of cement scum laitance and subsequent dusting on the surface of the hardened concrete to result in increased serviceability, resistance to wear, erosion and weathering as well as better quality and more uniform finishes, colour/texture uniformity and general aesthetics.
- **Increased** bond, shrinkage resistance chemical resistance and, with the provision of adequate concrete *cover*, increased steel reinforcement corrosion resistance with by means of lower water:cement ratio concretes/mortars/plasters for the same consistency - thus eliminating future costly maintenance of these materials in their hardened form.
- **Non-set-retarded**, normal set time 'wet-mix' plastic concrete and mortars (with about 20% less water for the same slump at a given concrete temperature) for easy site application and trouble free screeding, floating and finishing. Also, for higher *early* strength – particularly strengths between 10-24 hours after setting – for earlier removal from moulds of concrete products or mould stripping from concrete sections.
- **Improved** pumping qualities of low slump plastic concrete with improved handling characteristics and reduced re-bond in water-reduced shotcrete-sprayed concrete/mortar mixes – thus achieving hassle-free site handling, application and perfect results in place every time.
- **More watertight** hardened poured-in-place concrete, masonry mortars, applied exterior cement wall renders, internal solid wall plasters and all types of concrete products having less corrosion potential to steel reinforcement together with lower shrinkage and creep (deformation of concrete under load) potential to result in long-term dimensional stability. These benefits are obtained by adding 'Cosmotron®' DPU-AC to prepared wet plastic pre-mixed 40 mm slump plastic concrete on site, re-mixing in the transit truck at the fastest barrel speed for 10 minutes to typically result in normal 70 mm to 80 mm slump plastic concrete for easy, normal placement and easy efficient site handling and processing – including the important compaction procedure by means of suitable concrete vibrating tools.

- **Brighter**, stronger and more uniform colours for integrally *through coloured* barrel mixed concrete, concrete products, brick mortars, cement renders etc with the use of Ability's ultra durable '**abilox**®', rapidly dispersing fine colouring oxide pigments in both pourable (slump) and semi-dry (no-slump) type concrete mixes (through better pigment particle dispersion) in lower water content mixes for UV resistant permanent colouration and happier clients and owners.
- **A uniform** finish for normal grey (unpigmented) poured-in-place off-form concrete products structural concrete members etc with less water for the same consistency and slump and, with the provision of adequate vibration/compaction, a more even uniform appearance with less 'bug' hole air bubble surface voids for improved surface finish quality and appearance.

## FEATURES & BENEFITS

- 'Cosmotron®' DPU-AC modified and therefore water reduced wet plastic poured-in-place concrete has a lower tendency to segregate because of its improved cohesiveness. 'Cosmotron®' DPU-AC results in other improvements such as easier placement and easier compaction by vibration and finishing, ie the speed of handling procedures is definitely improved allowing *easier*, trouble-free site processing.
- **The** problem of dusting powdery concrete floors and pavements which abrade easily is eliminated due to the use of an easily placeable pre-mixed concrete with a *low water:cement ratio* – easily achieved with the use of 'Cosmotron®' DPU-AC and, to ensure that the specified strength and performance *is* achieved, the correct use of a good film forming curing compound\* by concrete placers/processors is highly recommended.

## THE PRODUCT WHEN USED AS DIRECTED ALSO PROVIDES:

- **Improved**, easier-to-apply cement-based paints, other cementitious coatings, cement renders and applied wall finishes as well as decorative floor toppings/screeds/granolithic ('grano') factory floor topping mixes etc – all with technically recommended *less* water to result in lower water to cementitious ratios in comparison to the cementitious binder content.
- **Complete** compatibility with virtually all other chemical admixtures for concrete and mortars such as normal water-reducers, set time accelerators and retarders, white salt bloom efflorescence and permeability reducing admixtures, flexibilising resin polymers, silica fume etc ensuring, with the correct site processing steps, trouble-free results of the highest excellence.

\* Ability offers its 'Duro-Seel' liquid curing compound coating which can be easily applied by broom or suitable spraying

# C O S M O T R O N ® D P U - A C

- **Improved** stronger concrete products with *good looks* – lower blemishes, higher uniformity of texture or smoothness, higher hardness and density, higher early/ultimate strength and abrasive wear resistance for greater market acceptance.
- **Highly** flowable poured-in-place “wet-mix” concrete if required by using ‘Cosmotron®’ DPU-AC with a *normal* water content. Flowable concrete results in less placement, compaction, vibration, handling times and costs. However, to ensure that the design strength of the concrete *is* achieved in place, *all* grades and classes of concrete should be densified by adequate compaction by means of a vibration process to remove *all* air bubbles/voids.

## DOSING AND REDOSING:

- ‘Cosmotron®’ DPU-AC is easily dosed by weight – manually or with automatic free-flow powder flow metered dispensers (or weigh batching) in its exceptionally free-flowing 100% solids powder form – we do *not* sell water!

This product can also be *re-dosed* into previously mixed ‘Cosmotron®’ DPU-AC dosed plastic pre-mixed concrete if required to maintain slump and workability to obtain increased handling time flexibility during concrete placement/discharge. Also concrete, mortar and other cement bound mixes may in some cases be delivered to the site dry – without water – if required in transit mixers. Water (about 20% less than if ‘Cosmotron®’ DPU-AC is *not* used) can then be added if available on site and mixed in (for 10-15 minutes at the transit mixers *fastest* barrel speed) at the convenience of the purchaser or concrete site processor/finisher.

- The product also allows for shorter but necessary pre-set times to be used for elevated temperature and humidity curing schedules such as with the use of steam curing with reduced energy consumption at a given temperature for lower cost-to-make, factory cured, water reduced ultra-high early strength pre-cast concrete panels, concrete pipes and other concrete products.

## LONG STORAGE LIFE:

- ‘Cosmotron®’ DPU-AC powder grade super water-reducer and flow agent supplied by Ability has a very long shelf life and does not normally deteriorate on storage – provided that the ‘Concrete Friendly™’ degradable bags in which it is packed are stacked on pallets, off the ground under cover – thus preventing loss through wastage.

## OTHER GRADES:

- **A set-retarding version of ‘Cosmotron®’ DPU-AC** may be made available on firm, advance order if required for longer, more ‘open’ and flexible site handling time to avoid mistakes occurring through rushing.

## LOWER SHRINKAGE:

- ‘Cosmotron®’ DPU-AC ‘instantly’ dissolving powder added to water-reduced poured-in-place concrete allows worthwhile reductions in cement contents to therefore reduce subsequent shrinkage, cracking and creep potential. This option provides long term dimensional stability and integrity for the structure.

However, for *durability* considerations, an adequate cement or cementitious content to result in concrete having a *minimum* of 32Mpa compressive strength at 28 days in place, is in most cases considered necessary.

## A TRULY FLOWABLE POWDER:

- **Being a free-flowing**, easy-to-use powder, ‘Cosmotron®’ DPU-AC can be added into formulated factory compounded cement and/or lime/gypsum plaster based ready-to-use *dry-mixes* of all types – for ease of product use and quality results due to the **lower water contents** – which will tend to be automatically used by the operator.

## IMPORTANT NOTICE: CAUTION

If ‘Cosmotron®’ DPU-AC is used in poured-in-place (slump) concrete, mortars etc to reduce the water content at a normal or given slump ***please take note that approximately 40 minutes after making the concrete, at a concrete temperature of 25°C, it will rapidly lose slump (consistency) and be reduced to the slump applicable of a plain, unadmixed concrete at the reduced water content.*** However, this lower slump plastic concrete ***can be re-dosed with ‘Cosmotron®’ DPU-AC powder and adequately re-mixed to increase flowability and the slump again, if required.*** This re-dosed concrete should then be placed, site processed and finished ***rapidly. This loss of slump effect (increase in viscosity) will happen even more rapidly at higher temperatures.***

## EXAMPLE:

‘Cosmotron®’ DPU-AC admixed concrete at an 80 mm slump ***will revert, within a relatively short time, depending on the concrete temperature, typically to a slump of 30 to 40 mm.*** Therefore it should be placed, compacted by vibration and finished within 30-40 minutes approximately of manufacture at this temperature if the ***maintenance of an 80 mm slump is required for these operations.***

## A SUGGESTED STARTING POINT DOSE RATE FOR PRE-TESTING AND EVALUATING ‘COSMOTRON®’ DPU-AC

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The suggested starting point dose is 0.4% by weight of total cementitious content by weight. This equals 160 gms per standard 40 kg bag of Portland cement or 0.4 kg (400 gms) per 100 kg of cement or cementitious material.