

INFORMATION BULLETIN - 'abil-HARD' AN EXPERIMENTAL HARDENING ADDITIVE FOR AQUEOUS RESINS

TEST FIRST BEFORE USE - TRIALS AND COMPREHENSIVE TECHNICAL EVALUATION ARE ESSENTIAL.

PRO FORMA PRODUCT DATA
(EXPERIMENTAL PRODUCT WG - 40 Tentative Name: 'abil-BIND' or 'abil-HARD')

'abil-HARD' POWDER

'abil-HARD' is an *experimental* ultra-fine, virtually non-toxic powder catalyst, co-reactant and adhesive additive for industrial use. It may be used to potentially improve by chemical cross-linking and extra binding action, the speed of coalescence, degree of hardening, adhesion, impermeability to water and other liquids and chemical/heat resistance of factory applied liquid aqueous polymer resin latex emulsion-bound coatings, adhesives and other similar formulations.

After complete testing and evaluation, alkaline 'abil-HARD' at a pH of 11 may also be potentially used in the manufacture of paper box board and other products which are bound with virtually any type of high pH compatible latex emulsion polymer or bitumen binder (aqueous resin polymers/copolymers & homopolymer (PVAc's) acrylic, SBR and natural rubber latexes etc to increase their mechanical strengths and abrasion/water/fire/mould-resistance. 'abil-HARD' also has substantial commercial potential as the sole powder co-reactant (part B) in two (2) pack, water based/water borne coating, adhesive and similar formulated systems.

DESCRIPTION:

As a formulated reactive, free flowing powder additive 'abil-HARD' is based essentially on compounds which form by combination with water, highly durable, solid, hard, virtually immutable anhydrous metal silicates and aluminates eg aluminium silicate and calcium silicate, as well as anti-foaming agents and very small amounts of highly efficient *non-foaming* surfactants as dispersants.

It is an easy-to-use, precisely formulated industrial product designed to improve the properties of *factory applied* liquid emulsion latex resin based and other similar resin bound, *water-borne* coatings and adhesives, other water borne resin bound products, materials etc in both their plastic (non-hardened) as well as their coalesced or hardened film formed states after application to various substrates very soon after their manufacture.

'abil-HARD' potentially improves coalesced (dried) emulsion resin bound coatings, adhesives and other composites etc after it has assisted in forming additional *reinforcing* crystal lattices of hard inorganic hydrated metal silicates and aluminates - within them.

This makes them set faster, harden sooner, increases their hardness, wear and abrasion resistance as well as increasing their water, chemical, heat and fire resistance.

'abil-HARD' is supplied in the form of a finely divided, free-flowing white powder.

The product is *NOT* suitable for addition to liquid paints, adhesives, textile coatings, adhesives for building siding/panels, or other liquid latex resin based products not used/applied immediately after the addition of 'abil-HARD' ie it is *NOT* suitable for liquid products requiring container and extended shelf life stability such as normal single pack liquid paint products which are required to remain as viscosity stable liquids/semi-solids until used. If used, 'abil-HARD' will potentially cause these sooner or later to gel, solidify or irreversibly increase their viscosity - thus probably rendering them virtually useless. However, the product may be evaluated for use as the potential powder hardener/co-reactant/cross linker in water-based resin coating and adhesive products marketed and used as two (2) pack catalysed systems.

MICRONISED GRADE:

'abil-HARD' powder may also be made available on firm advance order at a higher price in an even finer particle size grade which has been micronised (jet milled) and is offered under the name 'abil-HARD' 1M.

This finer particle 'abil-HARD' powder product has extremely high, dry flowability and can therefore be dispensed into suitable manufacturing processes by means of factory flowable powder transporting and dispensing systems.

'abil-HARD' 1M compared with standard 'abil-HARD' has a slightly higher degree of whiteness and results in slightly easier dispersion in less time with a given degree of mechanical mixing shear. 1M's reactivity in aqueous emulsion latex resin bound systems is potentially greater in a given time and at a given temperature compared with the standard product and may therefore be more suitable in certain formulated product systems.

©Copyright. All rights reserved. First published 1986. Robert F Barber, Ability Building Chemicals.
AUSTRALIAN OXIDES PTY LTD, West Heidelberg, Victoria, Australia.

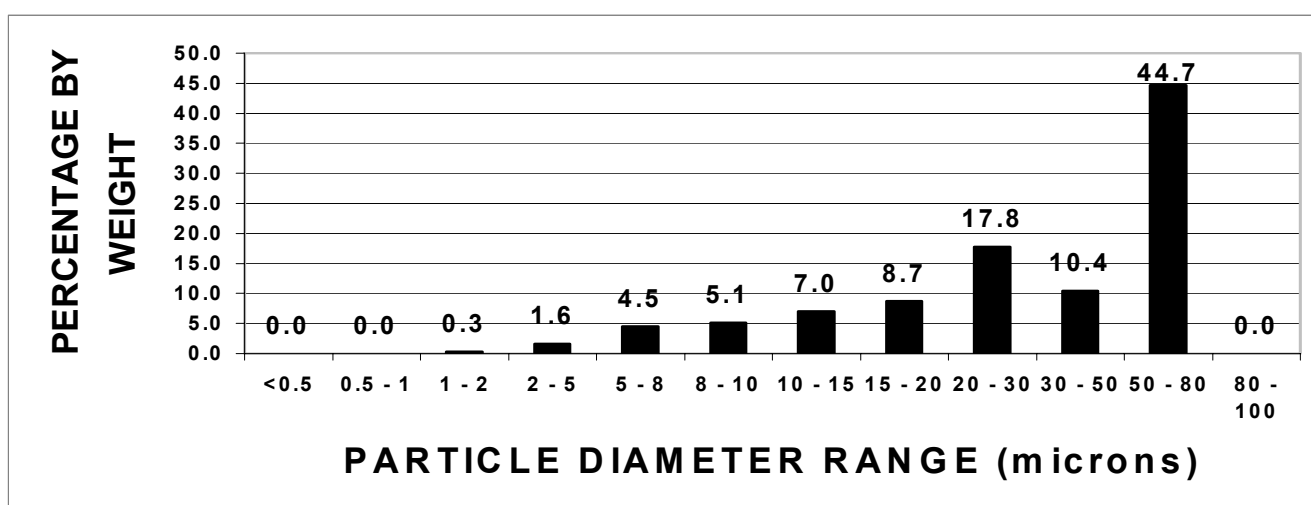
PLEASE READ THESE IMPORTANT NOTICES:

ALL INFORMATION IS GIVEN IN AND THE ABILITY (THE MANUFACTURER) PRODUCT(S) ARE SUPPLIED WITH GOOD FAITH BUT AS THEIR USE IS BEYOND THE MANUFACTURER'S CONTROL WITHOUT WARRANTY FOR THE FINAL COMPOSITE PRODUCT OR MATERIAL IN WHICH IT/THEY IS/ARE USED. 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 DOES NOT RELIEVE PROCESSORS AND USERS FROM THE RESPONSIBILITY OF CARRYING OUT THEIR OWN TESTS AND EXPERIMENTS, NEITHER DO THEY IMPLY ANY LEGALLY BINDING ASSURANCE OF CERTAIN PROPERTIES OR SUITABILITY FOR A SPECIFIC PURPOSE. IT IS ALSO THE RESPONSIBILITY OF THOSE TO WHOM WE SUPPLY OUR PRODUCTS, TO ENSURE THAT ANY PROPRIETARY RIGHTS AND EXISTING LAWS AND LEGISLATION ARE OBSERVED.

BATCH CERTIFICATE

<u>SPECIFICATION:</u>	
PRODUCT NAME	'abil-HARD'
CLIENT	ABILITY BUILDING CHEMICALS CO
DATE SUPPLIED	28/7/93
SAMPLE NO.	495
ORDER #	N/A
RAW MATERIAL	ABILITY BUILDING CHEMICALS CO
RAW MATERIAL BATCH #	N/A
BULK VOLUME	-
PACKAGING	-
<u>PARTICLE COUNT</u>	
% BELOW 10 MICRONS	95.8
% 10 TO 20 MICRONS	3.3
% 20 TO 50 MICRONS	0.8
% OVER 50 MICRONS	0.1



ADDITION RATE:

'abil-HARD' is added, usually at the dispersion/'grind' or high speed cavitation mixing stage of manufacture, to virtually any liquid polymer emulsion bound pigmented formula intended for virtually immediate use in coating, moulding, adhering etc processes as a 10% - 100% replacement of the colouring pigment or the total pigment including all (or some of) the non-hiding white extender 'filler' pigments in the formulation or if found suitable, just of the filler pigments alone.

In unpigmented, resin bound composite product systems, such as most adhesives, suggested starting point dose rates for *comprehensive* evaluation to determine suitability may vary from say 5% to 80% of the binder solids.

The higher the proportion of 'abil-HARD' powder to the total water content, the higher will potentially be the stated benefits at a compounding/decreasing rate of the resin's flexibility.

POTENTIAL FEATURES AND BENEFITS:

The product after comprehensive testing and evaluation may at the possible expense of some flexibility, unless additional proportions of latex resin binder is used, typically offer some or all of the following features and benefits:

- * Typically in water based paints and coatings, 'abil-HARD' comprehensively cross-links within, and thereby assists to harden and improve the (film) integrity of, coalesced hardened/dried coatings to potentially result in less thermoplasticity, substantially higher resistance to moisture penetration, solar radiation and weathering as well as improving their resistance to deterioration by chemicals, wet scrubbing, dry abrasion, impact, higher temperature/fire/flame spread and general wear resistance, with a substantial improvement in adhesion - especially when the dried film is dampened, ie the product provides a more bonded, watertight hardened coating or adhesive eg for use in two (2) pack paving paints, ceramic wall and floor tile, other adhesives etc.
- * If residual surfactant *mainly from the latex resin emulsion* is removed from the dried, coalesced paint film, adhesive or product by copious water spraying (example: approximately 6 - 8 substantial hoses with water for 10 minutes in a given area over 2 days) - commencing as soon as it touch dries or just set the 'abil-HARD' modified product/material will usually become *absolutely* watertight.

- * The wide suggested starting point dose rates of say 5% to 80% 'abil-HARD' by weight of the total binder weight, can potentially be used in resin reinforced cellulose paper products in general and fibre board for cartons as a pH increasing water proofing, fire resistance increasing, hardening and strengthening additive in particular. 'abil-HARD' has low foaming potential and may, in some systems reduce or inhibit foaming. Difficulties concerned with the application of formulations that foam, froth etc are usually reduced as is also any macro air entrainment associated with the problem of pin-holing and/or cratering of, the applied coating, adhesive etc prior to it hardening or drying.
 - * Generally the higher the proportion of 'abil-HARD' powder to water in a formula the higher is the potential increase in performance.
 - * In paint/coating formulations 'abil-HARD' helps to disperse fine particulate colouring/hiding pigments not replaced by it and does so, usually more efficiently than added polyacrylate type pigment dispersants used alone. This usually results in better overall solid particle dispersion, more uniform longevity and a finer 'grind' as well as giving a higher degree of colour development and intensity per unit weight of colouring pigment. Colouring pigment proportions may therefore potentially be reduced slightly for the same intensity of colour and a consequent cost saving. The dose rate reduction for colouring pigments, should this occur may potentially prove to be in the 5 – 10% range by weight.
- In addition, in many 'abil-HARD' modified liquid formulations, with the exception of those incorporating ultra, ultra fine particulate materials such as Carbon Black, Phthalocyanine blue etc colouring pigments a 50% by weight reduction of the typically used polyacrylate dispersant and a 20 – 100% by weight reduction of any wetting agent, surfactant, emulsifier or 'dispersant' that reduces the surface tension of water, (eg 'TERIC'S') and the coating or product's water resistance may possibly be effected as a consequence of various improvements associated with improved dispersion of the colouring pigment(s) (eg improved colour development, lower viscosity, better flow etc) as well as the previously mentioned *reduced* foam potential.
- * 'abil-HARD' tends to increase the pH of most composite formulated systems – usually in proportion to its dose rate. This in turn may (or may NOT) proportionally improve the rheological properties of the non-hardened liquid formulation in its application properties. Also the product usually increases a liquid system's thixotropy which in turn may result in applied coatings having a higher dry film build or coating weight per area (higher DFT - Dry Film Thickness) with a consequential increase in durability and prevent 'run-down' of applied liquid paint on vertical surfaces.

PLEASE NOTE:

* 'abil-HARD' MODIFIED FORMULAE/SHOULD PREFERABLY BE COMPLETELY EVALUATED FOR THESE STATED POTENTIAL IMPROVEMENTS FOLLOWING 7-14 DAYS OR LONGER (AT AMBIENT TEMPERATURES) AFTER THEY SET OR 'TOUCH' DRY. THE FULL CURE/MECHANICAL STRENGTH DURABILITY AND RESISTANCE PROPERTIES WILL BE GREATER AT LATE AGES (SAY 7-21 DAYS) AFTER SETTING OR DRYING THAN AT SHORTER PERIODS OF TIME AT A GIVEN TEMPERATURE AND HUMIDITY. PERFORMANCE IMPROVEMENTS WILL BE HIGHER AS THE AMOUNT OF 'abil-HARD' POWDER INCREASES IN RELATION TO THE WATER CONTENT IE THE LOWER THE WATER TO POWDER RATIOS THE HIGHER THE PERFORMANCE.

UPON REQUEST FREE TRIAL SAMPLES OF ABILITY'S EXPERIMENTAL 'abil-HARD' POWDER CAN BE MADE AVAILABLE FOR YOUR THOROUGH EVALUATION AND TESTING BEFORE ACTUAL USE.

WARNING: CARE!

Do not use this water reactive product in formulations that contain resins or pigments sensitive to high pH or are sensitive to higher pH (higher alkalinity) than that found to be optimum (for that particular formula) or in products not used immediately or fairly soon after it's incorporation into the batch on the same day as manufacture.

- * 'abil-HARD' may increase a liquid formulation's initial flow with a probable slight temporary decrease in viscosity as well as the probable decrease in time of ultimate gellation at a given temperature. It would therefore reduce shelf life and 'can stability' of single pack water-based liquid paints, adhesives and other similar product formulae. It may also reduce the drying and 'open' time of the system formula (the time the formulation maintains its initial flow without increasing viscosity after adding and mixing it in) – particularly at higher than average air temperatures.

CONCLUSION:

'abil-HARD' powder has significant potential for the coatings, adhesives, paper boards etc, formulating chemist to improve many aspects of the performance of single pack, air drying, *factory applied* polymer resin latex emulsion bound coatings, composites and adhesives - particularly panel bonding adhesives used in production processes shortly after mixing it in - such as for non-flexible textile coating, metal sheet/plastic laminate composite architectural panel construction, automotive motor vehicle panel adhesives, the production of packaging box/carton products etc — and other similar composite products/materials.

The product may be considered after complete and satisfactory test results for use at higher dose weight percentages than indicated here (that is up to say a 40-80% replacement by weight of the weight of all non hiding filler pigments instead of say a 10-15% replacement) as well as it being potentially supplied in far greater proportions to the intended water content as a separate 'Part B' powder component in two pack liquid, shelf stable coatings and adhesive products of which the Part-A liquid component is based on the latexes previously mentioned. Such two pack catalysed coating/adhesive products being potentially highly suitable in service for areas/service conditions subject to relatively high temperatures (depending on the 'abil-HARD' powder:water ratio - possibly with high proportions of 'abil-HARD' powder up to 180°C), high pH surfaces, high abrasion, salt laden atmospheres, flame spread, acids and other chemicals, constant dampness/wetting etc, poorly prepared surfaces and extreme exposure to weathering.

TEST FIRST BEFORE USE – TRIALS AND COMPREHENSIVE TECHNICAL EVALUATION ARE ESSENTIAL.

'abil-HARD' WAS INVENTED, DEVELOPED AND IS MANUFACTURED BY ABILITY BUILDING CHEMICALS,
A SOLELY AUSTRALIAN OWNED AND OPERATED COMPANY.

PLEASE DIRECT ALL ENQUIRIES FOR AUSTRALIAN SUPPLY AND EXPORT ORDERS TO

**ABILITY BUILDING CHEMICALS CO
SUBSIDIARY OF AUSTRALIAN OXIDES PTY LTD**

ABILITY BUILDING CHEMICALS ARE MANUFACTURERS OF FINE, UV RESISTANT 'abilox[®]', 'EARTHY' TONE MINERAL OXIDE AND 'duro[®]' BRIGHT AND SEMI-BRIGHT ORGANIC/INORGANIC COLOURING PIGMENTS, ADDITIVES ETC FOR INDUSTRY: CHEMICAL ADMIXTURES TO MODIFY, IMPROVE, PROTECT AND DECORATE CONCRETE & MORTARS AS WELL AS A RANGE OF SPECIALISED *LONG-LIFE*, FILM FORMING, HIGH PERFORMANCE SURFACE COATINGS FOR CONCRETE AND OTHER BUILDING SURFACES.

WAREHOUSE AND OFFICE:

(PO BOX 391)

124 -126 NORTHERN ROAD

WEST HEIDELBERG

VICTORIA, 3081, AUSTRALIA

TEL: (03) 9457 6488

INTERNATIONAL TEL: +61 3 9457 6488

FAX: (03) 9458 4683

INTERNATIONAL FAX: +61 3 9458 4683

CONTACTS: PETER GRAY - Manager
MICHAEL TREACY - Production Manager

PRODUCTS OF EXCELLENCE



- ACHIEVING BETTER CONCRETE
- ACHIEVING BETTER COATINGS
- ACHIEVING BETTER COLOURS

ACTIVE SELLING AGENTS AND DISTRIBUTORS ARE REQUIRED IN SOME AREAS OF AUSTRALIA AND OFF-SHORE. 'abil-HARD' IS AVAILABLE FOR EXPORT. PLEASE CONTACT US NOW FOR FURTHER DETAILS OF THIS EXCELLENT COMMERCIAL BUSINESS OPPORTUNITY. YOUR ENQUIRIES WILL RECEIVE OUR PROMPTEST ATTENTION.

BUSINESS MOTIVATION:

OUR BUSINESS IS MOTIVATED AND DRIVEN BY CUSTOMER DEMAND NOT SOLELY BY MANAGEMENT POLICY.

PLEASE TAKE CAREFUL NOTE THAT:

THIS INFORMATION, PRESENTATION, PRODUCT LABELLING AS WELL AS THE PRODUCT FORMULA ARE THE INTELLECTUAL PROPERTY OF ABILITY BUILDING CHEMICALS CO'S SUBSIDIARY OF AUSTRALIAN OXIDES PTY LTD.

PRODUCTS OF EXCELLENCE:

ABILITY BUILDING CHEMICALS CO, SUBSIDIARY OF AUSTRALIAN OXIDES PTY LTD, STRIVES TO PRODUCE USEFUL PRODUCTS THAT LAST (AND LAST) AND WHEN USED INTELLIGENTLY, ACCORDING TO OUR RECOMMENDATIONS, WORK DEPENDABLY; ARE OFTEN CAPABLE OF IMPARTING GREAT BEAUTY AND WHICH ARE THE BEST OF THEIR KIND.