

ACUSOL™ 445

Detergent Polymer

ACUSOL™ 445 is an homopolymer of acrylic acid with an optimized molecular weight to be used in different applications such as : automatic dishwashing, powder and liquid fabric wash, laundry additives, industrial and institutional detergents.

It is supplied in liquid form and available as partially or fully neutralized grades.

PHYSICAL AND CHEMICAL PROPERTIES

(these do not constitute specifications)

Aspect	clear solution to slightly yellow
Chemical nature	acrylic polymer
Grade	partially neutralised Na form
Average molecular weight (Mw)	4500
Total solids (%)	48
Specific gravity (at 25°C)	1.24
pH as is (at 25°C)	3.7
Viscosity Bookfield (mPa.s at 25 °C)	650
Residual acrylic acid (ppm)	10

CHEMISTRY AND MODE OF ACTION

ACUSOL™ 445 is an homopolymer of acrylic acid with selected molecular weight around 4500 in order to optimize the following properties.

- **Anti-precipitation** : ACUSOL™ 445 will increase solubility of precipitating salts by threshold effect. This allows to reduce in the wash bath precipitation of inorganic salts (carbonates, phosphates, sulphates of Ca and Mg).
- **Crystal distortion** : this polymer gets entrapped into crystal lattices, preventing their growth and facilitating their breakage. This minimizes adherence of salts on surfaces and facilitate their elimination by rinsing.

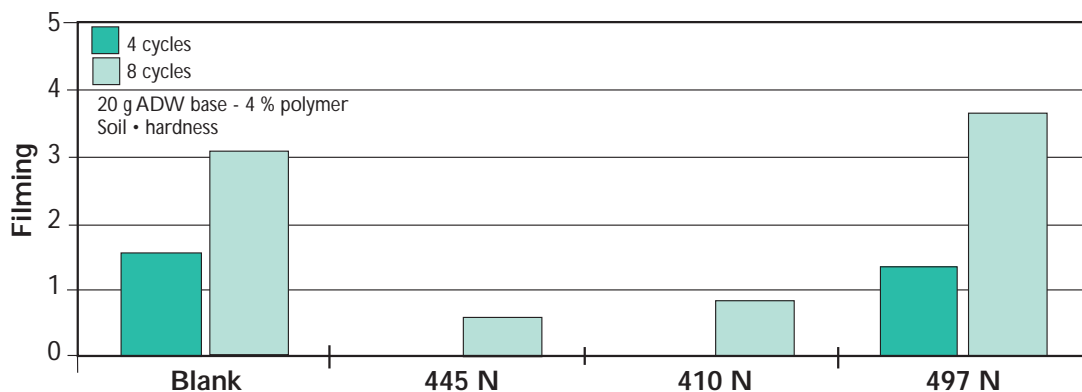
- **Dispersing properties** : this polymer is a good dispersant for soils and will help to prevent their redeposition on surfaces in particular glass and dishwares.
- **Processing aids** : the polymeric and chemical nature of ACUSOL™ 445 will bring binding properties which can be useful in several detergent manufacturing processes especially tableting.

BENEFITS

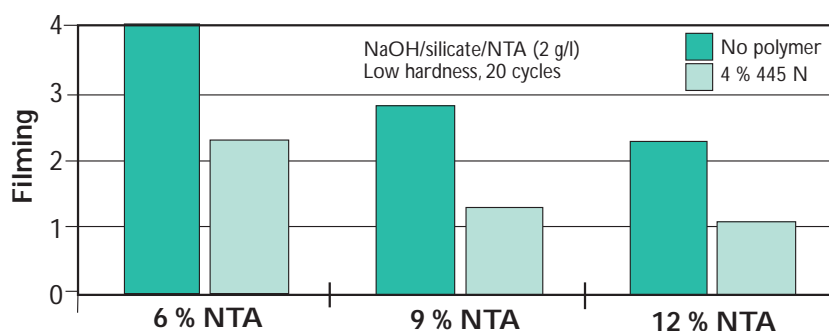
ACUSOL™ 445 is a key ingredient in autodish formulations and in institutional and industrial cleaners. It might also perform in laundry additions. By using this polymer, the detergent manufacturers will enjoy the following advantages :

- **Inhibition of crystal growth**, thus preventing precipitation of carbonates phosphates or silicates.
- **Dispersion of precipitates** in the cleaning bath to avoid settling and scaling on surfaces and fibers.
- **Improvement of filming maintenance** by soil dispersion, which minimize organic components deposition on glass and dishwares.
- **Increase of bleach stability** especially in chlorinated formulations by binding heavy metals which destabilize chlorine species through catalytic reactions.
- **Use in medium alkaline to very alkaline formulations**, thanks to high solubility of ACUSOL™ 445 in caustic products. Caustics should be added slowly to a water premix containing polymer to avoid high pH gradients.

FILMING INHIBITION IN ADW 8 cycles - Carbonate/silicate formulation



FILMING INHIBITION IN INDUSTRIAL DISHWASHING



DOSE RATES

To obtain an optimal effectiveness this polymer should be used at levels between 250 and 1000 ppm in the wash baths (household) and 100 to 500 ppm for industrial purposes. This will generally correspond to 2-6 % (as is) in liquid formulation.

ACUSOL™ 445 is designed to be used in phosphate based or phosphate free detergents, the latter based on carbonate, silicate, citrate and NTA.

ACUSOL™ 445 is a suitable candidate for automatic dishwashing detergents, alkaline and chlorinated cleaners.

In addition, ACUSOL™ 445 can be incorporated in carbonate rich fabric wash powders, and at low level in liquid laundry formulations.

MATERIAL SAFETY DATA SHEETS

Rohm and Haas company maintains Material Safety Data Sheet (MSDS) on all of its products. These contain important information that you may need to protect your employees and customers against any known health and safety hazards associated with our products. We recommend you obtain copies of MSDS for our products from your local Rohm and Haas technical representative or the Rohm and Haas company. In addition, we recommend you obtain copies of MSDS from your suppliers of other raw materials used with our products.

**More information on the web about our products and services
and all our worldwide addresses: www.acusol.com**

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