

**ALBRIGHT  
& WILSON**

**TECHNICAL BULLETIN**

**PRODUCTS FOR MINING  
AND MINERAL  
PROCESSING**



## RHEOLOGY CONTROL

Both Gardisperse 200P and Gardisperse 400 are very effective viscosity reducing agents. They can be used for example to control rheology of copper concentrate slurries, enabling the slurries to be pumped for long distances at high solids content.

Gardisperse 200P is particularly effective on clays. The use of Gardisperse 200P allows processing of higher solids slurries in gold mining operations where clays are a problem in the ore.

Gardisperse 400 is used extensively to reduce the viscosity and improve the flowability of concrete slurries used in the construction industry. There is potential for their use to improve the handling and increase the strength of cemented backfill used in mining operations.

A&W products for rheology control include:

**ALBRITE TSPP** tetrasodium pyrophosphate

**POLYFOS IG** sodium tripolyphosphate

**GARDISPERSE 200P**

**GARDISPERSE 400**

## DISPERSION

As a corollary to their use in rheology control, A&W polyphosphates and polynaphthalene sulphonates are excellent dispersing agents. A typical application is the use of polyphosphate to disperse crude kaolin in the process of converting it into products suitable for paper coating. Polyphosphates are also used to disperse titanium dioxide slurries and in the separation of rare earth minerals.

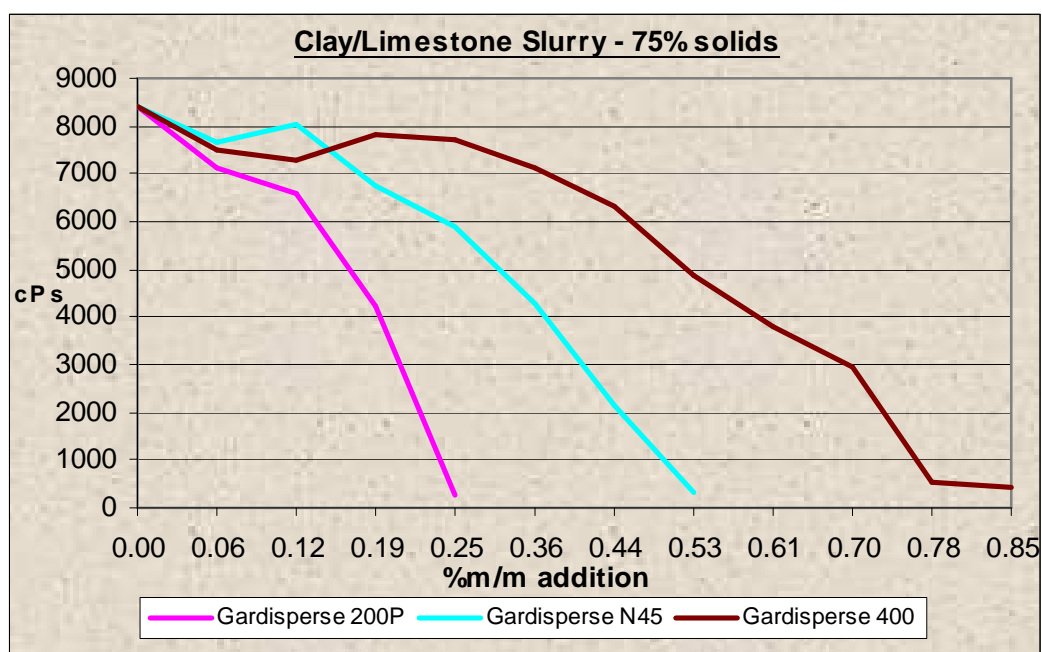


Figure 1

Figure 1 above shows the viscosity reduction effects of 3 dispersants on a 75% solids clay/limestone slurry where relatively minor amounts of dispersants significantly reduce the viscosity of high solids slurries.

Both Gardisperse 200P and Gardisperse 400 are effective dispersants for coal water mixtures, allowing stable 70% solids (and greater) slurries to be prepared.

In the flotation of mineral ores the best separation is likely when the minerals are dispersed. Selective dispersion can be an effective technique and Gardisperse 200P is used to advantage in this way to separate nickel sulphides from magnesium gangue minerals.

A&W products for dispersion include:

**ALBRITE TSPP** tetrasodium pyrophosphate

**POLYFOS IG** sodium tripolyphosphate

**GARDISPERSE 200P**

**GARDISPERSE 400**

## FLOTATION



The benefits of Gardisperse 200P in ore flotation may be simply related to their dispersing characteristics, as mentioned in the previous section, or may be attributable to their multifunctional nature. Improved recovery rates in flotation of copper concentrates are one of the areas where benefits have been demonstrated.

A&W products for ore flotation:

**POLYFOS<sup>®</sup> IG** sodium tripolyphosphate

**GARDISPERSE 200P**

## DEPRESSANTS

Gardisperse 200P and Gardisperse 400 have depressant properties useful in ore flotation. Gardisperse 400 acts as a depressant for carbonaceous impurities. They can be used to depress carbonaceous pyrites in lead/zinc circuits and to minimise "preg-robbing" in gold recovery. Gardisperse 200P's depressant action, such as in the depression of siliceous gangue in base metal flotation, may be a function of its selective dispersing power, and is also able to wet and disperse talcs.

A&W depressants:

**GARDISPERSE 400**

**GARDISPERSE 200P**

**POLYFOS IG** sodium tripolyphosphate

## **DRILLING AIDS**

All of the polyphosphates are effective deflocculants in drilling muds but the most widely used are sodium acid pyrophosphate and the sodium hexametaphosphates. The hexametaphosphates are effective at lower concentrations but can be prone to breakdown at the higher temperatures found in deep wells. The acid pyrophosphates are much more stable under these adverse conditions.

Surfactants are useful components in drilling fluids both for foam drilling and drilling detergent formulations. Our wide range of locally manufactured products includes ethoxy sulphates and alkyl benzene sulphonates. Drilling detergents can be formulated to take advantage of the synergies between polyphosphates and surfactants.

A&W products for drilling:

**CALGONT** sodium hexametaphosphate

**ALBRITE SAPP** sodium acid pyrophosphate

**GARDILENE LSM30/AU** sodium alkyl ethoxy sulphate

**GARDILENE LAM30/AU** ammonium alkyl ethoxy sulphate

**GARDILENE S25/L** sodium alkyl benzene sulphonate

## **MILLING**

Wet milling is commonly practised in the mineral processing industry. Slurry rheology is a key parameter in determining milling effectiveness and the addition of dispersants at the wet milling stage can lead to reduced power consumption, increased yield and improved separation. Inorganic dispersants such as the polyphosphates are amongst the most effective materials in this application.

Sequestration of impurity elements or conditioning of the mineral particles can also be achieved at this stage. Polyphosphates can act multi-functionally to achieve the desired results. In the attritioning of mineral sands, iron staining is reduced and separation in the HT circuit is improved.

A&W products for wet milling:

**ALBRITE® TSP** tetrasodium pyrophosphate

**POLYFOS® IG** sodium tripolyphosphate

**GARDISPERSE 200P**

## **WETTING AGENTS**

A&W manufactures a large range of anionic, nonionic and cationic surface active agents with wetting, dispersing and cleaning properties. The wetting agent most frequently used in the mining industry is sodium di- (2 ethyl hexyl) sulphosuccinate.

Surfactants are most widely used for dewatering applications in the sulphide minerals, iron ore and coal industries.

## **SCALE INHIBITORS**

Scale control can be important in general water supply (including reverse osmosis facilities), cooling water, boiler water and in the production process itself.

In general water supply the polyphosphates are most commonly used for threshold treatment of scale. In reverse osmosis applications calcium sulphate scale can be prevented by the addition of Calgon T. The membrane manufacturer should be consulted to ensure compatibility.

For boiler water treatment the orthophosphates can be used, but for convenience of use Calgon T is preferred. Examples of in-process problems that can be controlled by polyphosphates are calcium sulphate in phosphoric acid production, and scales and filter clogging in cyanide recovery of gold.

A&W products for scale control:

**ALBRITE** disodium phosphate anhydrous

**CALGON T** sodium hexametaphosphate

### **Albright & Wilson (Australia) Limited**

ABN 36 004 234 137

#### **SALES OFFICES**

Region	Telephone	Facsimile
New South Wales, Victoria, Tasmania and South Australia	1800 814 730	1800 814 740
Queensland	(07) 3808 5888	(07) 3808 3500
Western Australia	(08) 9356 2277	(08) 9356 2278
New Zealand	(09) 520 5915	(09) 520 6301

[www.albright.com.au](http://www.albright.com.au)  
[sales@albright.com.au](mailto:sales@albright.com.au)

**Issued July 2007**

® **ALBRITE, POLYFOS, CALGON** and **GARDISPERSE** are registered trademarks of Albright & Wilson (Australia) Limited

*PLEASE NOTE there may be uses or applications of products we sell which are protected by patents and customers in their own interest should take necessary steps to avoid infringement of such patents. Every endeavour has been made to ensure that the information contained in this publication is reliable, but we shall not be liable for any inaccuracy in the information or for any loss, injury or damage whatsoever or howsoever arising which may result from its use. All sales of products referred to in this publication which are sold by Albright & Wilson (Australia) Limited or Albright & Wilson Specialities Pty Ltd will be made pursuant to our standard Terms of Sale, available upon request*