

SILICONE
SOLUTIONS
FOR OIL & GAS
APPLICATIONS



Momentive Performance Materials has been developing new ways to increase productivity and enhance overall performance in the Oil & Gas industry for decades.

SAG™ antifoams, **Silwet™** silicone surfactants, **Silbreak™** demulsifiers and **Indusil™** silicones, along with **Element14™** PDMS line, are now used worldwide to **enhance productivity, cut costs and improve performance**, providing solutions for a broad range of Oil & Gas applications.



UPSTREAM

- **Foam control**
 - Antifoaming
 - Drilling muds
 - Completion fluids
 - Gas/oil separators
 - Water reinjection
 - Waste-water treatment
 - Foamants
- **Demulsification**
- **Drilling additives**
- **Non-emulsifiers**
- **Surfactants**
- **Fines control**

DOWNSTREAM

- **Antifoams**
 - Diesel fuel additive packages
 - Gas sweetening
 - Delayed cokers
 - Butadiene extraction
 - Distillation
 - Lube oil
 - Waste-water treatment

SAG™ Antifoams and FF Fluorosilicones

SAG silicone antifoams and FF fluorosilicones have proven to effectively control foam in a variety of Oil & Gas applications, such as **diesel fuel, gas sweetening, butadiene units, gas oil separators and drilling muds**. The newer generation SAG silicone antifoams have shown to offer **lower use levels, stability in extreme conditions, easier handling, improved compatibility and stability** providing **better overall performance** in many Oil & Gas applications.

Silwet™ Silicone Surfactants

Silwet surfactants are very versatile, offering virtually unlimited capabilities in many diverse applications. They feature **high surface activity** and can dramatically reduce the interfacial tension at very low addition levels. This helps actives penetrate a substrate, wet a surface, disperse particles in a formulation or maximize aqueous products spreading, thus highly impacting the success of the application, and providing **critical performance difference** in every process step.

Silbreak™ Silicone Demulsifiers

The new Silbreak silicone demulsifiers **combine the outstanding surface activity** of siloxanes polymers with the **water or oil solubility** of organic substituents. They are based on organically modified siloxane molecules and therefore behave significantly differently from polydimethylsiloxanes. Silbreak silicone demulsifiers are not intended to replace organic demulsifiers, but can be used as boosters or adjuncts at typically very low concentrations.

Indusil™ Silicones

Indusil silicones work to **improve industrial processes** throughout a variety of applications as foam controllers, wetting agents, and surface modifiers, which can lead to improved productivity and lower manufacturing costs.



FOAM CONTROL AGENTS

MAIN BENEFITS



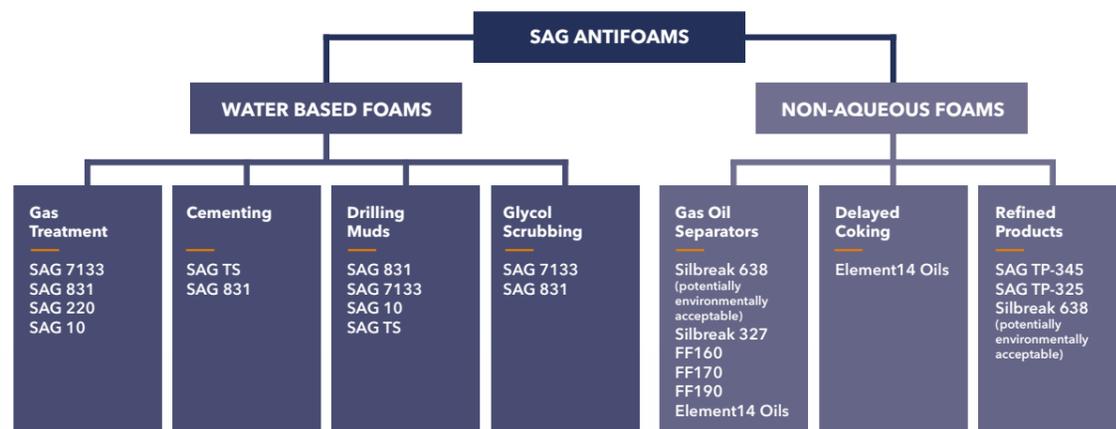
WATER BASED FOAMS SOLUTIONS

- **Stability/compatibility** in high ionic strength solutions, which can lead to **durable effect** and long intervals between maintenance shutdowns
- **Low concentration**, continued dosage can result in **stable DeltaP** and **excellent line control**
- Formulated to withstand **extreme climates**
- **Excellent foam control at low silicone loading** in the system

NON-AQUEOUS FOAMS SOLUTIONS

- Deaeration as well as foam destruction in gas/oil separators can result in **maximum gas extraction, cleaner flares, increased productivity**
- Silbreak 638 silicone demulsifier has **low viscosity** and is generally **easy to handle**
- **Excellent deaeration** performance
- Foam control with **significantly lower silicon metal loading** in the crude
- May combine foam control and compatibility in packages for the refined grades

SAG Antifoams	Amine/Butadiene Units	Drilling Muds	Gas/Oil Separators	High Performance Diesel Fuel	Compatibility	Deaeration	Defoaming	Durability	Dosage	Percentage of Solids
SAG 7133 Antifoam Emulsion	yes	yes			high	medium	high	medium	medium	12% solids antifoam emulsion
SAG 831 Silicone Antifoam Emulsion	yes				high	medium	high	high	low	45% solids antifoam emulsion
SAG TS Silicone Antifoam Emulsion		yes			high	medium	high	high	medium	>10% solids antifoam emulsion
SAG 220 Antifoam Emulsion	yes				high	medium	high	medium	low	43% solids antifoam emulsion
SAG 10 Silicone Antifoam Emulsion	yes				low	medium	medium	medium	medium	15% solids antifoam emulsion
Silbreak 638 Silicone Demulsifier			yes		high	high	high	high	low	50% actives silicone antifoam
Silbreak 327 Silicone Demulsifier			yes		high	high	high	high	low	25% actives silicone antifoam
FF160 Foam Control Agent			yes		low	high	high	high	very low	100% actives fluorosilicone
FF170 Foam Control Agent			yes		low	high	high	high	very low	100% actives fluorosilicone
FF190 Foam Control Agent			yes		low	high	high	high	very low	100% actives fluorosilicone
SAG TP-325 Foam Control Agent				yes	high	high	high	high	low	50% actives silicone antifoam
SAG TP-345 Foam Control Agent				yes	high	high	high	high	medium	50% actives silicone antifoam



Typical product data values should not be used as specifications.
Assistance and specifications are available by contacting Momentive sales office.

UPSTREAM SILICONE SOLUTIONS

MAIN BENEFITS



DEMULSIFICATION

- Improved cost/performance at low concentrations
- Increased speed of separation or reduced BS&W
- Improved interface or clean water
- Reduced temperature of demulsification

FOAMING

- Stabilized foam for foam drilling or fracturing
- Stabilized crude oil foam in gas lift applications

STIMULATION

Fines control

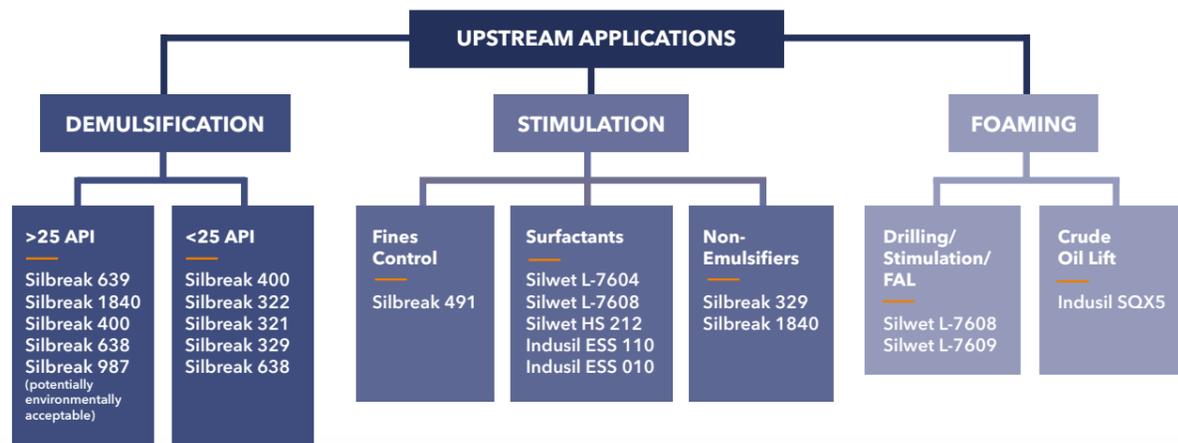
- Reduced fines in siliceous formations during acid jobs

Surfactants

- Improved wetting, spreading and the surface coverage of solvents onto substrates
- Improved dispersibility of fines in different media
- Lowering surface tension of water based or solvent based systems

Non-Emulsifiers

- Excellent emulsion prevention during well drilling and completion
- Work at low concentration
- Suitable for all types of acidizing jobs



Silbreak Demulsifiers	RSN	Viscosity at 20°C, cSt	Speed of Separation	Lower Temperature	Lower BS&W	Clean Water, Sharp Interface	Non-Emulsifiers	Technology
Silbreak 321 Silicone Demulsifier	8.2	2,000	H					Polyol/silicone
Silbreak 322 Silicone Demulsifier	15.3	720		H	H			Polyol/silicone
Silbreak 329 Silicone Demulsifier	14.9	1,300			H	H	H	Polyol/silicone
Silbreak 400 Silicone Demulsifier	7.0	2,500	H	H	H			Polyol/epoxy/silicone
Silbreak 638 Silicone Demulsifier and Antifoam	9.4	150	H		H			Polyol/alcohol/silicone
Silbreak 639 Silicone Demulsifier	17.1	200			H	H	H	Polyol/silicone
Silbreak 1840 Silicone Demulsifier	12.0	300	H	H		H	H	Polyol/silicone
Silbreak 987 Silicone Demulsifier	TBD	1,000		H	H			Polyol/silicone

Silbreak & Others	Actives, %	Viscosity at 20°C, cSt	Wetting	Spreading	Fines Control	Foaming	Diluent
Indusil ESS 010 Wetting Agent	100	1	H	H			Hydrocarbon/solvent
Indusil ESS 110 Wetting Agent	100	3	H	H			Hydrocarbon/solvent
Silwet L-7604 Silicone Surfactant	100	420	H				Water
Silwet L-7608 Silicone Surfactant	100	35	H	H		H	Water
Silwet L-7609 Silicone Surfactant	100	100	H	H		H	Water
Silwet Hydrostable 212 Silicone Surfactant	100	20	H	H			Water
Indusil SOX5 Silicone	50	12				H	Hydrocarbon/solvent
Silbreak 491 Fines Control Agent	40	4			H		Water





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