



# Ashland Home Care

## Overview Guide

**ASHLAND**<sup>®</sup>

With good chemistry great things happen.™



## Reimagining Home Care Formulations

Changing consumer needs and the trend toward sustainable solutions are driving manufacturers of home care products to expand the capabilities of finished formulations. Today, virtually every major manufacturer is rethinking established brands or creating entirely new products to better serve consumers. Moving new innovations to market, however, may require novel chemistry, novel formulating techniques or combinations of technologies to address a host of consumer needs.

Ashland Care Specialties, a leading provider of performance polymers, encapsulation technologies, preservatives and specialty surfactants, offers global R&D and technical services to help formulators create differentiated products with exceptional efficiency and efficacy. Manufacturers with complex formulation challenges or a need to create differentiated attributes work with Ashland in all phases of the development process. Offering both commercial and custom technologies, Ashland supports formulators and marketers to deliver specific consumer benefits and sustainability profiles in finished formulations.

## Translating Science to Consumer-perceivable Benefits

Consumers want products that make cleaning easier. Marketers want fragrances that deliver specific sensory attributes. Most want to reduce their carbon footprint, and everyone is in search of the next big technology that will change the way we look at cleaning laundry, dishes and hard surfaces.

Meeting current market demands and developing innovations to meet future consumer needs, however, is a real challenge. That is why a world-class team at Ashland is committed to supporting novel technology, new innovations and end-user needs. In making this commitment, we provide customers the optimum level of support required to commercialize new products that attract consumer attention. Investing in the technology and innovation requirements of customers, Ashland provides resources in these key areas:

- **Synthetic and natural polymer research.** Polymer synthesis scientists work with naturally derived, semi-synthetic and synthetic polymers to create one or more effects in cleaning formulations. With a highly diverse polymer technology portfolio, Ashland's synthesis experts lead projects that require unique consumer benefits in addition to traditional functionality. Scientists work directly with formulators, applications experts and consumer scientists who require novel performance and functionality with commercial polymers or polymer hybrids specifically designed to impart a range of performance attributes in new products.
- **Project-specific technical service.** When a polymer, encapsulant, soil release technology, anti-soil redeposition agent or other technology is identified as a potential formulation solution, Ashland's technical service team helps formulators and marketers realize those benefits in customer-specific formulations.
- **Formulation support.** Making starter formulations perform as intended is the task of Ashland's specialists. Expert chemists support product development to provide the most efficient formulating solutions containing Ashland technologies.
- **Consumer science support.** Consumer science is about connecting and translating laboratory findings to consumer-perceivable benefits. Ashland's consumer science team works closely with customers to achieve product innovations.



### Global Capabilities

- Primary laboratories in the Americas, Europe, Asia, and the Middle East support global and local needs.
- Polymer synthesis experts create new technologies and understand structure-function relationships.
- Technical service experts help formulators create new/improved end-product benefits.
- Cleaning product formulation specialists translate benefits to starter formulations.
- Consumer science experts identify where and how these benefits may be leveraged in the marketplace.



## Formulation Solutions from Ashland

Did you know Ashland is a leading supplier of commercial technologies that solve some of the most complex formulation challenges in laundry, dishwashing and hard surface cleaning applications? These technologies address an ongoing need to improve soil removal from various substrates and hold it in suspension, as well as emerging needs such as lending protective properties to clothes, surfaces and dishes. Ashland's recent formulation solutions include:

### Solutions in laundry care

- Improved product sustainability profiles with efficient cold-water cleaning
- Improved color protection of clothes during cleaning
- Anti-redeposition of soil for better cleaning
- Mineral scale control to limit encrustation on fabrics
- Encapsulation of ingredients in formulation such as fragrances and actives
- Rheology modification of liquid laundry care products for improved consumer experience



### Solutions in dishwashing

- Superior auto dish cleaning performance without phosphates
- Improved mineral scale prevention to reduce spotting
- More effective disintegration of tablets and solids
- Encapsulation of ingredients for actives delivery or visual cues



### Solutions in hard surface cleaning

- Improved wetting on ceramic, wood, steel and glass surfaces
- Soil release technologies to prevent permanent soiling on surfaces
- Comprehensive rheology modifier portfolio for a wide range of formulations

## Lending Sustainability to Formulations with Improved Performance

While some in the cleaning product industry know Ashland for its proven technologies and others know Ashland for its ability to translate chemistry into consumer-desirable benefits, the future of cleaning is linked to sustainable solutions. Every sustainable cleaning project will have its own requirements, but all of them will at one point address the trend toward energy efficiency and effective cleaning with a minimum of ingredients.

Under these circumstances, polymer-based technologies will become an increasingly vital component of sustainable cleaning products. A range of polymer technologies lends performance attributes to formulations at very low use levels, providing the means to improve the efficiency of today's formulations. Hybrid polymers, another area of consideration, are conceived as a way to strike a balance in a new generation of formulations that requires biodegradation, formulation efficiency and higher performance.

Ashland, in addition, will look at sustainable solutions from a functional perspective. Just as certain polymers may be tailored for specific effects in formulation, these technologies may be engineered to reduce laundry drying time, reduce water requirements in various cleaning applications and extend the interval of cleaning schedules.



# Introduction to Ashland Home Care Technology Portfolio

Ashland Home Care invites formulators of household products to reimagine and re-create ground-breaking innovations or entirely new categories of products with commercial and custom technologies.

	Dishwashing	Fabric Care	Household Cleaning	Industrial & Institutional Cleaning	Anti-fog Additive	Anti-scalant	Anti-soil Redeposition Agent	Biocide	Chelating Agent	Chlorinated Solvent Alternative	Dispersant	Dye Transfer Inhibitor	Flocculant	Microencapsulation Technology	Opacifier	Rheology Modifier	Rinse Aid	Soil Release Additive	Surface Shine Enhancer	Surface Wetting Agent	Tablet Binder	Tablet Disintegrant	Thickener
<b>Polymers - Synthetic</b>																							
Chromabond™ polymers		•	•	•			•				•	•						•					
Disintex™ disintegrants	•	•																				•	
EasySpere™ polymers	•	•	•	•		•	•				•							•					
Easy-Wet™ 20 wetting agent	•	•	•	•													•			•			
Gantrez™ S polymers	•	•	•	•	•	•			•		•					•							
Jaypol™ polymers	•	•	•	•		•	•		•		•					•							
Polectron™ 430 (Antara™ 430) polymer		•												•									
PVP K-series	•	•	•	•			•				•	•				•			•		•		
Rapifloc™ polymer			•	•									•										
Sorez™ 100 polymer		•					•											•					
Sorez HS 205 polymer			•	•														•					
Stabileze™ QM polymer	•	•	•	•												•							
Styleze™ W polymers			•													•							
Surfadone™ wetting agents	•	•	•	•													•			•			
<b>Polymers - Cellulosic</b>																							
Benecel™ methyl cellulose and hydroxypropyl methylcellulose		•	•	•			•									•							•
Bondwell™, Blanose™, Aqualon™ carboxymethylcellulose		•	•	•			•									•		•			•		•
Klucel™ hydroxypropylcellulose		•	•	•			•									•							•
Natrosol™ hydroxyethylcellulose		•	•	•			•									•							•
<b>Encapsulation Technology</b>																							
MicroBeads™ encapsulates	•	•	•											•									
MicroCapsules™ encapsulates	•	•	•											•									
<b>Biocides</b>																							
Bacillat™ biocides	•	•	•	•			•																
Bodoxin™ AE biocide	•	•	•	•			•																
Ebotec™ biocides	•	•	•	•			•																
Fungitrol™ biocides	•	•	•	•			•																
Nuosept™ biocides	•	•	•	•			•																
Integra 44 microbicide	•	•	•	•			•																

## Polymers - Synthetic

### Polectron™ 430 (Antara™ 430) polymer

Antara 430 polymer functions as an opacifier in liquid detergents and as a film-forming polymer in waxes, polishes and synthetic starches. With a glass transition temperature of approximately 100°C, Antara 430 polymer enables transparent, thermoplastic films that readily adhere to glass, plastics and metals. The emulsion is compatible with many polymers and surfactants.

Polectron 430 polymer (sold as Antara 430 polymer in all other regions of the world) is a white, 38 - 41% solids, latex produced as a graft, emulsion copolymer of polyvinylpyrrolidone and styrene in the presence of an anionic surfactant. About 90% of the particles are <0.5 micron with a maximum 25°C viscosity of 750 cps @ pH 2.0 - 5.0.

Antara 430 polymer is thermally and mechanically stable in the presence of a variety of ionic compounds. The viscosity is unaffected after three freeze-thaw cycles between ambient and -20°C; the emulsion is unbroken at 25°C after 1/2 hr @ 10,000 rpm and does not coagulate upon the addition of 1% hydrochloric acid, calcium chloride, aluminum or sodium borate.

Trade Name	Chemical Description	Features and Benefits	Applications
Polectron 430 (Antara 430) polymer	PVP/Polystyrene Latex	<ul style="list-style-type: none"> <li>Excellent opacifier for liquid detergent products</li> <li>Creamy opaque appearance</li> <li>Broad compatibility with formulation components</li> </ul>	<ul style="list-style-type: none"> <li>Fabric Care</li> </ul>

### Chromabond™ polymers

Chromabond polymers are vinylpyridine-based polymers that contain either nitrogen oxide (Chromabond S-400 and S-403E polymers) or betaine (Chromabond S-100 polymer) functionalities.

Chromabond polymers are premium dye transfer inhibitors developed and used in color-safe laundry detergents. These polymers demonstrate superior complexing of fugitive dyes at cost-effective levels under different temperatures and surfactant environments. Its chemical structure promotes dye complexation up to 60°C while resisting interaction with anionic surfactants. Chromabond polymers are soluble in water and water-alcohol mixtures but insoluble in most other solvents.

Trade Name	Chemical Description	Features and Benefits	Applications
Chromabond S-100 polymer	Poly (Vinylpyridine Betaine)	<ul style="list-style-type: none"> <li>Act as dye transfer inhibitors and anti-soil redeposition agents</li> <li>Soluble in water and water-alcohol mixtures</li> <li>Complexes with dyes and other aromatics</li> <li>Prevents deposition of oil and clay-based soils on a range of fabrics</li> </ul>	<ul style="list-style-type: none"> <li>Fabric Care</li> </ul>
Chromabond S-350 polymer	Poly (Vinylpyridine N-Oxide)	Fabric Care <ul style="list-style-type: none"> <li>Act as dye transfer inhibitors and anti-soil redeposition agents</li> <li>Soluble in water and water-alcohol mixtures</li> <li>Complexes with dyes and other aromatics</li> <li>Prevents deposition of clay-based soils on a range of fabrics</li> </ul>	<ul style="list-style-type: none"> <li>Fabric Care</li> <li>Household Cleaning</li> <li>Industrial and Institutional Cleaning</li> </ul>
Chromabond S-400 polymer		Household Cleaning <ul style="list-style-type: none"> <li>Soluble in water and water-alcohol mixtures</li> <li>Prevents deposition of oil- and clay-based soils on a range of fabrics</li> </ul>	
Chromabond S-403E polymer		Industrial and Institutional Cleaning <ul style="list-style-type: none"> <li>Soluble in water and water-alcohol mixtures</li> </ul>	

## Disintex™ disintegrants

Disintex disintegrants series – Disintex 75 and 200 disintegrants – are proprietary blends of polyvinyl polypyrrolidone (PVPP), cellulose and/or inert salts. They are used extensively as disintegrants in laundry and dishwashing detergent tablets because of their high swell volumes. The cross-linked PVPP homopolymers are highly hydrophilic and will rapidly absorb water on contact to swell and create internal stress points that will breakup tablets.

Trade Name	Chemical Description	Features and Benefits	Applications
Disintex 75 disintegrant	Proprietary blends of Polyvinyl Polypyrrolidone (PVPP)	<ul style="list-style-type: none"> <li>• Excellent disintegrants for tablet-based products</li> <li>• Swells with high hydrostatic pressure for rapid tablet break-up</li> <li>• Rapidly dispersed, resulting in low residues</li> <li>• Minimal effect on tablet friability</li> </ul>	<ul style="list-style-type: none"> <li>• Dishwashing</li> <li>• Fabric Care</li> </ul>
Disintex 200 disintegrant			

## EasySperse™ polymers

EasySperse polymers are effective dispersants of hydrophobic actives.

EasySperse polymer is based on a copolymer of the monobutyl/ethyl ester of poly (methyl vinyl ether/maleic acid) partially neutralized with sodium hydroxide. The material is supplied as a 25% aqueous solution and is an excellent film-former.

EasySperse P-20 polymer is a spray-dried, optimized composite polyvinylpyrrolidone (PVP) and methyl vinyl ether/maleic acid half ester. It offers superior stability with hydrophobic actives and excellent compatibility with formulation ingredients.

Trade Name	Chemical Description	Features and Benefits	Applications
EasySperse polymer	Copolymer of Monobutyl Ester of Poly (MVE/Maleic Acid) partially neutralized	<ul style="list-style-type: none"> <li>• Ideal for “difficult” ingredients in water-based systems</li> <li>• Highly effective dispersant for enhanced anti-soil redeposition</li> </ul>	<ul style="list-style-type: none"> <li>• Dishwashing</li> <li>• Fabric Care</li> <li>• Industrial and Institutional Cleaning</li> </ul>
EasySperse P-20 polymer	Polyvinylpyrrolidone (PVP) and Methyl Vinyl Ether/Maleic Acid Half Ester	<ul style="list-style-type: none"> <li>• Offers superior stability of hydrophobic actives</li> <li>• Effective polymeric dispersant for anti-soil redeposition</li> <li>• Provides excellent compatibility with formulation ingredients</li> </ul>	<ul style="list-style-type: none"> <li>• Dishwashing</li> <li>• Fabric Care</li> <li>• Household Cleaning</li> <li>• Industrial and Institutional Cleaning</li> </ul>

## Easy-Wet™ 20 wetting agent

Easy-Wet 20 wetting agent is a proprietary super-wetting agent based on N-Octyl-2-Pyrrolidone in a convenient-to-use liquid form. Easy-Wet 20 wetting agent is a cost-effective, premium wetter/surfactant suitable for HI&I cleaning, textiles, pigments, agricultural and other industrial applications where superior wetting and spreading performance is required.

Trade Name	Chemical Description	Features and Benefits	Applications
Easy-Wet 20 wetting agent	Patented formulation based on N-Octyl-2-Pyrrolidone	<ul style="list-style-type: none"> <li>• Powerful wetting at very low use levels</li> <li>• Use on low-energy, high-energy and polyolefin substrates</li> <li>• Dynamic and equilibrium surface tension reduction</li> <li>• Foaming</li> <li>• Enhanced cleaning performance</li> <li>• Conforms to Detergent Regulation EC 648/2004</li> </ul>	<ul style="list-style-type: none"> <li>• Dishwashing</li> <li>• Fabric Care</li> <li>• Household Cleaning</li> <li>• Industrial and Institutional Cleaning</li> </ul>

## Gantrez™ S polymers

Gantrez polymers have repeating co-maleic acid units produced by hydrolysis of (poly methyl vinyl ether/maleic anhydride) copolymer. The range includes the Gantrez S-95 polymer, which is a methyl vinyl ether/maleic acid copolymer, and the Gantrez S-97 polymer, which is a methyl vinyl ether/maleic anhydride copolymer. Polycarboxylic acid derivatives with a pH of ~2 at 5% concentration are available either as viscous solutions or white powders. The vicinal dicarboxylic acid functionality of these materials is useful in a number of applications. The free acid forms are water-soluble, giving clear and tacky films. Solution rheology can be modified by the addition of salts and bases.

Trade Name	Chemical Description	Features and Benefits	Applications
Gantrez S-95 polymer	Poly (Methyl Vinyl Ether/Maleic Acid) Copolymer	<ul style="list-style-type: none"><li>• Excellent disintegrants for tablet-based products</li><li>• Swells with high hydrostatic pressure for rapid tablet break-up</li><li>• Rapidly dispersed, resulting in low residues</li><li>• Minimal effect on tablet friability</li></ul>	<ul style="list-style-type: none"><li>• Dishwashing</li><li>• Fabric Care</li><li>• Household Cleaning</li><li>• Industrial and Institutional Cleaning</li></ul>
Gantrez S-97 polymer		<ul style="list-style-type: none"><li>• Can act as a anti-fog additive, dispersant and/or rheology modifier</li><li>• Anti-fog additive for window and glass cleaners</li><li>• Cold-water soluble</li><li>• Enhances hydrophilicity of surface</li><li>• Prevents soil redeposition</li><li>• Promotes long-lasting, streak-free surfaces</li><li>• Superior adhesion</li><li>• Thickener for aqueous and organic solvent systems</li></ul>	<ul style="list-style-type: none"><li>• Dishwashing</li><li>• Fabric Care</li><li>• Household Cleaning</li><li>• Industrial and Institutional Cleaning</li></ul>



## Jaypol™ polymers

Jaypol polymers are acrylic-based polymers that are grouped into two categories: dispersants and rheology modifiers.

Jaypol polymer dispersants are designed to enhance primary and secondary detergency and inhibit scale deposition.

They work by:

- Protecting surfactants, bleach systems, whitening agents, etc. from inactivation by polyvalent ions
- Protecting fabrics from soil redeposition and encrustation with hardness salts
- Protecting machine surfaces from scale deposition

The fundamental action of the Jaypol polymers series of dispersants selected for the home care category is to adsorb on surfaces involved in the washing/cleaning cycle. This may be the surface of crystals of insoluble salts, soil and lime soap particles or fabrics being washed. These dispersants will also work on complex hardness and heavy metal ions, effectively removing them from solution and preventing interference with other actives.

Products targeted at inhibiting the effects of hardness salts act by slowing the growth of microscopic seed crystals. Crystals therefore do not become visible until a much higher concentration is reached – called the “threshold effect”.

The adsorbed layer of inhibitor keeps the crystals dispersed and reduces scale deposition on surfaces. Products targeted at anti-soil redeposition adsorb on the fabric surface to repel emulsified oils and dirt, etc. by electrostatic and steric forces.

The Jaypol polymers series of rheology modifiers are targeted for aqueous systems and form tangled networks of polymer chains that give structure to water, effectively inhibiting flow. Raising the viscosity with Jaypol polymers will help stabilize emulsions and dispersions, or improve product handling and application attributes. The Jaypol polymers series of rheology modifiers are supplied either as alkali-swellable emulsions (ASE) or their hydrophobically modified versions (HASE). They are “activated” on neutralization when the coiled polymer expands to form the network of tangled chains. Other products maintain the coiled polymer dispersed in oil. On dilution and stirring, these liquid-dispersion polymers (LDP) are released to form the tangled chain network. When the complexity of the polymer network is formed, its interaction with other ingredients in the solution and how the chains untangle under shear determine the rheological character imparted to the system by the products.

Trade Name	Chemical Description	Features and Benefits	Applications
Jaypol polymers	Acrylic-based Polymers	<p>Dispersants</p> <ul style="list-style-type: none"><li>• Anti-soil redeposition property</li><li>• Protect carboxylated surfactants, bleach systems, whitening agents, etc. from inactivation by polyvalent ions</li><li>• Protect fabrics from redeposition and encrustation with hardness salts</li><li>• Protect machine surfaces from scale deposition</li></ul> <p>Rheology Modifiers</p> <ul style="list-style-type: none"><li>• Help stabilize emulsions and dispersions</li><li>• Improve product handling and application attributes</li></ul>	<ul style="list-style-type: none"><li>• Dishwashing</li><li>• Fabric Care</li><li>• Household Cleaning</li><li>• Industrial and Institutional Cleaning</li></ul>

## PVP K-series

Polyvinylpyrrolidone is a hygroscopic, amorphous polymer supplied as a white, free-flowing powder or a clear aqueous solution. Available in several molecular weight grades, they are characterized by K-value and used in various applications. Polyvinylpyrrolidone can be plasticized with water and most common organic plasticizers. It is considered to be physiologically inert.

Applications take advantage of one or more of the following properties inherent in the polymer, typically due to the lactam ring:

- High polarity and the resultant propensity to form complexes with hydrogen donors, such as phenols and carboxylic acids, as well as anionic dyes and inorganic salts
- Dispersancy, where components in a mixture are uniformly distributed through the use of polyvinylpyrrolidone
- Hydrophilicity, where the substantial water solubility of polyvinylpyrrolidone is its dominant feature and frequently a factor along with other properties valuable to numerous applications
- Adhesion, taking advantage of the higher molecular weight polyvinylpyrrolidones formulating in aqueous media, then evaporating sufficient water to generate a solid product for the desired application
- Cohesivity, where cohesive strength is achieved through a variety of dry blending and granulation techniques

Polyvinylpyrrolidone is cross-linkable to a water-insoluble, swellable material either in the course of vinylpyrrolidone polymerization, by addition of an appropriate multifunctional comonomer or by post-reaction, typically through hydrogen abstraction chemistry.

Trade Name	Chemical Description	Features and Benefits	Applications
PVP K-series	Polyvinylpyrrolidone	<ul style="list-style-type: none"> <li>Used as rheology modifiers in liquid dishwashing formulation</li> <li>Compatible in clear liquid, heavy duty detergents</li> <li>Excellent binder for tablet formulations</li> <li>Stabilize emulsions and structure liquid products</li> </ul>	<ul style="list-style-type: none"> <li>Dishwashing</li> </ul>
		<ul style="list-style-type: none"> <li>Used as anti-soil redeposition agents, dye transfer inhibitors, rheology modifiers, and/or tablet binders</li> <li>Soluble in water and many organic solvents</li> <li>Complexes with dyes and other aromatics</li> <li>Provides anti-soil redeposition, enzyme stabilization</li> <li>Prevents deposition of clay-based soils on range of fabrics</li> <li>Provides dye transfer inhibitor and enzyme stabilization</li> <li>Compatible in clear liquid, heavy duty detergents</li> <li>Stabilize emulsions and structure liquid products</li> <li>Excellent binder for tablet formulations</li> <li>Binder and protective coating for enzymes</li> </ul>	<ul style="list-style-type: none"> <li>Fabric Care</li> </ul>
		<ul style="list-style-type: none"> <li>Used as rheology modifiers and/or surface shine enhancers</li> <li>Compatible in clear liquid, heavy duty detergents</li> <li>Stabilize emulsions and structure liquid products</li> <li>Nonionic Newtonian rheology</li> <li>Surface shine enhancement in cleaning products</li> <li>Forms hard, transport, glossy films</li> </ul>	<ul style="list-style-type: none"> <li>Household Cleaning</li> </ul>
		<ul style="list-style-type: none"> <li>Used as dispersants and/or rheology modifiers</li> <li>Uniformly distributes components in a mixture</li> <li>Compatible in clear liquid, heavy duty cleaners</li> <li>Stabilize emulsions and structure liquid products</li> <li>Nonionic Newtonian rheology</li> </ul>	<ul style="list-style-type: none"> <li>Industrial and Institutional Cleaning</li> </ul>

### Rapifloc™ polymer

Rapifloc polymer is a high molecular weight polyacrylamide used as a flocculation aid in water treatment and water clarification.

Trade Name	Chemical Description	Features and Benefits	Applications
Rapifloc polymer	Polyacrylamide	<ul style="list-style-type: none"> <li>Used as a settling agent for hard surface cleaners</li> <li>Excellent flocculation of particulates and oils</li> <li>Film-forming polymer with high surface area</li> </ul>	<ul style="list-style-type: none"> <li>Household Cleaning</li> <li>Industrial and Institutional Cleaning</li> </ul>

### Sorez™ 100 polymer

Sorez 100 polymer is a modified polyester copolymer concentrate in water-soluble form. The product imparts wicking properties to hydrophobic textiles. It provides soil release and anti-redeposition properties while reducing the electrostatic charge of treated polyester. Sorez 100 polymer can be used in laundry detergents, fabric softeners and pre- and post-wash stain removers. The polymer forms a thin film on the substrate, enabling effective soil removal during subsequent wash cycles.

Trade Name	Chemical Description	Features and Benefits	Applications
Sorez 100 polymer	Polyethylene Glycol Polyester Copolymer	<ul style="list-style-type: none"> <li>• Superior anti-soil redeposition properties for synthetic and cotton-blend</li> <li>• Broad compatibility with all surfactant types</li> <li>• Miscible with cold water at any ratio</li> <li>• Prevents deposition of oil-based soils on range of fabrics</li> <li>• Soil release property on blend and synthetic fabric</li> </ul>	<ul style="list-style-type: none"> <li>• Fabric Care</li> </ul>

### Sorez™ HS 205 polymer

Sorez HS 205 polymer can help deliver four sought-after benefits in hard surface cleaning products: soil release, soil repellency, anti-scale performance and hydrophilization. At the recommended use levels of 0.5% to 1.5%, Sorez HS 205 polymer is substantive to negatively charged surfaces, reducing the ability of the soil to stay in place and allowing for easier cleaning. Sorez HS 205 polymer offers a water “sheeting” effect, reducing the amount of energy required in the use of hard surface cleaner formulations. In the bathroom and the kitchen, surfaces cleaned with Sorez HS 205 polymer stay cleaner, longer – even after repeated soiling and rinsing phases.

Trade Name	Chemical Description	Features and Benefits	Applications
Sorez HS 205 polymer	Vinylpyrrolidone/Dimethylaminoethyl Methacrylate Copolymer	<ul style="list-style-type: none"> <li>• Highly efficient soil release</li> <li>• Effective soil repellency</li> <li>• Inhibits scale formation</li> <li>• Hydrophilization</li> <li>• Reduced cleaning time</li> <li>• Surfaces stay cleaner for longer</li> <li>• Excellent for oily soils</li> <li>• Works in anionic and nonionic formulas</li> <li>• Less spotting and streaking</li> </ul>	<ul style="list-style-type: none"> <li>• Household Cleaning</li> <li>• Industrial and Institutional Cleaning</li> </ul>

### Stabileze™ QM polymer

Stabileze QM polymer, a poly (methyl vinyl ether/maleic anhydride decadiene) crosspolymer, is a pseudoplastic rheology modifier that yields clear, aqueous gels that are shear-thinning. The resulting gels have good shear, temperature and UV-A radiation stability. The polymer is a white, free-flowing powder with a glass transition temperature of approximately 150°C. The solid can be dispersed in water without coagulating, and the anhydride function will hydrolyze directly or through the action of base. A neutralized 0.5% solution in water at pH 7 and 25°C has a viscosity range of 45,000 - 70,000 cP.

Trade Name	Chemical Description	Features and Benefits	Applications
Stabileze QM polymer	Poly (Methyl Vinyl Ether/Maleic Anhydride Decadiene) Crosspolymer	<ul style="list-style-type: none"> <li>• Readily hydrolyzed and neutralized to form gels</li> <li>• Water-clear for strong visual impact</li> <li>• Readily shear thinning for pumping/pouring/spraying</li> <li>• High yield values for suspension</li> <li>• Capable of emulsifying hydrophobic materials</li> </ul>	<ul style="list-style-type: none"> <li>• Dishwashing</li> <li>• Fabric Care</li> <li>• Household Cleaning</li> <li>• Industrial and Institutional Cleaning</li> </ul>

### Styleze™ W polymers

Styleze W polymers are random terpolymers of vinylpyrrolidone, dimethylaminopropyl methacrylamide and methacryloylaminopropyl lauryl dimethyl ammonium chloride. They promote and stabilize foam through their ability to reduce surface tension. Additional solution viscosity improvements can be achieved by the addition of salts.

Trade Name	Chemical Description	Features and Benefits	Applications
Styleze W polymers	Vinylpyrrolidone/ Dimethylaminopropyl Methacrylamide/ Methacryloylaminopropyl Lauryl Dimethyl Ammonium Chloride Terpolymer	<ul style="list-style-type: none"> <li>• Thickener for strong acid formulations such as toilet bowl cleaners</li> </ul>	<ul style="list-style-type: none"> <li>• Household Cleaning</li> </ul>

## Surfadone™ wetting agents

Surfadone wetting agents are linear, N-Alkyl-2-Pyrrolidones. They combine the hydrophilic, dipolar pyrrolidone ring with a hydrophobic alkyl group and exhibit a unique combination of solvency and surface activity. They are hydrophobic in nature, functioning as excellent wetting agents and effective dispersing and cleaning aids.

Surfadone LP-100 wetting agent (N-Octyl-2-Pyrrolidone) is a low-foaming, nonionic rapid wetting agent with an HLB of 6 and having no critical micelle concentration (CMC). Due to the electron delocalized lactam ring, Surfadone LP-100 wetting agent interacts with anionic surfactant micelles. This greatly enhances its water solubility, resulting in synergistic surface tension reduction and wetting enhancement at low concentrations.

Surfadone LP-300 wetting agent (N-Dodecyl-2-Pyrrolidone) is sparingly soluble in water (0.002 weight percent) and soluble in most organic solvents. It is a low-foaming, nonionic surfactant with an HLB of 3 and has no critical micelle concentration (CMC). Like its lower homolog, Surfadone LP-300 wetting agent interacts with anionic surfactants, forming mixed micelles, which greatly enhances its solubility, resulting in synergistic surface tension reduction and wetting enhancement. Appropriate combinations of Surfadone LP-300 wetting agent and anionic surfactants produce viscous solutions and gels.

### Key Features:

- Powerful surface tension reduction at low levels
- Synergistic performance with anionics or nonionics
- Powerful wetting
- Non-foaming
- Conform to Detergent Regulation EC 648/2004
- Listed on CleanGredient US EPA Design for Environment

Trade Name	Chemical Description	Features and Benefits	Applications
Surfadone LP-100 wetting agent	N-Octyl-2-Pyrrolidone	<ul style="list-style-type: none"> <li>• Used as a rinse aid</li> <li>• Reduces drying time</li> <li>• Acts as a protein soil defoamer</li> <li>• Provides rapid/effective wetting and low foam</li> <li>• Exhibits minimal filming and spotting</li> </ul>	<ul style="list-style-type: none"> <li>• Dishwashing</li> </ul>
		<ul style="list-style-type: none"> <li>• Provides rapid/effective wetting</li> <li>• Facilitates the removal of oily soil and grease stains from cotton, polyester and cotton-polyester fabrics</li> </ul>	<ul style="list-style-type: none"> <li>• Fabric Care</li> </ul>
		<ul style="list-style-type: none"> <li>• Biodegradable, performance-enhancing co-surfactants and coupling solvents</li> <li>• Used in institutional/household kitchen, bathroom, glass, and all-purpose cleaners</li> <li>• Dynamic surface activity promotes rapid wetting, penetration and softening of oily/greasy soils, soap scum and mineral scale, to facilitate removal from a variety of substrates</li> <li>• Surfadone LP-100 wetting agent minimizes streaking on glass</li> </ul>	<ul style="list-style-type: none"> <li>• Household Cleaning</li> </ul>
		<ul style="list-style-type: none"> <li>• Provides high surface activity and wetting</li> <li>• Combines broad-spectrum solvent capability with favorable safety features</li> <li>• Safer alternative to hazardous solvents and provides solvency for a wide range of organic materials and resins</li> <li>• In aqueous metal cleaners, 1% - 2% Surfadone LP-100 wetting agent facilitates cleaning performance and interacts with alkoxyated thiol surfactants to minimize odor</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial and Institutional Cleaning</li> </ul>
Surfadone LP-300 wetting agent	N-Dodecyl-2-Pyrrolidone	<ul style="list-style-type: none"> <li>• Biodegradable, performance-enhancing co-surfactants and coupling solvents</li> <li>• Used in institutional/household kitchen, bathroom, glass, and all-purpose cleaners</li> <li>• Dynamic surface activity promotes rapid wetting, penetration and softening of oily/greasy soils, soap scum and mineral scale to facilitate removal from a variety of substrates</li> <li>• Particularly effective as a coupling solvent for fragrances</li> </ul>	<ul style="list-style-type: none"> <li>• Household Cleaning</li> </ul>
		<ul style="list-style-type: none"> <li>• Provides high surface activity and wetting</li> <li>• Combines broad-spectrum solvent capability with favorable safety features</li> <li>• Safer alternatives to hazardous solvents and provide solvency for a wide range of organic materials and resins</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial and Institutional Cleaning</li> </ul>

## Polymers - Cellulosic

### Benecel™ methylcellulose and hydroxypropyl methylcellulose

Benecel methylcellulose (MC) and its derivatives are made by reacting alkali-cellulose with methyl chloride (resulting in methylcellulose, MC) and ethylene oxide (resulting in methyl hydroxyethylcellulose, MHEC) or propylene oxide (resulting in methyl hydroxypropylcellulose, MHPC) under rigidly controlled conditions.

Trade Name	Chemical Description	Features and Benefits	Applications
Benecel MC	Methylcellulose	<ul style="list-style-type: none"> <li>• Water retention</li> <li>• Quality of solution</li> <li>• Gel strength</li> <li>• Cold-water solubility</li> <li>• Solubility in organic solvents</li> <li>• Rheology control/thickening/stabilizing effect</li> </ul>	<ul style="list-style-type: none"> <li>• Fabric Care</li> <li>• Household Cleaning</li> <li>• Industrial and Institutional Cleaning</li> </ul>
Benecel HPMC	hydroxypropyl methylcellulose		

### Bondwell™, Blanose™, AquaVIS™, Aqualon™ carboxymethylcellulose

CMC is a cellulose ether, produced by reacting alkali cellulose with sodium monochloroacetate under controlled conditions. It is an anionic, water-soluble polymer. Specific grades of this range can be used as rheology modifiers in fabric care and household cleaning applications.

Trade Name	Chemical Description	Features and Benefits	Applications
Bondwell, Blanose, Aqualon CMC	Carboxymethylcellulose	<ul style="list-style-type: none"> <li>• Cold-water solubility</li> <li>• Rheology control/thickening/stabilizing effect</li> <li>• Anti-redeposition property</li> </ul>	<ul style="list-style-type: none"> <li>• Fabric Care</li> <li>• Household Cleaning</li> <li>• Industrial and Institutional Cleaning</li> </ul>

### Klucel™ hydroxypropylcellulose

Klucel hydroxypropyl cellulose (HPC) is a nonionic water-soluble cellulose ether with unique combination of properties, soluble in cold-water and polar organic solvents, surface active, forms films of exceptional flexibility without addition of plasticizers.

Trade Name	Chemical Description	Features and Benefits	Applications
Klucel HPC	Hydroxypropylcellulose	<ul style="list-style-type: none"> <li>• Film-former</li> <li>• Cold-water solubility</li> <li>• Rheology control/thickening/stabilizing effect</li> <li>• Anti-redeposition property</li> </ul>	<ul style="list-style-type: none"> <li>• Fabric Care</li> <li>• Household Cleaning</li> <li>• Industrial and Institutional Cleaning</li> </ul>

### Natrosol™ hydroxyethylcellulose

Natrosol hydroxyethylcellulose (HEC), a nonionic, water-soluble polymer is a white, free-flowing granular powder. Solutions of Natrosol HEC are pseudoplastic and shear-thinning. Natrosol HEC is easily dissolved in cold or hot water to give crystal-clear solutions of varying viscosities. Furthermore, low to medium molecular weight types are fully soluble in glycerol and have good solubility in hydro-alcoholic systems containing up to 60 percent ethanol. Natrosol HEC is generally insoluble in organic solvents.

Trade Name	Chemical Description	Features and Benefits	Applications
Natrosol HEC	Hydroxyethylcellulose	<ul style="list-style-type: none"> <li>• Film-former</li> <li>• Cold-water solubility</li> <li>• Rheology control/thickening/stabilizing effect</li> <li>• Anti-redeposition property</li> </ul>	<ul style="list-style-type: none"> <li>• Fabric Care</li> <li>• Household Cleaning</li> <li>• Industrial and Institutional Cleaning</li> </ul>

# Encapsulation Technology

## MicroBeads™ encapsulates

MicroBeads encapsulates are produced using JetCutter™ Technology – rotating cutting wires that create hydrogel beads from a continuous jet of viscous fluid. The resulting droplets are transformed into solidified beads through immersion in a bath of hardening solution – producing a uniform bead matrix that can contain high levels of encapsulated material. Naturally derived materials such as chitosan, alginate and carrageenan can be used as the matrix material.

MicroBeads encapsulates are produced in sizes ranging from 250µm to 3000µm in diameter and can be used to encapsulate a wide range of materials including oils, pigments and harmless bacteria. Delivery triggers vary from dilution to pressure and temperature. Recently developed wax-based MicroBeads encapsulates have been designed with melting points as high as 70°C to 75°C.

## MicroCapsules™ encapsulates

MicroCapsules encapsulates are produced via complex coacervation using naturally derived gelatin and acacia (gum Arabic) as the principal wall materials; they range from 15µm to 2000µm in diameter. Visible MicroCapsules encapsulates have a minimum diameter of 500µm and can be used in otherwise clear or homogeneously opaque carriers to provide a striking visual impact while delivering actives or other ingredients with beneficial properties.

MicroCapsules encapsulates are invisible in the 15µm to 50µm range and can be used to deliver long-lasting fragrances or other active ingredients onto substrates such as fabrics. The optimization of size, core content and wall structure allows the properties of the microcapsules to be controlled and used in a wide range of formulations.

Trade Name	Chemical Description	Features and Benefits	Applications
MicroBeads encapsulates	MicroBeads encapsulates are custom-manufactured spherical particles produced in sizes ranging from 250µm to 3000µm	<ul style="list-style-type: none"><li>• Creative sensory experience</li><li>• Eco-friendly</li><li>• Formulation creativity</li><li>• High payloads of lipophilics and insolubles</li><li>• Protection and delivery of sensitive ingredients</li><li>• Targeted delivery and deposition</li><li>• Temperature, dilution and chemical triggering</li><li>• Visual differentiation</li></ul>	<ul style="list-style-type: none"><li>• Dishwashing</li><li>• Fabric Care</li><li>• Household Cleaning</li></ul>
MicroCapsules encapsulates	MicroCapsules encapsulates are custom-manufactured spherical particles produced in sizes ranging from 5µm to 2000µm		



## Biocides

### Bacillat™ biocides

Bacillat biocides are part of a varied range of biocides and preservatives that can help protect against bacteria, fungus and algae.

Trade Name	Active Ingredients	Features and Benefits
Bacillat TOK biocide	Tetrahydro-1,3,4,6-Tetrakis (Hydroxy-Methyl)-Imidazo-[4,5-d] Imidazole -2,5 (1H,3H)-Dione (TMAD), 2-Octyl-2H-Isothiazol-3-One (OIT) and 2-Methyl-2H-Isothiazol-3-One (MIT)	<ul style="list-style-type: none"> <li>• Provides long-lasting preservation</li> <li>• Enhanced fungicidal efficacy</li> <li>• Physical form: solution</li> <li>• Effective pH range: 3 - 10</li> <li>• Available only in Europe</li> </ul>
Bacillat biocide	Tetrahydro-1,3,4,6-Tetrakis (Hydroxy-Methyl)-Imidazo-[4,5-d] Imidazole -2,5 (1H,3H)-Dione (TMAD)	<ul style="list-style-type: none"> <li>• Broad-spectrum bactericide with long-term efficacy</li> <li>• Physical form: solution</li> <li>• Effective pH range: 3 - 10</li> <li>• Available only in Europe</li> </ul>

### Bodoxin™ AE biocide

Bodoxin AE biocide is part of a varied range of biocides and preservatives that can help protect against bacteria, fungus and algae.

Trade Name	Active Ingredients	Features and Benefits
Bodoxin AE biocide	(Ethylenedioxy)-Dimethanol (EDDM)	<ul style="list-style-type: none"> <li>• Highly concentrated formulation of a fast-acting formaldehyde donor with broad-spectrum activity</li> <li>• Physical form: solution</li> <li>• Effective pH range: 3 - 10</li> <li>• Available only in Europe</li> </ul>

### Ebotec™ biocides

Ebotec biocides are part of a varied range of biocides and preservatives that can help protect against bacteria, fungus and algae. The Ebotec biocides range is based on isothiazolones and additional actives like bronopol and phenoxyethanol.

Trade Name	Active Ingredients	Features and Benefits
Ebotec MB biocide	Mixture of 5-Chloro-2-Methyl-2H-Isothiazol-3-One (CMIT) and 2-Methyl-2H-Isothiazol-3-One (MIT) (3:1) and Bronopol	<ul style="list-style-type: none"> <li>• Broad-spectrum of bactericidal and fungicidal efficacy, VOC-free</li> <li>• Physical form: solution</li> <li>• Effective pH range: 3 - 8</li> <li>• Available only in Europe</li> </ul>
Ebotec MB150 biocide	Mixture of 5-Chloro-2-Methyl-2H-Isothiazol-3-One (CMIT) and 2-Methyl-2H-Isothiazol-3-One (MIT) (3:1) and Bronopol	<ul style="list-style-type: none"> <li>• Broad-spectrum of bactericidal and fungicidal efficacy, VOC-free</li> <li>• Reduced potential for allergic contact sensitization</li> <li>• Physical form: solution</li> <li>• Effective pH range: 3 - 8</li> <li>• Available only in Europe</li> </ul>
Ebotec BT80 biocide	1,2-Benzisothiazol-3(2H)-One (BIT) and Phenoxyethanol	<ul style="list-style-type: none"> <li>• Broad-spectrum of bactericidal and fungicidal efficacy, AOX-free</li> <li>• Physical form: solution</li> <li>• Effective pH range: 3 - 12</li> <li>• Temperature stable</li> <li>• Available only in Europe</li> </ul>

## Fungitrol™ biocides

Fungitrol biocides are part of a varied range of biocides and preservatives that can help protect against bacteria, fungus and algae. The Fungitrol biocides range is based on IPBC (3-Iodo-2-Propynyl Butylcarbamate) and offers broad-spectrum protection.

Trade Name	Active Ingredients	Features and Benefits
Fungitrol 420S biocide	IPBC (3-Iodo-2-Propynyl Butylcarbamate)	<ul style="list-style-type: none"><li>• Broad-spectrum protection</li><li>• Excellent solubility in the presence of ionic and nonionic surfactants</li><li>• Effective pH range: 3 - 10</li><li>• Available only in North America</li></ul>
Fungitrol 720 biocide	IPBC (3-Iodo-2-Propynyl Butylcarbamate)	<ul style="list-style-type: none"><li>• VOC-free carrier, odorless</li><li>• Excellent solubility in the presence of ionic and nonionic surfactants</li><li>• Physical form: liquid</li><li>• Effective pH range: 3 - 11</li><li>• Available globally</li></ul>
Fungitrol 940G biocide	IPBC (3-Iodo-2-Propynyl Butylcarbamate)	<ul style="list-style-type: none"><li>• Fungicide suitable for water-based products requiring a protection against mold</li><li>• Physical form: dispersion with fine particle size</li><li>• VOC-free</li><li>• Effective pH range: 3 - 11</li><li>• Available globally</li></ul>
Fungitrol L20 biocide	IPBC (3-Iodo-2-Propynyl Butylcarbamate) in different solvents	<ul style="list-style-type: none"><li>• Broad-spectrum protection</li><li>• Excellent solubility in the presence of ionic and nonionic surfactants</li><li>• Effective pH range: 3 - 10</li><li>• Available only in Europe</li></ul>



## Nuosept™ biocides

Nuosept biocides are part of a varied range of biocides and preservatives that can help protect against bacteria, fungus and algae. The Nuosept biocides range encompasses a variety of preservatives based on various active ingredients.

Trade Name	Active Ingredients	Features and Benefits
Nuosept 498G biocide	1,2-Benzisothiazol-3(2H)-One (BIT)	<ul style="list-style-type: none"> <li>• Broad-spectrum protection preservative for aqueous systems</li> <li>• Non-settling</li> <li>• Freeze-thaw stable</li> <li>• Excellent dispersability</li> <li>• Physical form: water-based dispersion</li> <li>• Effective pH range: 3 - 12</li> <li>• Available only in North America</li> </ul>
Nuosept 497G biocide	1,2-Benzisothiazol-3(2H)-One (BIT)	<ul style="list-style-type: none"> <li>• Broad-spectrum protection preservative for aqueous systems</li> <li>• VOC-free aqueous glycolic solution</li> <li>• Freeze-thaw stable</li> <li>• Excellent dispersability</li> <li>• Physical form: water-based dispersion</li> <li>• Effective pH range: 3 - 12</li> <li>• Available globally</li> </ul>
Nuosept 515N biocide/ Nuosept 515R biocide	Mixture of 5-Chloro-2-Methyl-2H-Isothiazol-3-One (CMIT) and 2-Methyl-2H-Isothiazol-3-One (MIT) (3:1)	<ul style="list-style-type: none"> <li>• Well-established fungicide/bactericide with broad-spectrum of effect</li> <li>• Compatible with a large range of aqueous products</li> <li>• Highly efficient at low cost</li> <li>• Physical form: solution</li> <li>• Effective pH range: 4 - 9</li> <li>• Available in Europe (N) and North America (R)</li> </ul>
Nuosept BIC biocide	1,2-Benzisothiazol-3(2H)-One (BIT), IPBC (3-Iodo-2-Propynyl Butylcarbamate) and 2-Methyl-2H-Isothiazol-3-One (MIT)	<ul style="list-style-type: none"> <li>• Broad-spectrum protection preservative against bacteria, yeast and molds</li> <li>• Provides quick kill and long-lasting preservation</li> <li>• Physical form: water-based dispersion</li> <li>• Effective pH range: 3 - 9.5</li> <li>• Available only in Europe</li> </ul>
Nuosept BM11 biocide/ Nuosept BM22 biocide	1,2-Benzisothiazol-3(2H)-One (BIT), 2-Methyl-2H-Isothiazol-3-One (MIT)	<ul style="list-style-type: none"> <li>• Provides long-lasting preservation</li> <li>• Free of VOC and AOX</li> <li>• Physical form: solution</li> <li>• Effective pH range: 2 - 10</li> <li>• Available only in Europe</li> </ul>
Nuosept BMc 442 biocide/ Nuosept BMc 422 biocide/ Nuosept BMc 412 biocide	1,2-Benzisothiazol-3(2H)-One (BIT), 2-Methyl-2H-Isothiazol-3-One (MIT), Mixture of 5-Chloro-2-Methyl-2H-Isothiazol-3-One (CMIT) and 2-Methyl-2H-Isothiazol-3-One (MIT) (3:1)	<ul style="list-style-type: none"> <li>• Long-term protection from BIT/MIT, low level of CMIT acts as a booster during production and filling</li> <li>• No VOC contribution</li> <li>• Physical form: dispersion, water-based</li> <li>• Effective pH range: 2 - 10</li> <li>• Nuosept BMc 442 biocide available only in Europe</li> <li>• Nuosept BMc 422 biocide available in Europe and North America</li> <li>• Nuosept BMc 412 biocide available only in North America</li> </ul>
Integra 44 microbiocide		<ul style="list-style-type: none"> <li>• Aqueous solution of sodium hydroxymethylglycinate</li> <li>• Derived from glycine – a naturally occurring amino acid</li> <li>• Broad-spectrum antimicrobial activity</li> <li>• Effective against bacteria and fungi</li> <li>• For use in pH range of 3.5 to 12</li> <li>• Easy to use and safe to handle</li> <li>• Excellent for water-based applications such as liquid detergents and dishwashing liquids, cleaning products</li> </ul>

Trade Name	Active Ingredients	Features and Benefits
Nuosept BTK biocide	1,2-Benzisothiazol-3(2H)-One (BIT), 2-Methyl-2H-Isothiazol-3-One (MIT), Phenoxyethanol	<ul style="list-style-type: none"> <li>• Provides long-lasting preservation</li> <li>• Enhanced efficacy compared to standard BIT + MIT systems</li> <li>• Free of CMIT</li> <li>• Physical form: solution</li> <li>• Effective pH range: 3 - 10</li> <li>• Available only in Europe</li> </ul>
Nuosept 44 biocide	Sodium Hydroxymethylglycinate	<ul style="list-style-type: none"> <li>• Provides long-lasting preservation</li> <li>• AOX-free, low odor</li> <li>• Physical form: solution</li> <li>• Effective pH range: 3 - 12</li> <li>• Available globally</li> </ul>
Nuosept DBNPA20 biocide/ Nuosept 220 biocide	2,2-Dibromo-3-Nitrilopropionamide (DBNPA)	<ul style="list-style-type: none"> <li>• Fast kill sanitizer and treatment of aqueous fluids</li> <li>• Quick and safe degradation in aquatic environments</li> <li>• Physical form: solution</li> <li>• Effective pH range: 7 - 9</li> <li>• Nuosept DBNPA20 biocide available in Europe</li> <li>• Nuosept 220 biocide available in North America</li> </ul>

## Committed to Your Formulation

At Ashland, our commitment to the household consumer product formulator goes beyond our commercial and custom technology portfolio. It includes an active R&D program on four continents to better support regional formulation objectives. Ask us how we better serve manufacturers with a technical team that serves all phases of your product development cycle. Ashland is ready to help you succeed in any market around the world.





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