



Technical Data Sheet

ACUSOL™ 445 Detergent Polymer for Laundry **ACUSOL™ 445N Detergent Polymer for Laundry** **ACUSOL™ 445ND Detergent Polymer for Laundry**

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

It is supplied in liquid form and available as partially (ACUSOL™ 445 Detergent Polymer) or fully neutralized (ACUSOL™ 445N Detergent Polymer) grades. It is also available in a spray-dried form (ACUSOL™ 445ND Detergent Polymer).

Features & Benefits

ACUSOL™ 445N Detergent Polymer is a key ingredient in household, institutional and industrial cleaners and laundry detergents. By using this polymer, the detergent manufacturers will enjoy the following advantages:

- Inhibition of crystal growth, thus reducing 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 dish wares.
- 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, due to high solubility of ACUSOL™ 445N Detergent Polymer in caustic products. Caustics should be added slowly to a water premix containing polymer to avoid high pH gradients.
- Reduces the redeposition of clay sink onto the fabric or hard surface by keeping the particles suspended in the wash bath.

Composition

ACUSOL™ 445N Detergent Polymer is a homopolymer of acrylic acid with selected molecular weight around 4500 in order to optimize the following properties:

- Anti-precipitation: ACUSOL™ 445N Detergent Polymer can 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 facilitates their elimination by rinsing.

Composition (Cont.)

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

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Property	Unit	Result		
		ACUSOL™ 445 Detergent Polymer	ACUSOL™ 445N Detergent Polymer	ACUSOL™ 445ND Detergent Polymer
Appearance		Clear solution to slightly yellow	Clear solution to slightly yellow	White to tan, free flowing powder
Grade		Partially neutralized Na form	Fully neutralized	Fully neutralized, spray dried
Average molecular weight Mw		4500	4500	4500
Total solids	%	48	45	92–94
Specific gravity (at 25°C)		1.24	1.32	
pH as is (at 25°C)		3.7	6.9	6.5–7.5
Viscosity Brookfield (mPa.s/cps at 25°C)		650	800	

Performance Properties

Typical values, not to be construed as specifications. Users should confirm results by their own tests.

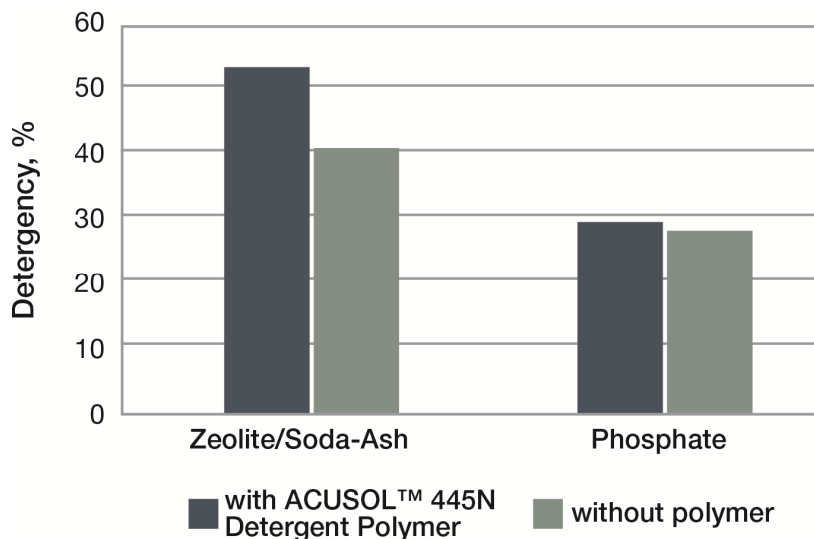


Figure 1. Cleaning vs. Detergent Base (Clay Soil Removal on Cotton)

The use of a dispersant polymer will enhance the cleaning properties (clay soil removal) of laundry detergents based on both zeolite/soda ash and phosphate.

Performance Properties (Cont.)

Conditions

Zeolite/Soda-Ash-Based: 150 ppm hardness; 0.15% detergent; 38°C; 10 minute wash.

Phosphate-Based: 150 ppm hardness; 0.1% detergent; 49°C; 10 minute wash.

Typical values, not to be construed as specifications. Users should confirm results by their own tests.

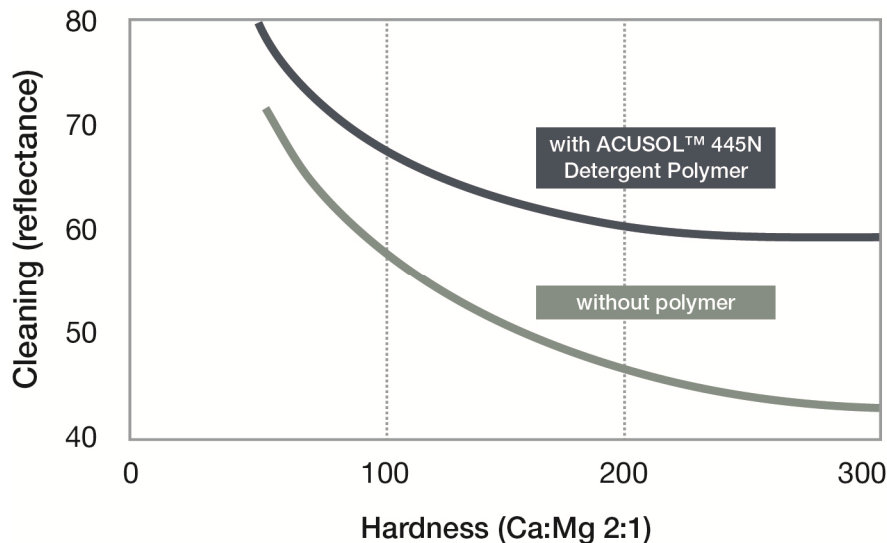


Figure 2. Effect of Polymer on Cleaning (Clay Soil Removal on PE/Cotton)

The cleaning performance of any laundry detergent is inversely related to water hardness. The use of a dispersant polymer such as ACUSOL™ 445N Detergent Polymer, however, can help to offset the effect of the hardness.

Conditions

Zeolite/Soda-Ash-Based: 150 ppm hardness; 0.15% detergent; 38°C; 10 minute wash.

Phosphate-Based: 150 ppm hardness; 0.1% detergent; 49°C; 10 minute wash.

Performance Properties (Cont.)

Typical values, not to be construed as specifications. Users should confirm results by their own tests.

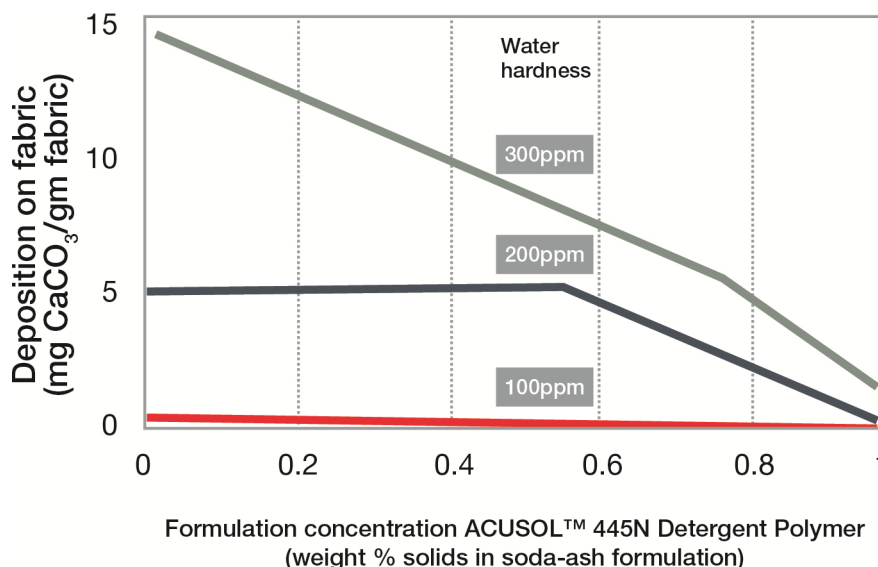


Figure 3. Effect of ACUSOL™ 445N Detergent Polymer on the Deposition of CaCO₃

ACUSOL™ dispersant polymers have a remarkable ability to reduce calcium carbonate deposition (encrustation) on laundry during the wash cycle. Even with very hard water (300 ppm calcium), adding 1.0 percent of ACUSOL™ 445N Detergent Polymer to a soda-ash-based detergent will virtually eliminate encrustation.

Conditions

Soda-Ash-Based: 0.1% detergent; 40°C; 10 minute wash/5 minute rinse; 5 cycles.

Dose Rates

To obtain an enhanced 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™ 445N Detergent Polymer is designed to be used in phosphate based or phosphate free detergents, the latter based on carbonate, silicate, citrate and NTA.

ACUSOL™ 445N Detergent Polymer is a suitable candidate for alkaline and chlorinated cleaners. In addition, ACUSOL™ 445N Detergent Polymer can be incorporated in carbonate rich fabric wash powders, and at low level in liquid laundry formulations.

Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

Usable Life and Storage

Store product in tightly closed original container at temperatures recommended on the product label.

Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

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