



## ACUSOL™ 425N Dispersant Polymer

ACUSOL™ 425N Dispersant Polymer is an acrylic acid copolymer which offers exceptional threshold effect and scale inhibition in automatic dishwashing, industrial and institutional cleaners.

### Features & Benefits

ACUSOL™ 425N Dispersant Polymer is a suitable cobuilder in automatic dishwashing, institutional and industrial cleaners. It can also be used in advanced laundry detergents with a high content of soluble and/or precipitating builders. The following advantages can be obtained from its use:

- Especially high performance in carbonate rich, low to no phosphate systems.
- Inhibition of crystal growth, helping to minimize precipitation of insoluble salts.
- Dispersion of precipitates in the cleaning bath to avoid settling and scale formation on hard surfaces and fibers.
- Improve filming on glassware, ceramic plates, and flatware.
- Can be used across a wide range of alkalinity levels, from medium to very alkaline formulations. Has a moderate to high solubility in caustic media (can be incorporated in NaOH or KOH based formulations).
- Use in chlorinated formulation due to its bleach stable structure. In addition, ACUSOL™ 425N Dispersant Polymer can contribute to an increase of chlorine stability by binding heavy metals which act as catalysts to reduce chlorine species.

### Typical Properties

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

Property	Unit	Result
Appearance		Clear fluid, free of visible matter
Chemical Nature		Acrylic polymer
Grade		Neutralized form sodium salt
Average Molecular Weight (Mw)	g/mole	~1900
Total Solids	%	50
pH as is (at 25°C)		7.5
Brookfield Viscosity (at 25°C)	mPa.s/cps	2000

## Chemistry and Mode of Action

### Anti-precipitation

ACUSOL™ 425N Dispersant Polymer will increase solubility of precipitating salts by threshold effect. Solubility enhancement by threshold effect, which reduces precipitation of low solubility inorganic salts (calcium carbonate in particular). This will minimize film formation on glass and dishware as well as mineral encrustation (graying) on the fabrics.

### Crystal Distortion

The polymer gets entrapped into crystal lattices, minimizing their growth and facilitating their breakage. Crystal growth modification, which deforms the growing inorganic salt crystal to give small, irregular, readily fractured crystals that do not adhere well to surfaces and can be easily removed during cleaning operations.

### Dispersing Properties

Dispersing activity which minimizes precipitated crystals or other inorganic particles from agglomerating and depositing on surfaces.

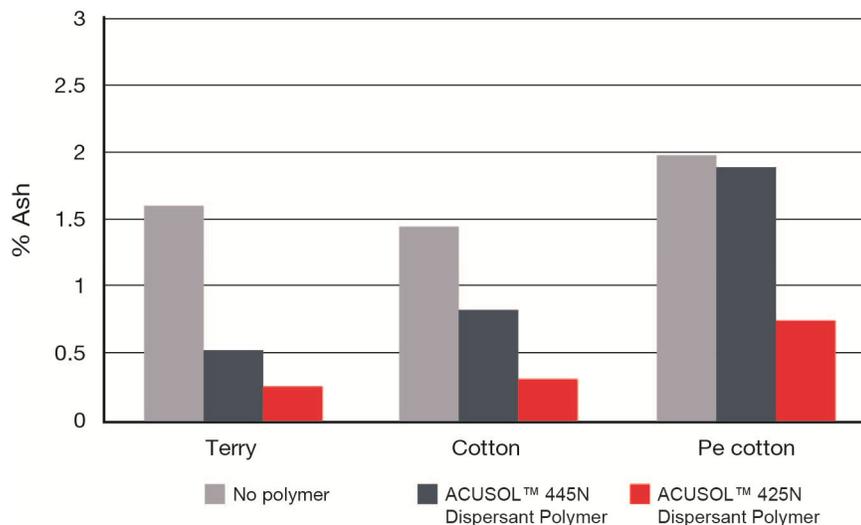
### Binding

The chemical nature of this functionalized acrylate supports its use in specific applications where higher binding capacity vs. Ca<sup>2+</sup>, Mg<sup>2+</sup> and divalent metal ions is required.

### Mineral Encrustation Inhibition in Laundry Formulation Without Zeolite

Effect of various polycarboxylates on film inhibition (no phosphate/intermediate-high carbonate) % ash after 25 cycles – Silicate/Carbonate/Bicarbonate 2/1/1 4% dry polymer - 60°C - 500 ppm as CaCO<sub>3</sub> hardness

% Ash After 25 Cycles – Silicate/Carbonate/Citrate 1/1/1  
4% dry polymer - 60°C - 500 ppm as CaCO<sub>3</sub> hardness



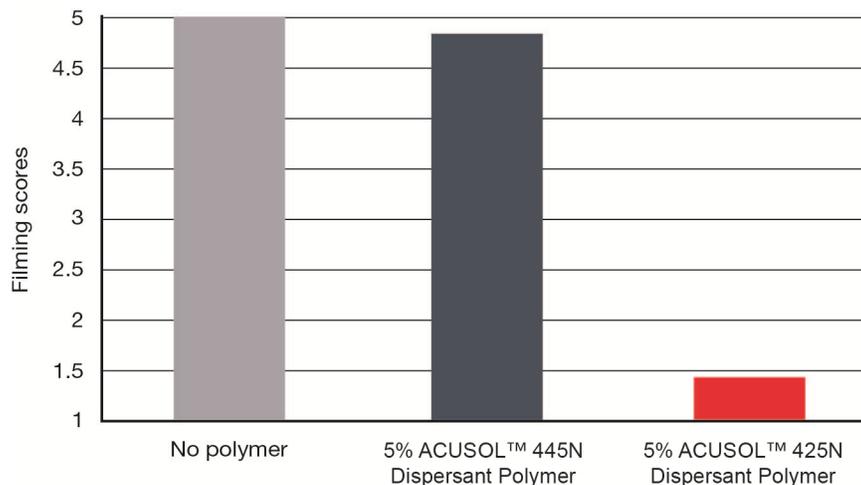
**Figure 1**

The graphic representations are presented here for illustrative purposes only and should not be construed as product specifications.

## Chemistry and Mode of Action (Cont.)

### Effect of Various Polycarboxylates on Film Inhibition (No Phosphate/Intermediate-High Carbonate)

Kenmore Dishwashers, 5 Cycles, 300 ppm (3/1 Ca<sup>++</sup>/Mg<sup>++</sup>) Water Hardness, 130°F, No Food Soil, ASTM Rating System (1 = Clean Glass, 5 = Heavily Filmed)



**Figure 2**

The graphic representations are presented here for illustrative purposes only and should not be construed as product specifications.

## Dose Rates

An exceptional effectiveness will be obtained when using this polymer at levels between 125 and 500 ppm in wash baths for household applications, and between 100 to 500 ppm for industrial purposes.

This will generally correspond to 2 to 8% of polymer as is in powdered formulations.

ACUSOL™ 425N Dispersant Polymer is an excellent scale inhibitor for phosphate free automatic dishwashing formulations, based on a carbonate/silicate/citrate combination. ACUSOL™ 425N Dispersant Polymer is a high performing threshold agent for very alkaline and chlorinated cleaners. ACUSOL™ 425N Dispersant Polymer is particularly effective when used in zeolite free laundry detergents to maintain whiteness and avoid mineral encrustation on the fabrics. Performance is enhanced in high carbonate 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](http://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**

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