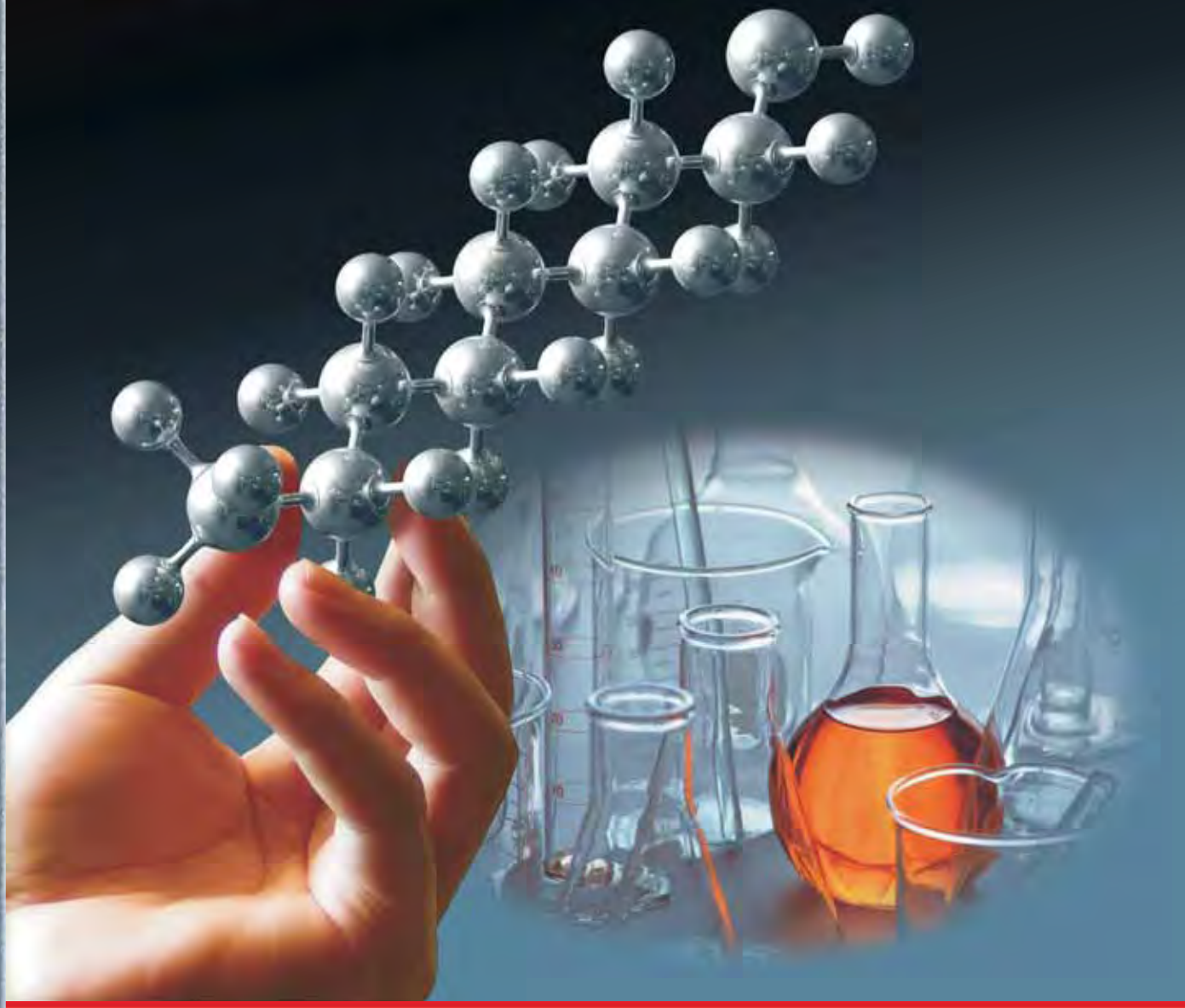
FLUOROSURFACTANTS

CHEMGUARD

SPECIALTY CHEMICALS

RAISING THE STANDARD IN FLUOROSURFACTANT TECHNOLOGY!



ADVANCED CHEMISTRY • SUPERIOR PERFORMANCE • UNPARALLELED SERVICE

CHEMGUARD
SPECIALTY CHEMICALS

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WELCOME!.....

On behalf of the entire Chemguard team, I welcome you to Chemguard Specialty Chemicals.

For more than two decades, we at Chemguard have been supplying superior quality products and equipment to industrial, military and municipal customers worldwide,

Chemguard has enjoyed quite a successful history and now, we are making history! As you will see in the pages that follow, we are committed to achieving continued technological advancements within the fluorosurfactant industry through extensive research and development. Much has already been accomplished, however recent discoveries indicate that we are now on the cusp of some truly new and exciting product innovations!

Our continuing growth and success as a company has been a direct result of our firm commitment to each and every customer. We ARE "Raising the Standard in Fluorosurfactant Technology" by providing the most advanced, environmentally friendly products possible. We WILL do this with "Unparalleled Service" to our customers!

Fluorosurfactant formulations have been developed to meet the unique challenges of a wide range of industrial and product applications. If you need samples for evaluation, specific product data, or custom formulations for your individual requirements, contact us....we are here to help!

Sincerely,

Roger K. Bower

Roger K. Bower
President and CEO
Chemguard

FLUOROSURFACTANTS

ADVANCED CHEMISTRY ● SUPERIOR PERFORMANCE ● UNPARALLELED SERVICE

CHEMGUARD TIMELINE

1984
Chemguard began as a manufacturer of dry chemicals in Grand Prairie, Texas.

1987
Chemguard was incorporated and began the development of AFFF foam concentrates.

1988
The first UL Listings were achieved for AFFF foam concentrates.

1990
Chemguard created and brought to market more than 20 UL Listed foam concentrates.

1992
Relocated to the new world headquarters and manufacturing facility in Mansfield, Texas.

1993
Introduced new product line of foam systems hardware.

1995
Built new manufacturing facility for foam systems hardware line.

1997
ISO 9001 Certification received. Acquisition of Haz-Tank Fabricators. Received ASME approval to manufacture bladder tanks.

1998
Acquisition of MSA high-expansion foam generator product line.

1999
Introduced novel hydrocarbon surfactant and two fluorochemical surfactants for use in AFFF agents.

2000
Introduced UL Listed foam blending facilities worldwide.

2001
Developed new low-fluorine line of AFFF and AR-AFFF agents using Chemguard manufactured surfactants.

2003
Acquisition of Ciba Specialty Chemicals Lodyne™ fluorosurfactant business for use in fire-fighting foam agents.

2004
Acquisition of Ciba Specialty Chemicals Lodyne™ fluorosurfactant business for use in leveling and wetting agents.

2005
Implemented Rotterdam/"UK" warehouse. Received USCG approval for AFFF foam stations and hose reel stations.

2006
Increased chemical plant manufacturing capacity by 50%.

2007
Introduced new perfluorinated surfactant line. Introduced new UL and FM approved foam pumps.

ABOUT CHEMGUARD.....

Roger Bower founded Chemguard in 1984 to produce dry chemicals for industrial and municipal fire fighting. Within three years Chemguard began developing aqueous film-forming foam (AFFF) concentrates. During the next decade, a number of Chemguard products became UL Listed and FM Approved, the company added an extensive foam systems hardware manufacturing facility, and Chemguard achieved ISO 9001 Certification.

In 2003 and 2004, Chemguard acquired the Lodyne™ fluorosurfactant and foam stabilizers business and the specialty Lodyne™ fluorosurfactant business from Ciba Specialty Chemicals and created the Chemguard Specialty Chemicals Division to market the Ciba products and further develop fluorosurfactants for the fire-fighting and coatings industries.

Today, Chemguard offers the most extensive line of efficient, environmentally friendly, UL Listed and FM Approved foam concentrates in the fire-fighting industry worldwide and is expanding rapidly into fluorosurfactant specialty chemical products. With the implementation of remote blending facilities throughout the world, Chemguard can supply customers with superior products with faster delivery times and lower transportation costs.

We approach the growth and development of our Specialty Chemicals Division with a determination to deliver high-quality, environmentally friendly, cost-effective, and innovative fluorosurfactant products for paints, wood stains and sealers, graphic arts, caulks, adhesives polymers, waxes, polishes, hard surfaces, cleaners, floor strippers, electronics, metal plating and oil and gas fields, as well as for fire-fighting foams. We continually strive to improve the performance and efficiency of Chemguard fluorosurfactant products to expand their potential applications to meet our customer's requirements and to enhance their formulations.

Chemguard IS "Raising the Standard in Fluorosurfactant Technology" with advanced chemistry, superior performance and unparalleled service!

CHEMGUARD OFFERS THE MOST EXTENSIVE PRODUCT LINE OF FLUOROSURFACTANTS IN THE INDUSTRY!

CHEMGUARD SPECIALTY CHEMICALS - A DIVISION OF CHEMGUARD
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CHEMGUARD

SPECIALTY CHEMICALS

SECTION 1
CHEMGUARD FLUOROSURFACTANTS

Chemguard offers an extensive line of high-performance fluorosurfactants. Potential fluorosurfactant product candidates should be properly tested to ensure that the best product options are chosen, based upon the end-use performance and specific application conditions. The table below highlights the proven benefits of Chemguard fluorosurfactants in common industrial applications.

CHEMGUARD FLUOROSURFACTANTS - OVERVIEW*
CHARACTERISTICS AND BENEFITS BY APPLICATION

INDUSTRIAL APPLICATIONS	CHARACTERISTICS AND BENEFITS
PAINTS	IMPROVES LEVELING - REDUCES ORANGE-PEEL EFFECT - REDUCES CRATERING - IMPROVES GLOSS - IMPROVES BLOCKING - INCREASES SOIL REPELLENCE - INCREASES OPEN TIME
WOOD STAINS/SEALERS	IMPROVES POOR-SURFACE WETTING - ELIMINATES VOIDS AND SURFACE DEFECTS
GRAPHIC ARTS	INCREASES PRINTING CYLINDER LIFE - ENHANCES PRINT DEFINITION - IMPROVES INK FLOW AND LEVELING
CAULKS	IMPROVES UV STABILITY - ENHANCES ANTI-SOILING CHARACTERISTICS IMPROVES "WEATHERABILITY"
ADHESIVES	IMPROVES WETTING CHARACTERISTICS - INCREASES PORE PENETRATION
POLYMERS	WORKS AS AN INTERNAL LUBRICANT - IMPROVES UV RESISTANCE ACTS AS A COUPLING AGENT
WAXES	IMPROVES LEVELING - REDUCES ORANGE-PEEL EFFECT
POLISHES	IMPROVES LEVELING - REDUCES ORANGE-PEEL EFFECT - IMPROVES SUBSEQUENT COATING ADHESION
HARD SURFACES	IMPROVES PORE PENETRATION AND WETTING - STABLE IN ACID STAINS
CLEANERS	INCREASES WETTING - ENHANCES PENETRATION - INCREASES STABILITY IN FOAM PRODUCTS IMPROVES ANTI-FOGGING CHARACTERISTICS
FLOOR STRIPPERS	IMPROVES WETTING - INCREASES PENETRATION
ELECTRONICS	IMPROVES WETTING AND PENETRATION - HELPS ELIMINATE VOIDS - REDUCES DRAGOUT
METAL PLATING	IMPROVES ETCHING EFFICIENCY - INHIBITS SCALING - SUPPRESSES ACID MISTING REDUCES DRAGOUT - ACTS AS A WETTING AID IN PHOTO-RESIST STRIPPERS
OIL AND GAS FIELDS	IMPROVES PERFORMANCE IN AQUEOUS AND NON-AQUEOUS SYSTEMS REDUCES SURFACE TENSION
FIRE-FIGHTING FOAM	IMPROVES HEAT STABILITY OF FOAMS - IMPROVES FOAM-RETENTION CHARACTERISTICS

*SEE PAGES 7 THROUGH 11 FOR ADDITIONAL PRODUCT-SPECIFIC INFORMATION.

SAMPLES ARE AVAILABLE FOR TESTING AND EVALUATION!

FLUOROSURFACTANTS

CHEMGUARD IS RAISING THE STANDARD IN FLUOROSURFACTANT TECHNOLOGY!

PHYSICAL PROPERTIES OF CHEMGUARD FLUOROSURFACTANTS

Chemguard manufactures all types of fluorosurfactants: amphoteric, anionic, cationic and nonionic. Chemguard fluorosurfactants offer surfactant and chemical properties far superior to non-fluorinated surfactants and provide low surface tension at low concentrations. Providing excellent wetting as well as chemical and thermal stability, these powerful fluorosurfactants are effective in concentrations as low as 50-1000 ppm (0.005-0.100%). All Chemguard fluorosurfactants are formulated as liquids to offer easy handling and dilution for production personnel.

The table below highlights the surface tension advantages of Chemguard fluorosurfactants and provides percent actives to assist formulators in determining the proper additions. For more information regarding a particular product, please contact Chemguard for a technical data sheet.

CHEMGUARD FLUOROSURFACTANTS PHYSICAL PROPERTIES

PRODUCT NUMBER AND TYPE	DESCRIPTION	SOLVENT	DENSITY g/ml (25°C)	FLASH POINT °C	ACTIVES	SURFACE TENSION (dynes/cm)	
						0.1%	0.01%
						(ACTIVES CONCENTRATIONS) (1000ppm)	(100ppm)
S-100 AMPHOTERIC	ALKYL AMINO ACID FLUOROSURFACTANT	HEXYLENE GLYCOL 10% TETRAMETHYLENE SULFONE 3% WATER 62%	1.10	>93	25%	21	21
S-111 AMPHOTERIC	ALKYL AMINE OXIDE FLUOROSURFACTANT	PROPYLENE GLYCOL 10% DIETHYLENE GLYCOL BUTYL ETHER 15% WATER 30%	1.22	>93	40%	15	17
S-103A ANIONIC	ALKYL SODIUM SULFONATE FLUOROSURFACTANT	HEXYLENE GLYCOL 15% MAGNESIUM SULFATE 1.7% WATER 38.3%	1.23	>93	45%	20	35
S-106A CATIONIC	ALKYL AMMONIUM CHLORIDE FLUOROSURFACTANT	HEXYLENE GLYCOL 10% SODIUM CHLORIDE 3% WATER 57%	1.14	>93	30%	29	46
S-107B NONIONIC	POLYOXYETHYLENE FLUOROSURFACTANT	ISOPROPANOL 34% ALKYL POLYOXYETHYLELNE 18% WATER 3%	1.06	17	45%	21	25
S-208M CATIONIC BLEND	ALKYL AMMONIUM CHLORIDE FLUOROSURFACTANT BLEND	HEXYLENE GLYCOL 10% WATER 55%	1.16	>93	45%	16	17
S-216M CATIONIC/SILICONE BLEND	FLUOROSURFACTANT AND SILICONE SURFACTANT BLEND	HEXYLENE GLYCOL 10% WATER 55%	1.14	>93	45%	16	16
S-222N NONIONIC	POLYALKYL ETHER FLUOROSURFACTANT	POLYOXYETHYLENE - POLYOXYPROPYLENE 15%	1.10	>93	85%	22	27
S-228M ANIONIC/SILICONE BLEND	FLUOROSURFACTANT AND SILICONE SURFACTANT BLEND	HEXYLENE GLYCOL 9.5% WATER 39%	1.14	>93	48%	16	17

CHEMGUARD SPECIALTY CHEMICALS

CHEMGUARD FLUOROSURFACTANTS PRODUCT SELECTION

Chemguard fluorosurfactants are unparalleled in their wetting and leveling power in both water-based and solvent-borne systems. In addition, Chemguard fluorosurfactants are much more stable than hydrocarbon surfactants, particularly in the presence of heat, acid, or alkalies. Chemguard fluorosurfactants generally are suitable for applications in which non-fluorinated surfactants have not given the desired effect.

Chemguard fluorosurfactants are available as both foaming and low-foaming agents. All products are soluble in polar solvents, and S-107B and S-222N find use in non-polar formulations due to their solubility.

The selection guide below shows Chemguard fluorosurfactants for a variety of applications. Potential fluorosurfactant product candidates should be properly tested to ensure that the best options are chosen, based upon end-use product performance and specific application conditions.

CHEMGUARD FLUOROSURFACTANTS PRODUCT SELECTION GUIDE

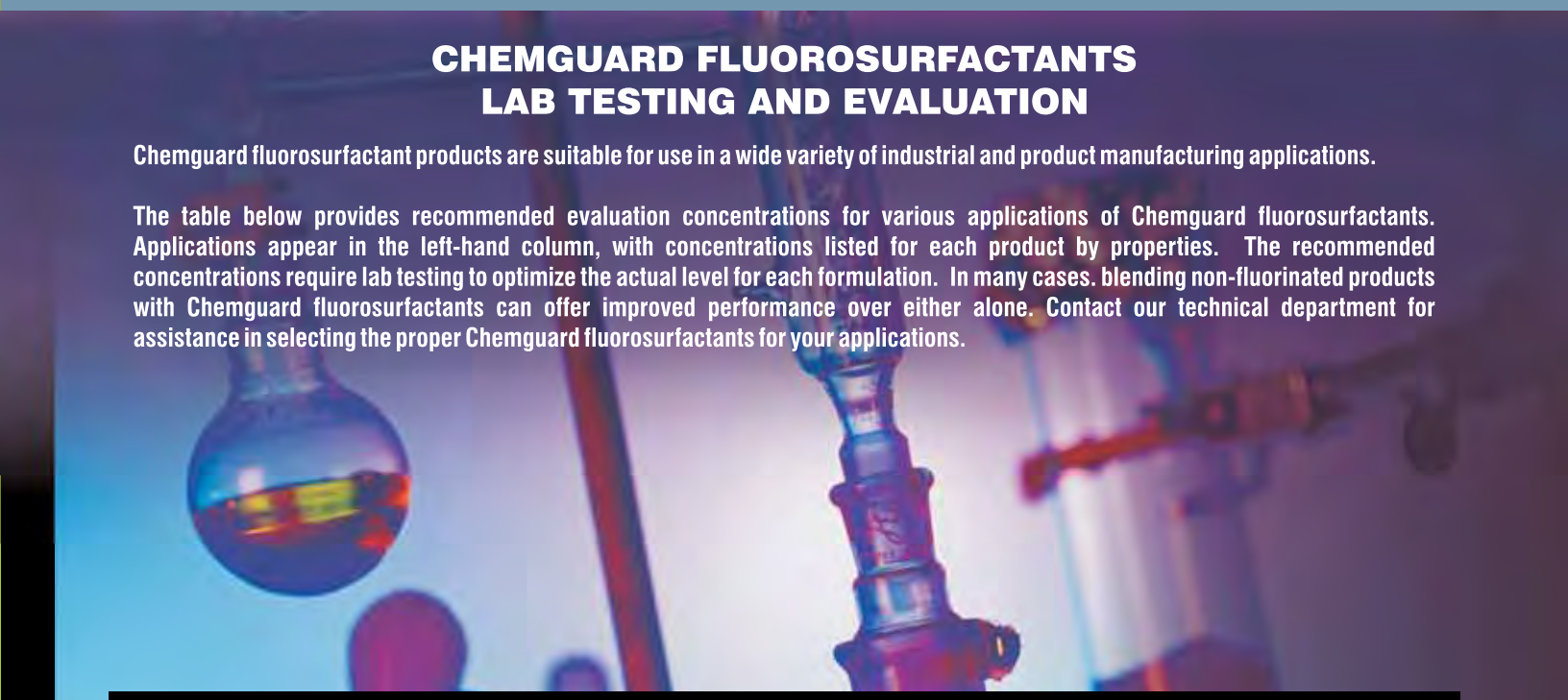
PRODUCT NUMBER AND TYPE	WETTING AGENT	FOAMING AGENT	SOLUBLE IN NON-POLAR SOLVENTS	SOLUBLE IN POLAR SOLVENTS	ANHYDROUS	CORROSION INHIBITOR	STABLE IN		
							HEAT	ACID	ALKALIES
S-100 AMPHOTERIC	●	●		●			●	●	●
S-111 AMPHOTERIC	●	●		●			●	●	●
S-103A ANIONIC	●	●		●		●	●	●	●
S-228M ANIONIC	●			●		●	●	●	●
S-106A CATIONIC	●	●		●		●	●	●	●
S-208M CATIONIC	●	●		●		●	●	●	●
S-216M CATIONIC	●			●		●	●	●	●
S-107B NONIONIC	●		●	●			●	●	●
S-222N NONIONIC	●		●	●	●		●	●	●

CHEMGUARD IS RAISING THE STANDARD IN FLUOROSURFACTANT TECHNOLOGY!

CHEMGUARD FLUOROSURFACTANTS LAB TESTING AND EVALUATION

Chemguard fluorosurfactant products are suitable for use in a wide variety of industrial and product manufacturing applications.

The table below provides recommended evaluation concentrations for various applications of Chemguard fluorosurfactants. Applications appear in the left-hand column, with concentrations listed for each product by properties. The recommended concentrations require lab testing to optimize the actual level for each formulation. In many cases. blending non-fluorinated products with Chemguard fluorosurfactants can offer improved performance over either alone. Contact our technical department for assistance in selecting the proper Chemguard fluorosurfactants for your applications.



CHEMGUARD FLUOROSURFACTANTS - LAB TESTING AND EVALUATION GUIDE

INDUSTRY/ APPLICATION	PROPERTIES	CHEMGUARD FLUOROSURFACTANT PRODUCTS								
		S-100 AMPHOTERIC	S-111 AMPHOTERIC	S-103A ANIONIC	S-228M ANIONIC	S-106A CATIONIC	S-208M CATIONIC	S-216M CATIONIC	S-107B NONIONIC	S-222N NONIONIC
PAINTS - COATINGS WAXES - POLISHES	WETTING LEVELING ANTI-SOILING	0.1 0.1 —	0.1 0.1 —	0.05 0.05 —	0.05 0.05 —	0.05 0.05 —	0.05 0.05 —	0.05 0.05 —	0.05 0.05 0.1	0.05 0.05 0.05
ADHESIVES	WETTING SEMI-RELEASE ADDITIVE NONAQUEOUS FORMULAS	— — —	0.1 — —	0.05 0.1 —	0.05 0.1 —	0.05 0.1 —	0.05 0.1 —	0.05 0.1 —	0.05 0.1 0.1	0.05 0.05 0.05
GRAPHIC ARTS	LEVELING DECREASED WICKING EMULSION WETTING	— — —	— — —	— — —	— — —	— — —	— — —	— — —	0.05 0.1 0.1	0.05 0.05 0.05
METAL PLATING	PLATING BATH AID ANTI-CORROSION CLEANING/ DESCALING DEGREASING	— — — —	— — — —	0.05 0.05 0.05 —	— 0.05 0.05 —	— 0.05 — —	— 0.05 — —	— 0.05 — —	— — 0.1 —	0.05 — 0.05 0.1
CLEANING	ALKALINE CLEANERS GLASS CLEANER/DEFOGGER SOLVENT DEGREASING	0.1 — —	0.1 — —	— — —	— — —	— — —	— — —	— — —	0.1 0.1 0.1	0.05 0.05 0.05
FOAMING	HYDROCARBON FOAMING AQUEOUS FOAMING ACID (HCl) FOAMING	— — —	— 0.05 —	— 0.05 —	— — —	— 0.05 0.3	— 0.05 0.3	— — —	— — —	0.5 — —

CHEMGUARD

SPECIALTY CHEMICALS

PRODUCT APPLICATIONS

PAINTS - WOOD STAINS AND SEALERS - GRAPHIC ARTS

PAINTS

Multi-functional Chemguard fluorosurfactants reduce surface tension, improving wetting, flow, and leveling on contaminated surfaces and low-energy substrates. Fluorosurfactants can reduce foam, improve open time, improve gloss, improve blocking and impart resistance to dirt pick-up at low concentrations. In many instances, the formulator can reduce or even replace multiple ingredients with one Chemguard fluorosurfactant and achieve improved results. The low concentrations required reduce surfactant interference with critical properties of paints. Importantly, the addition of Chemguard fluorosurfactants can reduce orange-peel effect and cratering.

WOOD STAINS AND SEALERS

Chemguard fluorosurfactants are effective in wetting soiled or contaminated surfaces, including new wood with a difficult-to-penetrate surface due to improper curing or drying. The addition of fluorosurfactants can allow wood to be used without additional drying times or costs. Using Chemguard fluorosurfactants in stains can eliminate voids and surface defects caused by entrapped bubbles during mixing or application. Formulation costs can be reduced due to improved pore penetration, which allows lower application rates and reduces waste.

GRAPHIC ARTS

Chemguard's multifunctional fluorosurfactants dramatically reduce surface tension to improve wetting, flow, and leveling without creating "bleeding" issues. In addition, the low concentrations will not interfere with dye and pigment dispersion phases. Low-foam options are available for low-voiding potential. Because Chemguard fluorosurfactants tend to migrate to the surface of applied inks, they can improve anti-blocking characteristics, which reduces transfer when printed sheets are stacked after ink application. Fluorosurfactants can also increase printing cylinder life. Request S-107B and S-222N for non-aqueous formulations.

FLUOROSURFACTANTS

CHEMGUARD - RAISING THE STANDARD IN FLUOROSURFACTANT TECHNOLOGY!

PRODUCT APPLICATIONS
CAULKS - ADHESIVES - POLYMERS

CAULKS

Chemguard fluorosurfactants improve UV stability, enhance anti-soiling, and improve the weatherability of caulks. The fluorosurfactants improve bond strength by increasing pore penetration, which increases the total surface area in contact with the caulk. Fluorosurfactants also reduce surface tension, which greatly improves adhesion on lower-energy surfaces and materials with surface contamination. Adding Chemguard fluorosurfactants can also increase open time in certain formulations, creating a wider application window without slowing curing. The addition of fluorosurfactants can also eliminate silicone bleeding. For non-aqueous formulations, select Chemguard S-222N.

ADHESIVES

Chemguard fluorosurfactants improve wetting characteristics and increase the pore penetration of adhesives, which improves bond strength. Chemguard fluorosurfactants also reduce surface tension, which improves adhesion on lower-energy surfaces and surfaces with contamination. The addition of fluorosurfactants can increase open time in certain formulations, which creates a wider application window without slowing curing. Chemguard S-222N is available for non-aqueous formulations.

POLYMERS

Chemguard fluorosurfactants improve particle wetting, aid in hydrocarbon emulsification, act as coupling agents, and serve as internal lubricants. Low foam generators, fluorosurfactants reduce surface tension and improve leveling to reduce voiding in 100% solids, polymer-based systems. In UV-curable systems, Chemguard fluorosurfactants can improve adhesion by improving pore penetration and leveling. Products are available for water-sensitive polymer-based systems.

CHEMGUARD
SPECIALTY CHEMICALS

PRODUCT APPLICATIONS
WAXES - POLISHES - HARD SURFACES

WAXES

Chemguard fluorosurfactants effectively maximize wetting power to produce uniform film formation, improved gloss, and excellent recoat performance. Many fluorosurfactants are low foaming for smooth, void-free finishes and reduced orange-peel effect. Waxes formulated with Chemguard fluorosurfactants can give excellent results when applied to surfaces that are not perfectly cleaned. Available for both water-based (S-228M) and solvent-based (S-222N) systems.

POLISHES

In polishes, Chemguard fluorosurfactants give uniform film formation, improved gloss, and excellent recoat performance by effectively maximizing wetting and leveling. The low-foaming characteristics of many surfactants produce smooth, void-free finishes with reduced orange-peel effect. Incorporating Chemguard fluorosurfactants allows polishes to be used on less-than-perfect wood or other porous surfaces and still give excellent results. Available for both water-based (S-228M) and solvent based (S-222N) systems.

HARD SURFACES

Chemguard fluorosurfactants improve wetting of dry ingredients in admix formulations for concrete, mortar and grout. Excellent pore penetration is achieved with small additions to sealers and concrete stains. The stability of Chemguard fluorosurfactants in the presence of acids make them ideal wetting additives for concrete and stains. Also, the ability of fluorosurfactants to wet contaminated surfaces allows tile and grout cleaners to perform more effectively. Adding small amounts of fluorosurfactants can reduce drying time for post-cleaned surfaces.

CUSTOM FORMULATIONS ARE AVAILABLE FOR SPECIFIC APPLICATIONS

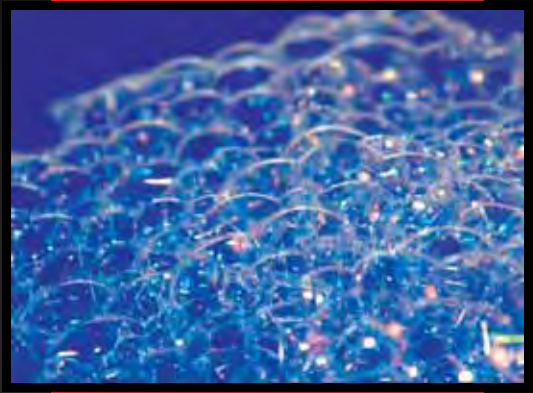
FLUOROSURFACTANTS

CHEMGUARD - RAISING THE STANDARD IN FLUOROSURFACTANT TECHNOLOGY!

PRODUCT APPLICATIONS
CLEANERS - FLOOR STRIPPERS - ELECTRONICS

CLEANERS

Incorporating Chemguard fluorosurfactants in cleaners reduces surface tension and promotes high penetration and wetting of contaminates, which in turn allows the ingredients added for emulsification and dissolution to work efficiently at reduced concentrations. For glass and hard-surface cleaning, the improved wetting power of Chemguard fluorosurfactants results in less residue, faster drying and no streaking or haze. S-222N and S-107B can impart anti-fogging properties. For foam cleaners, S-103A and S-106A create very stable, high-quality foams, even at low concentrations.

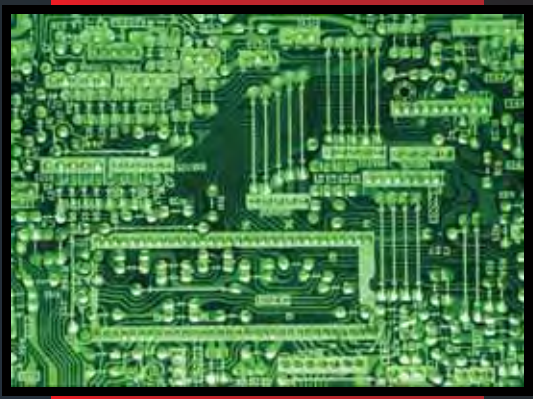


FLOOR STRIPPERS

In floor strippers, Chemguard fluorosurfactants reduce surface tension to improve the effectiveness of wetting and penetrating contaminates, which allows cleaning ingredients to more effectively dissolve old wax layers. With the addition of Chemguard fluorosurfactants, concentrations of the active cleaning ingredients can often be reduced. Choose S-107B and S-222N for non-aqueous formulations. S-100 and S-111 are used for alkaline-based formulations.

ELECTRONICS

Chemguard fluorosurfactants improve wetting of low-surface-energy substrates for fluxes, cleaners, strippers and etching baths. The ability of fluorosurfactants to dramatically reduce surface tension allows these solutions to penetrate the very tight spacings increasingly common on electrical equipment. The use of fluorosurfactants in underfills and encapsulants can help eliminate air entrainment and voids. Lower drag-out for etched and stripping baths are also achieveable with the addition of very low concentrations of Chemguard fluorosurfactants.



CHEMGUARD

SPECIALTY CHEMICALS

PRODUCT APPLICATIONS

METAL PLATING - OIL AND GAS FIELDS - FIRE-FIGHTING FOAMS

METAL PLATING

Chemguard fluorosurfactants assist in wetting contaminated surfaces and in penetrating difficult-to-wet tight spaces, which improves etching efficiency and reduces scale build-up. Fluorosurfactants are very stable in acid environments, even when heated, and many act as fume suppressants. By reducing drag-out and mist formation, Chemguard fluorosurfactants prolong bath quality while reducing contamination to the work environment and adjacent plating-solution tanks.

OIL AND GAS FIELDS

Chemguard fluorosurfactants more efficiently foam brine, alcohol/water, and acid solutions than hydrocarbon surfactants, for example when used to relieve hydrostatic blockage of gas wells. The stability of fluorosurfactants in harsh environments - including acids, bases and high temperatures - make them ideal for down-hole applications. Foam generated from Chemguard fluorosurfactants also reduces fluid loss, increases penetration, and improves proppant-carrying and particle lifting capabilities. Fluorosurfactants also reduce surface tension of both water and non-aqueous systems, reducing blockage of capillaries by trapped water and aiding in stimulation recovery.

FIRE-FIGHTING FOAMS

Chemguard offers an extensive line of fluorosurfactants for formulating all categories of fire-fighting foam products, including AFFF, AR-AFFF, and protein foams. Chemguard's heat-stable fire-fighting foam fluorosurfactants produce very dense, highly stable foam, with outstanding fire-fighting properties. Low concentrations can be used in conventional formulations, reducing the total release into the environment when utilized in fighting fires. Telomer based, these are the safest fluorosurfactants available on the market today. Chemguard's technical staff can help you optimize formulations to assist you in obtaining approvals from regulatory agencies worldwide.

See additional information regarding Chemguard fire-fighting fluorosurfactant products in the pages that follow, 12-16

FLUOROSURFACTANT

CHEMGUARD IS RAISING THE STANDARD IN FLUOROSURFACTANT TECHNOLOGY!

SECTION 2
CHEMGUARD FIRE-FIGHTING FOAM SURFACTANTS

Chemguard offers a complete line of fire-fighting surfactants for formulating reliable fire-fighting foams, including very heat stable fluorosurfactants. Chemguard's fluorosurfactants, which can be formulated to produce very dense, stable foam, are proven to exhibit outstanding fire-fighting properties.

CHEMGUARD

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FIRE-FIGHTING FOAM SURFACTANTS PRODUCT USAGE GUIDE

Chemguard fluorosurfactants are the industry standard for high-performance fire-fighting foam fluorosurfactants.

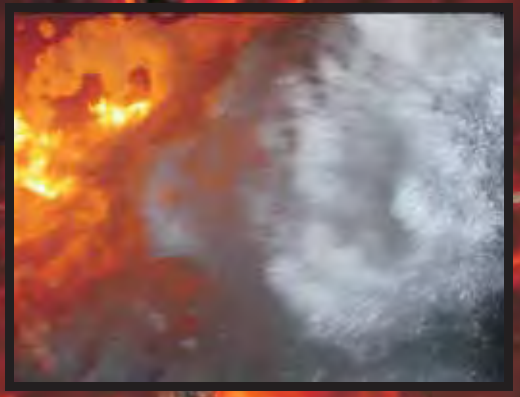
CHEMGUARD FIRE-FIGHTING FOAM SURFACTANTS USAGE GUIDE

CHEMGUARD PRODUCT	PRODUCT DESCRIPTION AND USES
F-102R	CONCENTRATED BLEND OF FLUOROSURFACTANTS FOR FORMULATING AR-AFFF CONCENTRATES TO MEET UL STANDARDS.
F-304	CONCENTRATED BLEND OF FLUOROSURFACTANTS FOR FORMULATING AFFF CONCENTRATES TO MEET UL STANDARDS AND U.S. MILITARY SPECIFICATIONS.
F-410A	CONCENTRATED BLEND OF FLUOROSURFACTANTS FOR FORMULATING AFFF CONCENTRATES TO MEET U.S. MILITARY SPECIFICATIONS.
FP-5100	ANIONIC POLY-PERFLUOROALKYLATED POLYAMINO ACID USED AS A POLAR SOLVENT VAPOR BARRIER ADDITIVE AND TO STABILIZE AR-AFFF CONCENTRATES.
FP-5102	PROPRIETARY BLEND OF FLUORINATED POLYMERS USED AS A POLAR SOLVENT VAPOR BARRIER ADDITIVE AND TO STABILIZE AR-AFFF CONCENTRATES.
FP-5103	PROPRIETARY BLEND OF FLUORINATED POLYMERS USED AS A POLAR SOLVENT VAPOR BARRIER ADDITIVE AND TO STABILIZE AR-AFFF CONCENTRATES.
FS-100	AMPHOTERIC FLUOROSURFACTANT USED IN PREPARING AFFF AGENTS.
FS-183	AMPHOTERIC FLUOROSURFACTANT USED IN PREPARING AFFF AND AR-AFFF AGENTS.
FS-157	AMPHOTERIC FLUOROSURFACTANT USED IN PREPARING AFFF, FFFP, AR-AFFF AND AR-FFFP AGENTS.
FS-157N	AMPHOTERIC FLUOROSURFACTANT USED TO MAXIMIZE BURN-BACK RESISTANCE IN AFFF, FFFP, AR-AFFF AND AR-FFFP FORMULATIONS.
FS-257	AMPHOTERIC FLUOROSURFACTANT USED TO MAXIMIZE BURN-BACK RESISTANCE IN AFFF, FFFP, AR-AFFF AND AR-FFFP FORMULATIONS.
FS-221	NONIONIC FLUOROSURFACTANT USED IN PREPARING AFFF AGENTS MEETING U.S. MILITARY SPECIFICATIONS AND FP, AFFF, FFFP, AND POLAR FORMULATIONS.
FS-220B	NONIONIC FLUOROSURFACTANT USED IN PREPARING AFFF AGENTS MEETING U.S. MILITARY SPECIFICATIONS AND FP, AFFF, FFFP, AND POLAR FORMULATIONS.
FS-818-11	NONIONIC FLUOROSURFACTANT USED IN PREPARING AFFF AGENTS MEETING U.S. MILITARY SPECIFICATIONS AND FFFP WHEN USED WITH FS-220B OR FS-221.
FS-9090	ANIONIC PERFLUOROTELOMER USED AS A POLAR SOLVENT VAPOR BARRIER ADDITIVE AND TO STABILIZE AR-AFFF CONCENTRATES.
HS-100	ANIONIC HYDROCARBON SURFACTANT USED IN PREPARING HIGHLY FLUORINE EFFICIENT AFFF AGENTS BY IMPROVING FOAM FLUIDITY AND ENHANCING FOAM EXPANSION AND DRAIN TIME.
FS-203	ANIONIC ALKYL SODIUM SULFONATE FLUOROSURFACTANT USED TO PREPARE AFFF AGENTS MEETING U.S. MILITARY SPECIFICATIONS.
S-103B	ANIONIC ALKYL SODIUM SULFONATE FLUOROSURFACTANT USED TO PREPARE AFFF AGENTS MEETING U.S. MILITARY SPECIFICATIONS.
S-152B	BLEND OF FLUOROSURFACTANTS AND HYDROCARBON SURFACTANTS USED TO PREPARE AFFF AGENTS MEETING U.S. MILITARY SPECIFICATIONS.

SAMPLES ARE AVAILABLE FOR TESTING AND EVALUATION!

FLUOROSURFACTANTS

CHEMGUARD IS RAISING THE STANDARD IN FLUOROSURFACTANT TECHNOLOGY!



FIRE-FIGHTING FOAM SURFACTANTS PHYSICAL PROPERTIES

Chemguard surfactants are manufactured and tested to the highest standards in the industry today.

FIRE-FIGHTING SURFACTANTS PHYSICAL PROPERTIES GUIDE

CHEMGUARD PRODUCT	APPEARANCE	ACTIVES (%)	DENSITY (g/ml)	FLASH POINT (°C)	FREEZING POINT (°C)
F-102R	CLEAR, COLORLESS LIQUID	37	1.14	27	-6
F-304	HAZY, YELLOW/GREEN LIQUID	34	1.13	40	8
F-410A	CLEAR, COLORLESS TO GREEN LIQUID	40	1.17	35	-8
FP-5100	CLEAR, PALE YELLOW LIQUID	33	1.10	>93	10
FP-5102	CLEAR, PALE YELLOW LIQUID	33	1.10	>93	10
FP-5103	CLEAR, PALE YELLOW LIQUID	33	1.10	>93	10
FS-100	CLEAR, DARK AMBER LIQUID	40	1.24	>93	10
FS-183	CLEAR, DARK AMBER LIQUID	40	1.22	>93	10
FS-157	CLEAR, DARK AMBER LIQUID	27	1.18	>93	10
FS-257	CLEAR, DARK AMBER LIQUID	27	1.18	>93	10
FS-157T	CLEAR, DARK AMBER LIQUID	34	1.22	>93	10
FS-221	CLEAR, PALE GREEN TO YELLOW LIQUID	40	1.02	27	10
FS-220B	CLEAR, PALE GREEN TO YELLOW LIQUID	40	1.02	27	10
FS-818-11	CLEAR, PALE YELLOW LIQUID	35	1.12	66	10
FS-9090	CLEAR, PALE YELLOW LIQUID	35	1.14	79	10
HS-100	DARK AMBER VISCOUS LIQUID	45	1.14	>95	10
FS-203	CLEAR, PALE YELLOW LIQUID	45	1.20	>95	8
S-103B	CLEAR, PALE YELLOW LIQUID	45	1.20	>95	8
S-152B	CLEAR, PALE YELLOW LIQUID	41	1.10	32	-11

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FIRE-FIGHTING FOAM SURFACTANTS CLASSIFICATIONS

Fire-fighting foam classifications are based upon product composition and effectiveness against hydrocarbon or polar liquid fires.

FIRE-FIGHTING FOAM CLASSIFICATION GUIDE

CLASSIFICATION[1]	TYPE OF FIRE[2]		FOAM EXPANSION[3]		
	HYDROCARBONS	POLAR-LIQUIDS	LOW	MEDIUM	HIGH
S	1	0	N	Y	Y
AFFF	3	0	Y	Y	N
AR-AFFF	3	3	Y	Y	N
P	1	0	Y	N	N
FP	2	0	Y	Y	N
FFFP	3	0	Y	Y	N
AR-FP	2	3	Y	Y	N
AR-FFFP	3	3	Y	Y	N

[1] S-Synthetic, AFFF - Aqueous film-forming foam, AR - Alcohol-resistant, P - Protein, FP - Fluoro-protein, FFFP - Film-forming fluoro-protein, AR-FFFP - Alcohol-resistant film-forming fluoro-protein

[2] Efficiency rating: 0-No efficiency, 1-Low efficiency, 2-Good efficiency, 3-Excellent efficiency

[3] Expansion level: Low expansion ratio between 2 to 1 and 20 to 1, Medium expansion ratio between 20 to 1 and 200 to 1, High expansion ratio more than 200 to 1

SYSTEM CERTIFICATION ISO 9001:2000 SGS

FLUOROSURFACTANTS

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FIRE-FIGHTING SURFACTANTS APPLICATIONS

Chemguard's technical staff is available to help you in optimizing formulations and to assist you in obtaining approvals from regulatory agencies worldwide. The table below outlines the Chemguard product options suitable for each fire-fighting classification.

FIRE-FIGHTING SURFACTANTS APPLICATION GUIDE

CHEMGUARD PRODUCT	CLASSIFICATION				
	AFFF	AR-AFFF	FP	FFFP	AR-FFFP
F-102R	●	●			
F-304	●			●	●
F-410A	●	●			
FP-5100		●			
FP-5102		●			
FP-5103		●			
FS-100	●	●		●	●
FS-183	●	●		●	●
FS-157	●	●		●	●
FS-157N	●	●		●	●
FS-257	●	●		●	●
FS-221	●	●		●	●
FS-220B	●	●		●	●
FS-818-11	●	●		●	●
FS-9090	●	●			●
HS-100					
FS-203	●	●		●	●
S-103B	●	●		●	●
S-152B		●			

● RECOMMENDED FOR USE

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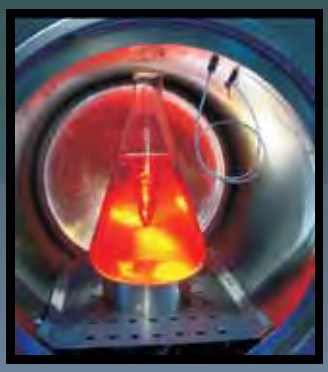
CHEMGUARD RESEARCH AND DEVELOPMENT

Chemguard is committed to continuous product development and innovation to meet customer requirements and market demands. In recent years, we have increased our R&D staff, expanded our laboratory facility, and invested in state-of-the-art equipment, such as a Kruss tensiometer.

Currently, we are developing a new generation of foam stabilizers that will allow us to manufacture low-viscosity alcohol-resistant aqueous film-forming foam (AR-AFFF) and alcohol-resistant film-forming fluoro-protein (AR-FFFP) agents, while providing improved polar solvent performance. Chemguard's research staff is available to answer your product questions and assist you with your application needs.



CUSTOM FORMULATIONS ARE AVAILABLE FOR SPECIFIC APPLICATIONS

FLUOROSURFACTANTS

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CHEMGUARD FLUOROSURFACTANTS AND THE ENVIRONMENT

Telomer-based fluorosurfactants are an effective option to fluorosurfactants based on perfluorooctyl sulfonate (PFOS) and perfluoro-octanoic acid (PFOA), which the industry is phasing out. Chemguard fluorosurfactants, which are based on telomer synthesis, are composed of predominately six carbon perfluoro chains with no known pathway of decomposing to PFOS or PFOA. They do not contain PFOS, PFOA or any derivatives that decompose to them. Also, all perfluoro intermediates are derived from the telomer process.

For recommended disposal, handling, and health and safety protection information for a specific Chemguard product, please refer to the material safety data sheet (MSDS). Please contact us for additional environment-related information on Chemguard fluorosurfactants.

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FLUOROSURFACTANTS

RAISING THE STANDARD IN FLUOROSURFACTANT TECHNOLOGY!

ADVANCED CHEMISTRY ● SUPERIOR PERFORMANCE ● UNPARALLELED SERVICE

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