Technical Data Sheet

ACUSOL™ 527G Polymer

ACUSOL™ 527G Polymer is a multifunctional, non-sulphonated monomer containing, hydrophobic modified dispersant that provides calcium and magnesium tolerance and threshold effect along with excellent carbonate, phosphonate and silicate scale inhibition in automatic dishwashing applications, providing an exceptional shine in MGDA-free formulations. ACUSOL™ 527G Polymer is commercially available in granular format and comes partially neutralized.

ACUSOL™ 527G Polymer is an excellent scale inhibitor for both phosphonate-containing and phosphate free automatic dishwashing formulations.

Features & Benefits

- High performance in both phosphonate and non-phosphate systems. This includes detergents that may contain carbonate, phosphonate, citrate, silicate, or other builders.
- Acts against multiple scale types: carbonate, silicate and phosphonates.
- Inhibits crystal growth, enabling it to prevent precipitation of insoluble salts.
- Reduces filming on glassware, ceramic plates and flatware.
- Disperses precipitates in the cleaning bath to avoid settling and scale formation on hard surfaces.

Composition

- Acrylic/carboxylate copolymer, sodium salt

Applications

- Automatic dishwashing detergents
- Laundry detergents

Typical Properties

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

Property	Unit	Result
Appearance		White, granular solid
Chemical Nature		Acrylic/carboxylate copolymer
Total Solids	%	95
pH (1% Solution; at 25°C)		4–7
Bulk Density	g/L	500–800

Form No. 27-2969-01-1120 S2D

Description

- Superior carbonate dispersancy compared to copolymer of acrylic and sulfonic acids
- Prevents HEDP scale seen in acrylic homopolymer formulations

Solubility

Due to its chemistry, ACUSOL™ 527G Polymer demonstrates superior water hardness tolerance compared with acrylic acid homopolymers. Its solubility in calcium containing aqueous solutions is notably higher than acrylic acid homopolymers as seen by Hardness Tolerance tests, where insoluble species formed in solution by polymer calcium complexation will scatter light and reduce the transmittance.

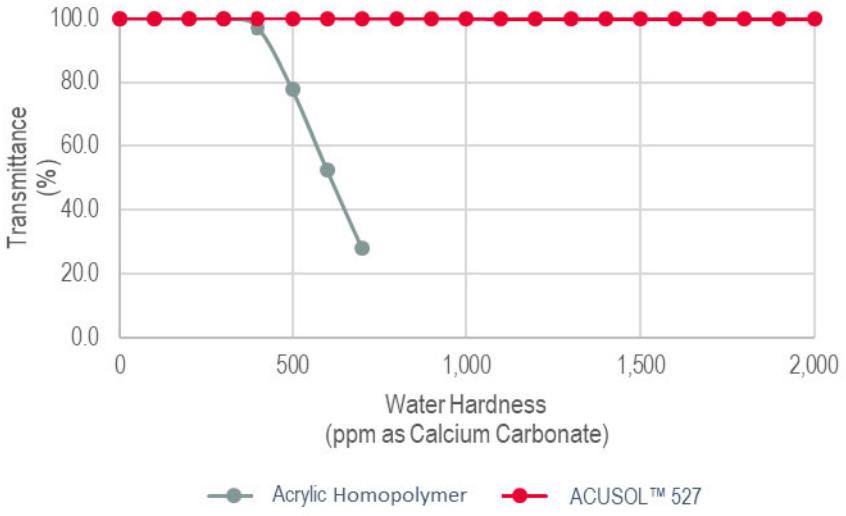

Figure 1: Hardness Tolerance

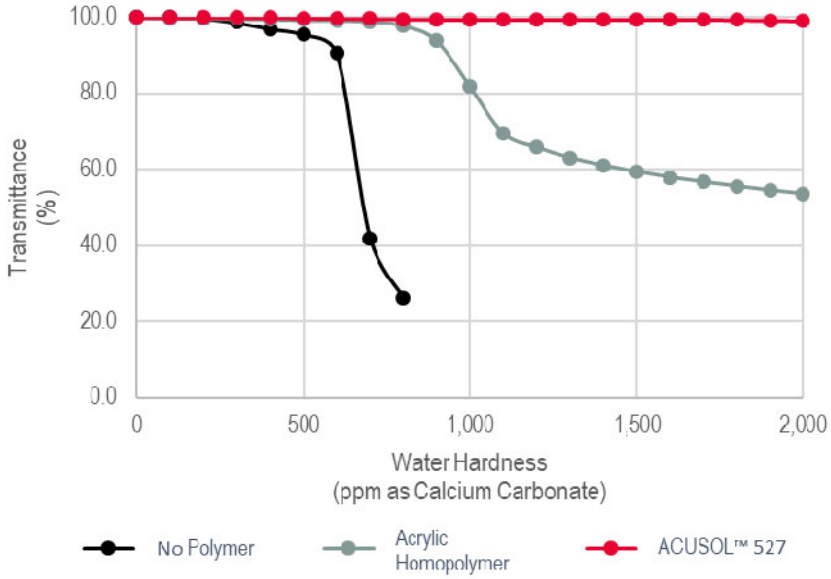

Figure 2: Calcium Carbonate Inhibition

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Solubility (Cont.)

Anti-precipitation
ACUSOL™ 527G Polymer will increase solubility of precipitating salts by threshold effect thus increasing salt tolerance. Solubility enhancement reduces precipitation of low solubility inorganic salts (calcium organic/inorganic complexes and magnesium silicate in particular). This will significantly reduce film formation on glass and dishware. This can be seen in calcium carbonate inhibition screens, where formation and growth of calcium carbonate crystals increase turbidity and reduce transmittance.

Crystal Distortion
ACUSOL™ 527G Polymer gets entrapped into crystal lattices, preventing their growth and facilitating their breakage. Crystal growth modification, which deforms the growing inorganic salt crystals gives small, irregular, readily fractured crystals that do not adhere well to surfaces. This permits any crystals formed to be easily removed during cleaning operations.

Dispersing Properties
ACUSOL™ 527G Polymer exhibits good dispersing activity which prevents precipitated crystals or other inorganic or organic particles from agglomerating and depositing on surfaces.

How to Use

To obtain an optimal effectiveness this polymer should be used at levels between 5 and 225 ppm in the automatic dishwasher wash baths (household) and 20 to 200 ppm for industrial purposes. This will generally correspond to around 0.5%–5% (as solid) in detergent formulations for household applications and around 2%–10% (as solid) in detergent formulations in industrial and institutional applications.

ACUSOL™ 527G Dispersant Polymer can be advantageously combined with other polymers, such as, ACUSOL™ 445 Polymer product family, ACUSOL™ 420N, ACUSOL™ 425N, ACUSOL™ 448, and ACUSOL™ 460N Polymer product family for optimal performance. Combining ACUSOL™ 527G Polymer with ACUSOL™ 528 Polymer / ACUSOL™ 528G Polymer also proved synergies for spot reduction on different substrates.

Formulation Example

Dance Brilliance - Automatic Dish Washing Monodose
ACUSOL™ 527G Polymer was formulated in the following Automatic Dish Washing Monodose combined with ACUSOL™ 528 Polymer and anti-spotting surfactant ECOSURF™ Bright 1 Surfactant, TERGITOL™ 15-S-7 Surfactant, and ECOSURF™ LFE-1410 Surfactant, two nonionic surfactants aiming to boost respectively cleaning performance on fat and foam control properties.

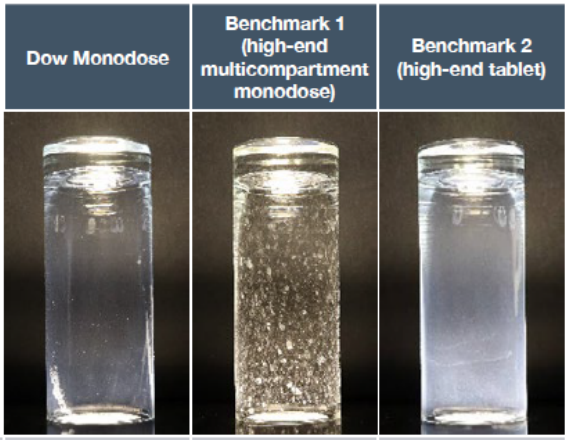
Formulation
Weigh all powdered/granular components and mix them until fully dispersed. Separately, mix ECOSURF™ Bright 1 Surfactant, TERGITOL™ 15-S-7 Surfactant and ECOSURF™ LFE-1410 Surfactant. Heat up to 40°C, mix until homogeneous. Let the mixture cool down to room temperature then add perfume and pigment to this solution. Mix until homogeneous.

Formulation Example (Cont.)

	Trade Name	% Wt
Solid	**ACUSOL™ 527G Polymer**	**3.1**
	ACUSOL™ 528G Polymer	**3.1**
	Sodium Carbonate	30.7
	Sodium Citrate	22.3
	Cublen K8514G	5.6
	Sodium Percarbonate	9.3
	Weylclean FDO-X/XP	5.0
	EXCELLENZ P1000	5.0
	EXCELLENZ S1000	3.1
	Britesil H20	2.5
Liquid	**ECOSURF™ Bright 1 Surfactant**	**3.1**
	ECOSURF™ LFE1410 Surfactant	**1.5**
	TERGITOL™ 15-S-7 Surfactant	**4.8**
	Citrus ADW43	0.2
	Liquitint Bright Red	0.9
		QS 100%

Shine Performance

Rinse test performed on Miele GLS2, Program: 65°C/8'/65°C, IKW soil, 5 cumulative wash cycles.



	Dow Monodose	Benchmark 1 (high-end multicompartment monodose)	Benchmark 2 (high-end tablet)
Spots	1	4.5	1
Film	2	1.5	3

Figure 3: Visual Assessment of Film & Spot on Glass from 0 (No Deposit) to 5 (Maximum Deposit)

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

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