

COMPREHENSIVE TECHNICAL DATA FOR 'abil-meld'

abil-meld

POWDER

A UNIQUE DISPERSING ADDITIVE FOR COLOURING PIGMENTS USED IN FINE COMPOSITE MATERIALS' MANUFACTURE SUCH AS PAINTS, ARTISTS' COLOURS AND INKS.

A PHOSPHOLIPID-BASED POWDER ADDITIVE USED AS A **HIGHLY** EFFICIENT **EMULSIFIER**, AS WELL AS A **HIGHLY** EFFECTIVE SURFACE ACTIVE **DISPERSING & 'WETTING' AGENT** FOR OBTAINING SMOOTH, HOMOGENEOUS, UNIFORM MIXTURES OF PIGMENTS & OTHER ULTRA-FINE PARTICULATE SOLIDS IN BOTH AQUEOUS AND NON-AQUEOUS LIQUIDS.

DESCRIPTION:

'abil-meld' is a light brownish yellow granular powder. It is miscible in water and soluble in most chemical resins, oils and solvents except acetone. It has almost universal use potential as an efficient mixing and dispersing agent to meld together dissimilar liquids and/or liquid/particulate solids to achieve a smooth, uniform, homogenised/de-agglomerated dispersed state - for example in the manufacture of paints, inks, artists' colours, adhesives, sealants, cosmetics and processed foods such as chocolate.

Perfect dispersion results in the **true** colour and degree of opacity or transparency to be derived from all types of pigments in pigmented materials, as well as the maximum gloss for high gloss paints, varnishes and lacquers.

The product may also be **effectively** used to emulsify and/or disperse liquid materials which do not dissolve in or are non-miscible with water, to form fine stable **dispersions** or **emulsions** in water or

smooth flowable consistent and uniform water-based liquids or pastes that contain non-dissolving ultra-fine particles of oleo-resinous materials at usable viscosities, eg. oil in water emulsions and emulsified ultra-fine polymer resin particles in water.

In addition, Ability's 'abil-meld' additive is used to very effectively de-aggregate/de-agglomerate to disperse non-dissolving solid particles such as fine pigments in **both** aqueous (water based) and non-aqueous (solvent) binding media by the process of pigment 'wetting', de-aggregation and the removal of occluded air from the surface of the pigment particles to form homogenous liquid suspensions or dispersions, the components of which when applied at any (coating) thickness/thinness, extruded or moulded then appear to be essentially alike, consistent, uniform and which dry/harden in the designed optimum manner.

TEST FIRST BEFORE ACTUAL USE. TRIALS ARE ESSENTIAL.

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'**abil-meld**' may be used in the manufacture/processing of fine composite products/materials of **many** industries - usually below a temperature of 100°C - including the ink, paint, textile dyeing and printing, pigments, cosmetics, cements, liquid cement colour, adhesives, rubbers, reinforced plastics, printing, mining, pre-mixed concrete, concrete products and asphalt *emulsions* for laying bituminous road pavement surfacings and even food, to name some.

It may also be effective in dispersing clay particles plus added pigments for already containing natural earth pigments such as ochres to obtain more intense colours or different colours than without it in coloured ceramic, pottery or baked clay brick manufacture.

SUPPLY FORM/TYPE:

'**abil-meld**' is supplied as a yellowish-brown, free-flowing but hygroscopic granular powder which has a fatty, waxy feel to the touch. It is composed of units of choline, phosphoric acid, fatty acids and glycerol.

'**abil-meld**' is completely miscible in water, and completely soluble in most chemical organic solvents, except acetone, and many other liquids. The product is decomposed by heating above 100°C.

DOSE RATE:

Dose rates for this additive used as an **emulsifier** for the manufacture of water based (aqueous) emulsions typically vary from 0.1 to 2% by weight of the, weight of, the non-aqueous component. Similar dose rates are also applicable for its use as a fine particulate **dispersant** for de-agglomerating non-dissolving tiny solid particles (either inert or reactive) in liquids:

For example, a typical dose rate for alkyd resin-bound printing inks is 1% \pm ½% by weight, on the weight of the pigment. Lower dose rates may be effective. ***Test first - comprehensively - before actual use.***

Production Managers/Chemists should determine the **optimum** dose rate **by trial**, keeping in mind

that the higher the surface area of the particulate solid(s) and the greater the difference of meld potential of the particle's surface compared with the liquid, the higher the dose of '**abil-meld**' will be required to effectively de-agglomerate/de-flocculate the solid(s) and achieve an ideal dispersed state.

SYNERGISM WITH EFFECTIVE DISPERSING EFFECTS USING 'abil-meld':

Many other chemical materials and proprietary mixtures used as effective **dispersants** and/or **emulsifiers** in industry may work **more** effectively **in combination with 'abil-meld'!** This usually applies to pigment dispersants of the highly popular polyacrylate type widely used to disperse Titanium Dioxide white and other pigments in **aqueous** (water-based) polymer resin binding media such as acrylic latex emulsion bound paints and coatings etc.

As a truly specific dispersant for use **in combination** with '**abil-meld**' in **aqueous** water-based media we particularly recommend the Melamine Formaldehyde Condensate type in general and Ability's '**Cosmotron®**' **DPU-CA** rapidly dissolving powder in particular. This is recommended because of Cosmotron's very **high** dispersion **efficiency without** foaming.

In numerous cases of either aqueous or non-aqueous formulae, it has been found **unnecessary to use any other surfactant** (dispersant, 'wetting' agent or both) when '**abil-meld**'/'**Cosmotron®**' **DPU-CA** powders are used in combination together in a particular aqueous dispersion/emulsified liquid/suspension formulation. The average dose rate for their use in combination is about **.5%** (half a per cent) of each by weight of the particulate solids/emulsifiable non-aqueous solids.

EXAMPLE I:

It has been found that the use of a 80:20 mixture of '**abil-meld**'/'**Cosmotron®**' **DPU-CA** powders at a 1% dose w/w particulate solids when using an efficient mixing machine **very** effectively disperses organic and inorganic pigments in short oil alkyd based printing inks giving the finest 'grind' as well as making clean-up of its fountain solution and the printing machinery using it, an **exceptionally** easy task.

EXAMPLE 2:

In a **triple** combination of:-

- ✿ **'abil-meld'** powder
- ✿ **'Cosmotron®' DPU-CA** powder and
- ✿ **'abil-wet'** powder (an efficient proprietary Ability **wetting** agent for **aqueous** media)

it has been possible to quickly make uniformly smooth, homogeneous, free flowing aqueous liquid dispersions of carbon blacks (300 angstroms average particle size diameters) at up to 30% solids **in water** using only slow speed mixing equipment [at 2%, 4% and 0.25% dose rates respectively of these materials by weight, of the weight, of carbon black powder (or pellets)].

EXAMPLE 3:

It is now known that to **prevent** corrosion of reinforcing steel in concrete to avoid the resultant concrete 'cancer' and massive potential danger of structures collapsing, or to maintain very long term durability of steel reinforced concrete piles in sea-water, it is necessary to adequately encapsulate the steel in dense, **durable** concrete which is non-porous and **completely** impermeable to water and aqueous salt solution.

This requires the use of **well cured*** high performance pre-mixed concrete - medium to high strength (**minimum** 32MPa compressive strength grade in place at 28 days) without air voids (eliminated in unset plastic concrete by satisfactory compaction and vibration procedures) containing a **maximum** water **content** of 190 litres/cubic metre (m³) of concrete.

With typical, transit mixing equipment currently used by the pre-mixed concrete industry, an efficient dispersant or **combination** of dispersants is required to reduce the water content of a wet (plastic), non hardened concrete mix whilst maintaining the required degree of flowable consistency (workable viscosity or 'slump') to meet this specification.

A 75:25 combination of Ability's **'Cosmotron®' DPU-AC** powder and **'abil-meld'** powder at 1% by weight of the cementitious binder content may be used to achieve these water-reduction requirements. (NB: another popular very high performance Ability admixture product used for this purpose is known as **'EFFLOREIN®' Mark 2** Powder). Why not request comprehensive printed

information about multi-benefit **'EFFLOREIN®' Mark 2'** powder?

- * In the construction industries effective **curing** of concrete and mortars means the adoption of a procedure that results in the **retention**, by **prevention** of the evaporation of the mixing water (preferably, for maximum mechanical strengths, kept **low** relative to the cementitious binder content) so that it may **all** be available for hydration of the cement (binder) component over a relatively long period of time – preferably 28 days – to achieve its ultimate strength – which is NOT achieved without this curing procedure.

INK & PAINT INDUSTRIES:

'abil-meld' acts as an **excellent** dispersant for **aqueous** paint and ink formulae particularly **in combination** with **'Cosmotron®' DPU-AC** powder. In oleo-resinous, non-aqueous binding media based either on drying oils used for convertible paint coatings as well as for semi-drying or non-drying resin media, used with elevated temperature hardening/drying below 100°C, often **'abil-meld'** **alone** acts both as an effective suspension agent **and** as an effective dispersant for the pigments.

Also, as its addition to drying oils used in surface coatings' manufacture slightly retards their drying in air **'abil-meld'** acts as an anti-oxidant. However, small amounts of **'abil-meld'** may usually be tolerated without deleterious drying time effects. Its benefit of assisting in preventing settlement of the pigments [**colouring** as well as non-hiding/non-colouring **extender** pigment(s)] on storage which may form a hard cake at the bottom of the container, **is** significant. This sinking/caking phenomenon can be a considerable disadvantage to the user as it can entail much work to restore the paint/ink to a workable condition.

The constitution of a properly dispersed pigmented paint/ink system is analogous to that of an emulsion, in which a liquid is dispersed in another with which it is not miscible, in the form of minute droplets - the particles of non-dissolving pigments/extendors in the coating taking the place of these micro droplets in this example.

The stability of a paint (a composite dispersion/suspension) is dependant on the force of adhesion between the surfaces of the fine solid particles and that of the surrounding liquid binding medium. If this is high (that is, if the pigment(s) **are**

thoroughly wetted, the particles are kept apart by an envelope of the liquid medium and, although on storage they may in a less-than-perfect formula sink to the bottom of the container owing to their relatively high specific gravity - leaving in some cases a clear liquid on the top - they **are readily** dispersed again on stirring.

If the liquid adhesion is low, the pigment particles will displace the film of liquid binding media keeping them apart and cause them to coalesce in a **dry** condition forming relatively **large** aggregates which may result in a different colour intended by the

pigment manufacturer and give reduced gloss in a gloss paint formula as well as settling out as a **hard** 'cake' in the bottom of the container on storage.

Effective particulate dispersant additives **adsorb** onto the surface of the particles which act as a link between the pigment and the binding vehicle medium, increasing the adhesion between them. Although quite variable, the **average** amount of the **dispersant** used is around 2½% by weight, of the weight, of the paint/dispersion. 'abil-weld' additive does this so well.

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