

WACKER

CREATING TOMORROW'S SOLUTIONS

SILFOAM®

SYSTEMATIC FOAM CONTROL
SILFOAM® STRIKES A BALANCE BETWEEN
INNOVATION AND EFFICIENCY

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SYSTEMATIC OPTIMIZATION – FOR EFFECTIVE, RELIABLE
AND ECONOMICAL FOAM CONTROL

Silicone-based antifoam agents from WACKER offer an effective and flexible alternative. Get the benefit of optimum performance and stable product quality.

Plenty of foam means good washing properties. At least, that's what most consumers think. They associate it with cleanliness, conditioning properties, a fragrance or perhaps simply fun. For many foam-intensive industrial processes, however, foam is disruptive and the cause of various production problems.

Foam can lower process efficiency and reliability and impair product properties. The end result is lower productivity, poorer economics and inferior product quality. So, how much foam does a process or product need in order to be effective, and how can it be regulated effectively? The smart way to find out is to use a high-quality, silicone-based antifoam agent from WACKER.

WACKER is a market leader in silicone antifoam agents. Our SILFOAM®, SILFAR®, PULPSIL® and WACKER® AK Silicone Fluid lines create a highly efficient product portfolio that is not only remarkable for its depth and breadth, but also meets the demands of markets all around the world. Our foam-control systems are general-purpose, ready-to-use products that are easy to process, economical, and individually tailored to your demands.

When you choose WACKER antifoam agents to control your foam, you are choosing an exceptionally innovative problem-solving system. We already offer a comprehensive range of custom solutions for many industries, such as textiles, detergents and cleaning agents, pulp, life sciences, water treatment,

petroleum and dispersion manufacturers. In laboratories and technical centers all around the world, WACKER specialists are continually refining and developing our products.

For each of these areas, the WACKER antifoam agent portfolio has a foam-control system that is ideal for you – regardless of whether you mainly use liquid or solid media, or whether you want a compound, a self-dispersing product or an emulsion.

If you have any questions about our products and applications, fields of use and advantages, please contact our experts, who will gladly take the time to provide you with expert and individual advice based on a practical analysis of your systems.

If you wish, we will also work together with you to implement innovative formulation ideas.

See for yourself how powerful our range of solutions is and discover the benefits of systematically optimizing your foam-intensive processes.

SILFOAM® Antifoam Agents – Integrated, Sustainable Solutions

Do you have a particular foaming problem in production? We will supply a custom antifoam agent to help resolve it.

And that's not all: our foam-control systems show their true strengths not only through their universality and compatibility, but also in their effectiveness, diversity, versatility and ongoing technical development.

SILFOAM® SC

Silicone Antifoam Compounds

- Oily, viscous, opaque or slightly cloudy liquids
- Mostly used in systems containing little or no water
- Compounds can be used neat or mixed with suitable formulation components such as surfactants.

SILFOAM® SD

Self-Dispersing Silicone Antifoam Agents

- Combination of antifoam agent compounds with organic active agents and auxiliaries
- Disperse spontaneously in contact with foaming formulations
- Show particularly good distribution and compatibility

SILFOAM® SE

Silicone Antifoam Emulsions

- O/W emulsions of antifoam agent compounds with an active ingredient content of 5 to 50%
- This product form is mainly used for water-based formulations and applications

SILFOAM® SP

Silicone Antifoam Powders

- The powder-form antifoam agents are specifically intended for powder products, e.g. powder detergents.

PULPSIL®

Silicone Antifoam Compounds and Emulsions, as well as Silicone Surfactants

- Specifically developed for use in the pulp and paper industry

SILFAR®

Silicone Product Range (Dimethicones, Simethicones, Antifoam Agents, Active Substances and Auxiliaries)

- Specially developed for use in the pharmaceutical industry and related life sciences

WACKER® AK

Silicone Fluids

- Are characterized by good antifoam properties in water-free, non-polar systems
- Suitable for applications in which compatibility with other substances is not required

Service Solutions – Flexible and Customized

Individual problems require individual service solutions – these are provided by our teams of experts.

To help you choose the antifoam agent that best suits your needs from our wide product range, we recommend you start by deciding whether you require a liquid or a solid, a water-free or a water-based product. The main criterion is whether the WACKER antifoam agent is compatible with your formulation.

Since the silicone-based antifoam usually has different solubility and dispersibility from those of the formulation components, it is necessary to choose a largely compatible antifoam product*. In contrast, relatively incompatible antifoam agents can be very efficient and so a balance must be struck between efficiency and compatibility.

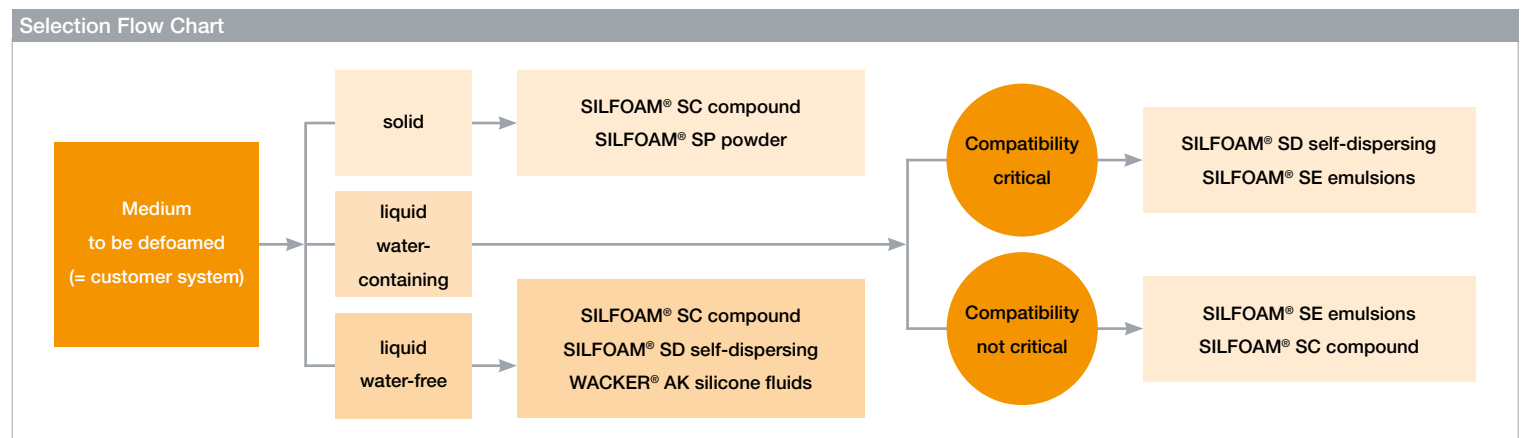
Our experts will be glad to assist you in solving this problem. You have the opportunity to perform detailed compatibility tests on your system with several products to determine the optimum WACKER antifoam agent.

As a company that thinks globally and acts locally, WACKER has oriented its production and services strictly to its

customers' needs. WACKER production sites in Germany, the USA, Brazil, Japan, India and China ensure that SILFOAM®, SILFAR®, PULPSIL® and WACKER® AK foam-control systems have the same high quality standard and breadth of applications worldwide. All production sites have their own technical centers for service and support. That allows us to adapt to local circumstances concerning application vari-

ants, delivery quantities and legal requirements in a manner that suits the market and customers.

* Foam-preventive substances are known as "antifoam agents," foam-destroying agents are called "defoamers." SILFOAM® foam-control systems are multifunctional, i.e. they act as antifoam agents or defoamers, or perform both functions depending on the application.



SILFOAM® Antifoam Agents – Application and Use

Correct handling of foam-control systems will ensure you get the best results. Some important aspects of using WACKER antifoam agents are discussed below:

Efficiency Comparisons

- These are oriented to customer systems and their technical processes
- Agitation and recirculation pump tests or the generation of foam profiles, for example in washing machines
- Provide practical data about the use of the antifoam agents in the final application.

Metering

- The optimum dosage of SILFOAM® antifoam agents in customer systems is determined by preliminary tests
- Good distribution of the highly active SILFOAM® products in the medium to be defoamed is essential for high efficiency
- In calculating the optimum amount to use, remember, during mixing, to allow enough antifoam agent present to compensate for any loss of effect due to storage or dispersion
- In metering SILFOAM® by pump, we recommend using low-shear equipment capable of metering small amounts precisely

Dilution

- Antifoam compounds can be incorporated homogeneously by diluting them with suitable solvents, such as white spirit, ester or isopropyl alcohol

- Viscous antifoam emulsions can be diluted by adding successive amounts of cold water in ratios of 1:1 – 1:10
- To keep dilute emulsions stable for longer periods, we recommend adding thickeners, such as carboxymethyl cellulose or polyacrylic acid solutions

Shear Stability

- Shear forces can impair the effectiveness of SILFOAM® antifoam agents
- With readily compatible antifoam agents, the shear force leads to rapid dispersion of the antifoam and often distributes it so finely that it quickly becomes exhausted
- With antifoam agents that are relatively incompatible, the shear forces can cause the antifoam to agglomerate and separate out
- Pre-dispersed products such as emulsions offer advantages as long as the shear forces are not too high

Storage Stability

- Silicone antifoam compounds resist high and low temperatures. We recommend storage at room temperature
- Self-dispersing silicone antifoam agents are best kept at room temperature
- Silicone antifoam emulsions are best stored at between 5 and 25 °C. Temperatures above 30 °C or freezing temperatures can affect the resistance and dilutability
- Once opened, the drums should be carefully sealed to prevent microbial contamination.

SILFOAM® STRIKES A BALANCE BETWEEN QUALITY AND ECONOMY



Highly Compatible Products Optimize Production Processes and Product Quality. SILFOAM® rounds off your textile production chain.

SILFOAM® foam-control systems – as silicone-based process and product defoamers - provide clear quality and efficiency advantages in all textile processes.

With today's globalization, modern high-tech fabrics, innovative technology, cost pressure and rising demands for quality, meeting the ever-greater challenges in textile production requires cost-efficient, optimized production methods. SILFOAM® antifoams from WACKER are invaluable aids to guaranteeing that production processes run smoothly and product properties are enhanced.

Foam can be generated during several important phases of textile processing, and when it occurs, it almost always results in lower quality and reduced efficiency. This is because foam affects the properties of textiles, which can then disturb sensitive process workflows. For example, it can lead to uneven coloring during textile dyeing.

This is exactly what SILFOAM® foam-control systems are designed to prevent. They are highly efficient, with low chemical reactivity, have a wide spectrum of action and can be used in two different ways. As process defoamers added directly to the treatment liquor, they regulate foam build-up during the ongoing process. Or they can be employed purely as a product defoamer, added to textile auxiliary formulations to become active when a potentially foamable product is in use.

With their wide versatility and our specific technical support, as well as preliminary tests in our laboratories, you will certainly find the right SILFOAM® antifoam for your needs.

Advantages

- Highly efficient
- Low dosage requirements result in no loss in product functionality and thus savings in material and costs.
- Broad range of applications
- Largely chemically inert, thus no reaction with the foaming substances
- Do not impair the wetting action of defoamed surfactants

One Product, Many Solutions – the Choice Is Yours

No single defoaming agent can fulfill all requirements equally well. The conditions are different with each application, and each of these places a different set of demands on the defoamer. That is why WACKER offers you a wide selection of SILFOAM® solutions exactly tailored to your specific application conditions.

Ionic Character

- WACKER silicone antifoam emulsions have various ionic characters; this considerably reduces the risk of precipitation caused by surfactant components with different ionic characters (e.g. anionic, cationic or amphoteric wetting agents).
- There is also a wide range of non-ionic silicone antifoam agents, which ensures good compatibility with ionic emulsifiers.
- WACKER also offers anionic silicone antifoam agents for anionic auxiliaries.

Dispersing Properties

- Foam cannot be combated effectively unless the defoamer disperses readily in the medium to be defoamed.
- Silicones have an inherent ability to disperse rapidly and show little tendency to form deposits.
- Due to their oily, hydrophobic character, WACKER silicone antifoam agents (compounds) only disperse well in the presence of a sufficient quantity of redispersants.

Influence of the Medium (pH)

- WACKER silicone defoamers show excellent persistence
- Since the defoamers' efficacy can decline rapidly under the influence of strongly alkaline formulations, WACKER offers alkali-resistant silicone antifoam emulsions for such textile applications as bleaching, reactive dyeing and mercerizing.
- Preliminary tests should be carried out to ensure resistance to chemical and thermal effects.

Self-Emulsifying Property

- WACKER self-emulsifying silicone anti-foam agents show good dispersibility and compatibility, especially in applications characterized by poor spreading.
- They disperse immediately on contact with water to form fine-particle emulsions.

Resistance to Boiling

- During bleaching and disperse dyeing of polyester fabrics, WACKER silicone anti-foam agents are exposed to temperatures ranging from 80 to 130 °C (jet dyeing machines).

- It is important here that the antifoam agent remains fully effective and does not coagulate.
- WACKER has developed special heat-resistant silicone antifoam agents for applications of this kind.

Shear Stability

- Shear forces caused by high process speeds have a major impact on defoamer efficiency, resulting in reduced foam suppression or emulsion breakdown.

- If the defoamer is highly compatible with the medium to be defoamed, shear forces disperse the defoamer too finely. The result is decreased defoamer activity.
- Predispersed silicone antifoam emulsions improve efficacy, provided the shear forces are not too high.

Compatibility

The textile processing chain places a variety of stringent demands on silicone defoamers:

- For process defoaming, the defoamer selected should not produce deposits or disrupt the process in any way (coagulation, spot formation on the textile substrate, etc.).
- For product defoaming, it is important to use a largely stable defoamer which disperses uniformly.

- This requires preliminary compatibility tests, where an amount of 0.5 to 2% WACKER silicone antifoam agent is added to the formulation.
- Depending on requirements, samples are examined several days later (for noticeable changes, such as flocculation, sedimentation or pronounced clouding). Formulations that appear to be largely homogeneous are then tested for their defoaming activity.

Smooth Production

Used as a process defoamer, SILFOAM® optimizes a range of textile production processes, from fiber manufacturing to dyeing and design.

Process Defoaming

In process defoaming (also known as external defoaming), a silicone antifoam agent is added periodically to regulate foaming in a running process. The top priority here is that the properties of the antifoam agent should not be affected by processing conditions. Above all, the antifoam agent must be highly heat resistant, resistant to alkalis and highly resistant to shear forces.

SILFOAM® effectively combats and controls the formation of unwanted foam during all phases of production in the following processes:

Fiber Production

- Monomer synthesis
- Polymerization
- Finishing

Fiber Processing

- Sizing
- Chemical bonding of nonwovens

Pretreatment

- Desizing
- Bleaching
- Bucking / kier boiling
- Mercerizing
- Washing

Dyeing and design

- Dyeing
- Printing and space dyeing
- Steaming
- Rinsing

Treatment

- Softening
- High-grade finishing
- Optical brightening
- Hydrophobic finishing
- Coating of textiles

Wastewater

- Defoaming of textile wastewater

SILFOAM®	Application	Dosage [%]	Solids content, approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH approx.	Ionic Character	Product type
SE 39	Wetting agent formulations in bleaching processes	0.1 – 0.5	33	White	150	7.0	Nonionic/anionic	Emulsion
SE 40	Polyester dyeing (jet)	0.2 – 0.5	16	White	3,000	7.0	Nonionic	Emulsion
SE 47	Universal	0.2 – 0.5	17	White	50	7.0	Nonionic	Emulsion
SRE	Universal	0.1 – 0.5	33	White	150	7.0	Nonionic	Emulsion
SD 771	Polyester dyeing (jet) combined reactive and disperse dyeing in polyester/cotton blends	0.1 – 0.5	100	Yellowish	Pasty; in emulsion: 1,400	6.0	Nonionic/anionic	Self-dispersing
SD 100 TS	Polyester dyeing (jet)	0.1 – 0.5	100	Yellowish	6,000	-	-	Self-dispersing

Service

WACKER offers a broad range of silicone antifoam agents, some of which meet these conditions in a general way, while others fulfill certain requirements exceptionally well. This allows us to offer you a system geared to your particular production conditions. Thus, for each phase of production, you can choose products that are optimized to your specific requirements for pH, shear or heat stability, and are individually tailored to your production set-up. For example,

it is possible to determine the most alkali-resistant defoamer for your bleaching and kier-boiling processes, or to choose the most stable defoamer for use in dyeing formulations that contain large amounts of salt and dispersion agents. And for high-speed continuous pretreatment processes with large amounts of surfactant, we carry out preliminary shear tests to ensure the required process stability.

Product Recommendations

SILFOAM® SE 39
 SILFOAM® SE 40
 SILFOAM® SE 47
 SILFOAM® SRE
 SILFOAM® SD 771
 SILFOAM® SD 100 TS

General-Purpose Applications

Here, we recommend emulsions SILFOAM® SE 47 and SILFOAM® SRE.

Wetting Agent Formulations

The highly alkali-stable emulsion SILFOAM® SE 39 is especially suitable for wetting agent formulations.

Polyester Dyeing in Jet Dyeing Machines

For this special application, we recommend the heat-stable SILFOAM® SE 40 emulsion, and the self-emulsifying SILFOAM® SD 771 and SILFOAM® SD 100 TS antifoam agents.

Improved Textile Properties

SILFOAM® product defoamers provide effective, persistent foam control in your textile system.

Product Defoaming

During product defoaming – or internal defoaming as it is also called – the antifoam agent is added preemptively to a system or a component, such as a textile auxiliary formulation. The defoamer then becomes active when the foamable product is used. The main problem during product defoaming is to strike a balance between an antifoam agent's activity and its compatibility with the medium being defoamed – for these two properties tend to be mutually exclusive. Thus, antifoam agents with very good

compatibility often exhibit rather low defoaming activity. In contrast, a high defoaming efficacy may have a negative effect on processing problems or product properties.

Our experts will gladly assist you in achieving the best balance between the properties you need and possible side effects so that you will find the SILFOAM® antifoam agent best-suited for your individual product. Our service includes our obligation-free advice

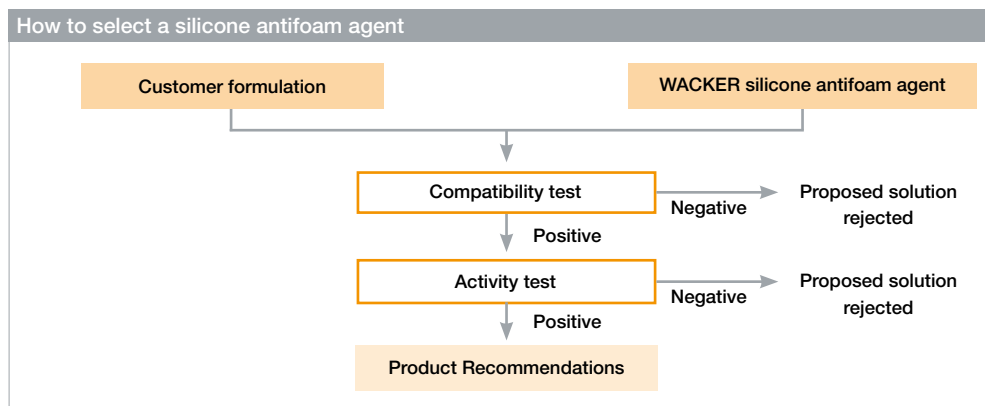
as well as the preparation of specific test profiles and a comprehensive analysis of your situation.

In addition to an antifoam agent's stability at various pH values, its ionic activity also plays an important role. Components with different ionicity often lead to precipitation. WACKER has a large selection of nonionic antifoam agents showing excellent compatibility with such ionic emulsifiers.

SILFOAM®	Application	Dosage [%]	Solids content, approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH, approx.	Ionic Character	Product type
SC 132	Wetting agent formulations for bleaching processes	0.5	100	Colorless, opaque	20,000	-	-	Compound
SC 339	Wetting agent formulations	0.5 – 1.0	100	Colorless, opaque	100	-	-	Compound
SC 369	Wetting agent formulations	0.5 – 1.0	100	Colorless, opaque	2,000	-	-	Compound
SC 385	Wetting agent formulations	0.5 – 1.0	100	Yellowish, opaque	300	-	-	Compound
SE 36	Wetting agent formulations in bleaching processes	0.5 – 3.0	28	White	8,000	7.0	Nonionic	Emulsion
SE 57	Wetting agent formulations	0.5 – 3.0	26	White	600	7.0	Anionic	Emulsion
SD 670	Basic binder/deaeration	0.5 – 2.0	100	Yellowish, opaque	150	-	-	Self-dispersing
SD 850	Bleaching processes	0.5 – 2.0	100	Yellowish, opaque	200	-	-	Self-dispersing
SD 882	Textiles/deaeration	0.5 – 2.0	100	Yellowish, opaque	20	-	-	Self-dispersing

Service

Targeted modification of the formulation based on a method we developed to determine the most appropriate SILFOAM® antifoam agents can significantly reduce any incompatibilities with your surfactant system. The key to this is the CONTIFOAM® fully automatic foam level measuring device. It permits textile processes to be simulated under practical conditions and SILFOAM® antifoam agents to be optimized in advance. That saves expensive test runs and makes your production more reliable. Now it is also possible to record foam profiles as a function of temperature and the instrument's range now extends to measurements at elevated pressures. In this way, we can simulate important process conditions such as high-temperature dispersion dyeing (polyester dyeing in jet-dyeing machines) under realistic conditions.



Preliminary Testing: Part 1

The CONTIFOAM® testing system is based on a special determination method developed to ensure scientifically exact foam control. As a result, we know in advance just how a silicone antifoam agent will react under your specific production conditions. At the same time, it permits foam-control systems to be adjusted in advance so that they are precisely tailored to your needs.

Preliminary Testing: Part 2

CONTIFOAM® II is the logical advancement of this innovative system. It is now possible to record temperature-dependent foam profiles and extend the range of applications to include measurements at different pressures. As a result, we can realistically simulate other important process conditions, such as high-temperature dyeing with disperse dyestuffs. This ensures that you will receive even more accurate analyses and better service.

Product Recommendations

SILFOAM® SC 132
 SILFOAM® SC 339
 SILFOAM® SC 369
 SILFOAM® SC 385
 SILFOAM® SE 36
 SILFOAM® SE 57
 SILFOAM® SD 670
 SILFOAM® SD 850
 SILFOAM® SD 882

Wetting Agent Formulations

SILFOAM® SE 36 antifoam emulsion is particularly suited for use in wetting agent formulations as is SILFOAM® SE 57, which is especially compatible with anionic systems. Each of these compounds – SILFOAM® SC 132, the hydrophilic SILFOAM® SC 339, the surfactant-compatible SILFOAM® SC 369 and SILFOAM® SC 385, which is highly suitable for systems where flow is critical – has its specific advantages.

Deaeration and Applications for Systems where Flow Is Critical

We recommend SILFOAM® SD 882 for these specialized application areas.

An underwater photograph showing a piece of translucent orange fabric floating in clear water. The fabric is draped and billowing, surrounded by numerous small, clear bubbles that catch the light. The water surface is visible at the top of the frame, with ripples and larger bubbles. The overall scene is bright and clean, emphasizing the product's compatibility with water.

**SILFOAM® STRIKES A BALANCE BETWEEN
PERFORMANCE AND COMPATIBILITY**

Foam performs a vital function in detergents and cleaning agents. By improving the foam balance, SILFOAM® improves a product's range of properties while being compatible with a wide variety of formulations.

Whether laundry detergents, fabric softeners or cleaning agents – SILFOAM® antifoam agents will give your products the crucial quality edge they need to establish themselves on the market.

Modern detergents and cleaning agents are complex and highly specialized. For consumers, they should offer the right functions, be easy to handle and reduce water consumption. Foam control plays a crucial role here. Manufacturers can only produce high-quality detergents and cleaning agents by effectively controlling foam. Foam formation is one of the properties that consumers use to judge the quality of such products. It is a measure of efficiency.

WACKER offers the right silicone-based antifoam agent for each type of detergent and cleaning agent. For powder detergents, we recommend SILFOAM® antifoam compounds and powders. And for liquid detergents, we offer self-dispersing SILFOAM® antifoam agents and antifoam emulsions with excellent compatibility and activity. Foam control is particularly important in detergent formulations specially developed for front loader machines with a horizontal axis – known as “high-efficiency machines.” These machines do a good wash, but generate a lot of foam in the process. Foam regulation is therefore essential here. SILFOAM® gives you optimum results.

In the cleaning agent industry, too, SILFOAM® antifoam agents show outstanding performance and good compatibility in various formulations. Here, too, controlled foam formation is an important precondition for producing an efficient end product. WACKER offers you a wide portfolio of highly effective antifoam agents. All our products are optimized to your specific formulations and applications – whether general-purpose or glass cleaners, or specific applications such as carpet or tile cleaners.

Advantages

- Highly effective in almost all kinds of surfactant systems and at all application temperatures
- Can be readily combined with other antifoam agents
- Effective irrespective of the water hardness
- Highly dispersible without leaving deposits
- Environmentally compatible with very low BOD/COD, without bioaccumulation

Experts for Full Wash Performance with Powder Detergents

Whether added in the end product or during production – SILFOAM® antifoam agents show the same excellent performance and impressive properties in the production process as in the finished powder detergent.

Foam control in powder detergents requires antifoam agents specially tailored to the alkalinity of the particular system. SILFOAM® antifoam agents from WACKER, whether as compounds or antifoam powders, show high efficiency in different formulations.

In largely neutral powder detergents, we recommend spraying our silicone antifoam compounds onto the powder detergent at the end of the manufacturing process. During this process, they can also be combined with other components, such as surfactants. Spraying is both efficient and cost-effective.

Antifoam Powder

In powder detergent production, the SILFOAM® antifoam agent powder is added in a post-addition step. SILFOAM® SP 150 for detergent and dishwasher formulations is ideal for this purpose.

Spray-On Method

Spraying on the liquid SILFOAM® antifoam agent in the form of a premix is the cost-effective option – the use of the product depends on the carrier matrix and surfactants.

Slurry Deaeration

In the production of powder detergents by spray drying, it is important for the material to flow smoothly and uniformly, and for the powder detergent to remain constantly homogenous. Here, SILFOAM® antifoam agents are particularly suitable for slurry deaeration.

SILFOAM®	Application	Dosage [%]	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	Density approx. g/cm ³ (25 °C)	Shelf life, min. (months)	Product type
SC 124	Slurry deaeration	0.05 – 0.2	100	Colorless, opaque	3,000	1.0	12	Compound
SC 132	Spray-on method	0.1 – 0.5	100	Colorless, opaque	20,000	1.0	12	Compound
SC 132	Powder premix	5 – 20	100	Colorless, opaque	20,000	1.0	12	Compound
SC 132	Slurry deaeration	0.05 – 0.1	100	Colorless, opaque	20,000	1.0	12	Compound
SC 1132	Spray-on method	0.1 – 0.5	100	Colorless, opaque	30,000	1.0	12	Compound
SC 1132	Powder premix	5 – 20	100	Colorless, opaque	30,000	1.0	12	Compound
SC 129	Spray-on method	0.1 – 0.5	100	Colorless, opaque	15,000	1.0	12	Compound
SC 129	Powder premix	5 – 20	100	Colorless, opaque	15,000	1.0	12	Compound
SC 129	Slurry deaeration	0.01 – 0.05	100	Colorless, opaque	15,000	1.0	12	Compound
SE 39	Slurry deaeration	0.05 – 0.2	20	White	150	1.0	6	Emulsion
SP 150	Post-addition	0.5 – 2	15	White powder	-	0.8*	12	Powder

*Bulk density

Service

WACKER assists you in choosing and fine-tuning the ideal silicone-based antifoam agent product by conducting preliminary tests in our application labs. There we use different types of washing machines to analyze foam profiles at different levels of water hardness and temperature levels. We also perform experiments to determine the storage stability of SILFOAM® antifoam agents in the customer's own formulation. To ensure a stable action of the antifoam agent, we record the foam profiles of our customers' detergent formulations

with the antifoam agent, before and after defined storage at elevated temperature and air humidity.

Product Recommendations

SILFOAM® SC 124
 SILFOAM® SC 132
 SILFOAM® SC 1132
 SILFOAM® SC 129
 SILFOAM® SE 39
 SILFOAM® SP 150

Antifoam Powder

SILFOAM® SP 150
 We recommend the use of SILFOAM® SP 150 in the post-addition. Because of its very good compressibility (due to the absence of starch), SILFOAM® SP 150 is particularly suitable for producing dishwasher tablets.

Spray-On Method

SILFOAM® SC 129, SC 132 and SC 1132
 Spraying on of silicone antifoam agents is only recommended for largely neutral formulations. For better distribution, the antifoam agent can be prediluted with a nonionic surfactant. The higher viscosities should be preferred, since they increase the antifoam agent activity and storage stability.

Powder Premix

SILFOAM® SC 129, SC 132 and SC 1132
 These products are ideal for customers to formulate their own antifoam powders or granules. Here, too, the higher viscosity products are to be preferred because of their higher activity. It is also possible to combine them with organic defoamers, for example paraffin-based products.

Slurry Deaeration

SILFOAM® SC 129, SC 132 and SE 39
 The antifoam agents are suitable for adjusting spray-dried detergent powers to a uniform, high granule density.

Experts in High-Efficiency Liquid Detergents

Fabric softeners, all-purpose and mild detergents – in all these liquid applications, SILFOAM® antifoam agents control foam efficiently and reliably.

The trend is towards liquid detergents. Liquid detergents have had a large market share in the USA for years. And though not as high in Europe, their share is nevertheless rising steadily. Consumers prefer modern liquid detergents because of their advantages over powders, particularly for low washing temperatures and dark laundry. In addition, consumer-friendly forms of dosing and application, such as gels, have become possible, here. Silicone-based SILFOAM® antifoam agents are ideal for this product segment, where their advantages over other

systems as regards compatibility and activity particularly come to the fore.

SILFOAM® antifoam agents can be used in structured and non-structured liquid detergents, as well as those formulated with or without builders. SILFOAM® is also ideal for use in gel detergents, which differ from liquid detergents in their specific rheological properties.

In addition, SILFOAM® antifoam agents also effectively control foam in fabric soft-

ener applications, where they are readily compatible with the quaternary ammonium compounds in softener formulations.

SILFOAM®	Application	Dosage [%]	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	Density approx. [g/cm³], 25 °C	Shelf life, min. (months)	Product type
SC 132	Liquid detergents, structured	0.2 – 0.4	100	Colorless, opaque	20,000	1.0	12	Compound
SC 132	Fabric softeners	0.05 – 0.2	100	Colorless, opaque	20,000	1.0	12	Compound
SC 132	Gel detergents	0.2 – 0.5	100	Colorless, opaque	20,000	1.0	12	Compound
SC 1132	Liquid detergents, structured	0.1 – 0.5	100	Colorless, opaque	30,000	1.0	12	Compound
SC 1132	Fabric softeners	0.05 – 0.2	100	Colorless, opaque	30,000	1.0	12	Compound
SC 1132	Gel detergents	0.2 – 0.5	100	Colorless, opaque	30,000	1.0	12	Compound
SC 129	Liquid detergents, structured	0.2 – 0.4	100	Colorless, opaque	15,000	1.0	12	Compound
SC 129	Fabric softeners	0.05 – 0.2	100	Colorless, opaque	15,000	1.0	12	Compound
SC 129	Gel detergents	0.2 – 0.5	100	Colorless, opaque	15,000	1.0	12	Compound
SC 141	Textile softeners for hand washing	0.05 – 0.2	100	Colorless, opaque	3,000	1.0	12	Compound
SE 36	Liquid detergents, non-structured	0.1 – 0.4	20	White	8,000	1.0	6	Emulsion
SE 36	Gel detergents	0.2 – 1	20	White	8,000	1.0	6	Emulsion
SE 39	Liquid detergents, structured	0.2 – 0.5	20	White	150	1.0	6	Emulsion
SE 39	Fabric Softeners	0.05 – 0.2	20	White	150	1.0	6	Emulsion
SD 168	Liquid detergents, non-structured	0.2 – 1	100*	Colorless, opaque	450	1.0	12	Self-dispersing
SD 850	Liquid detergents, non-structured	0.5 – 1	100*	Yellowish, opaque	200	1.0	6	Self-dispersing

* including organic actives

Service

The compatibility of the antifoam agent plays a crucial role in the choice of the optimum SILFOAM® product for your detergent formulation. Particularly strict requirements are placed on compatibility in modern liquid detergents. Our experts perform the necessary compatibility and functional tests on customer samples, allowing them to make a qualified product recommendation individually tailored to your problem.

Product Recommendations

SILFOAM® SC 132
SILFOAM® SC 1132
SILFOAM® SC 129
SILFOAM® SC 141
SILFOAM® SE 36
SILFOAM® SE 39
SILFOAM® SD 168
SILFOAM® SD 850

Structured Liquid Detergents

SILFOAM® SC 129, SC 132, SC 1132 and SE 39

If the liquid detergent is structured or sufficiently viscous, SILFOAM® SC 129, SC 132 or SC 1132 can usually be added directly.

In this case, the surfactants and dispersion aids in the detergent formulation are responsible for dispersion of the antifoam agent.

The stronger the dispersing action of the surfactant system, or the higher the energy input from the mixer, the higher the viscosity of the compound may be. For low-viscosity, structured liquid detergents, we also recommend SILFOAM® SE 39.

Non-Structured Liquid Detergent

SILFOAM® SD 168, SD 850 and SE 36

If the liquid detergent is not structured, SILFOAM® SE 36 or the very readily dispersible and water-free silicone antifoam agents SILFOAM® SD 168 and SD 850 can be used.

Gel detergents

SILFOAM® SC 129, SC 132, SC 1132 and SE 36

In gel products, high-viscosity products such as SILFOAM® SC 129, SC 132 or SC 1132 ensure improved foam control during washing. These products are also ideal filling aids, enabling containers to be filled properly and at high speed without bubbles. The anti-foam agent SILFOAM® SE 36 is specifically intended for low-viscosity gel detergents.

Single-Rinse and Easy-Rinse Products

SILFOAM® SC 141, SE 36 and SE 39

For use as a defoamer in so-called single or easy-rinse products for hand washing, we recommend SILFOAM® SE 36, SE 39 and SC 141. They significantly reduce water consumption for rinsing the laundry after washing.

Fabric Softeners

SILFOAM® SE 39, SC 129 and SC 132.

For modern textile softeners, which are mainly based on esterquats, the ideal products are SILFOAM® SE 39, SC 129 and SC 132.

Experts in Powerful Cleaning Agents

Whether general purpose, glass, carpet or sanitary disinfectant cleaners, SILFOAM® antifoam agents provide effective, customer-oriented optimization.

Modern, powerful cleaning agents must deliver cleanliness and hygiene in all kinds of applications: in the home, in the work place and wherever special demands are imposed, for example, on hygiene and disinfection. Undesirable foaming can significantly reduce the cleaning action.

The remedy is to use our silicone-based SILFOAM® antifoam agents, which control foam effectively while also improving the properties of cleaning products.

WACKER offers you a broad range of SILFOAM® products which have been specially tailored to individual applications for the cleaning agents market. Our products provide effective foam control in these specific application areas because they meet a wide range of requirements:

Floor Polishes

In floor polishes, particularly wax-based products, good flow and optimum deaeration are crucial to produce a smooth, bubble-free film on drying.

Carpet Cleaners

With carpet cleaners, an antifoam agent is necessary in the carpet shampooer's dirty-water tank to prevent foaming while dirty water is being sucked up.

Sanitary Cleaners

With sanitary cleaners, foaming is mostly a nuisance during filling into containers. SILFOAM® antifoam agent as filling aid, achieves high throughput during bottle filling.

Disinfectants

In disinfectant cleaners, there may be serious compatibility problems with the quaternary ammonium compounds (quats) often used here. Since cleaning products are normally mixed with water, hydrophilic defoamer formulations are a key focus of our portfolio.

SILFOAM®	Application	Dosage [%]	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	Density approx. g/cm³ (25 °C)	Shelf life, min. (months)	Product type
SC 132	General-purpose cleaners	0.05 – 0.2	100	Colorless, opaque	20,000	1.0	12	Compound
SC 129	General-purpose cleaners	0.05 – 0.2	100	Colorless, opaque	15,000	1.0	12	Compound
SRE	General-purpose cleaners	0.1 – 0.5	20	White	150	1.0	6	Emulsion
SRE	Floor polishes	0.1 – 0.5	20	White	150	1.0	6	Emulsion
SRE	Carpet cleaners	0.1 – 0.5	20	White	150	1.0	6	Emulsion
SE 47	Sanitary cleaners	0.01 – 0.5	10	White	50	1.0	6	Emulsion
SD 650	General-purpose cleaners	0.05 – 0.3	100*	Yellowish, opaque	150	0.99	6	Self-dispersing
SD 650	Floor polishes	0.05 – 0.3	100*	Yellowish, opaque	150	0.99	6	Self-dispersing
SD 650	Disinfectant cleaners	0.05 – 0.3	100*	Yellowish, opaque	150	0.99	6	Self-dispersing
SD 650	Glass cleaners	0.05 – 0.3	100*	Yellowish, opaque	150	0.99	6	Self-dispersing

* including organic actives

Service

Our expert teams will be glad to support you in choosing the best SILFOAM® anti-foam agent for your specific needs. By means of agitation tests, pumping tests and air introduced into the CONTIFOAM® measuring device, it is possible to recreate the foaming behavior and persistence of our antifoam agents in customer systems. In the case of film-forming polishes and conditioners, we also check foam spread on plastic film.

Given the different compatibilities of SILFOAM® antifoam agents in your specific system, we recommend that you supply product samples for preliminary testing. This will make it easier to perform a preliminary selection and to test samples of our antifoam agents.

Product Recommendations

SILFOAM® SC 132
 SILFOAM® SC 129
 SILFOAM® SRE
 SILFOAM® SE 47
 SILFOAM® SD 650

General-Purpose Cleaners

SILFOAM® SC 132, SD 650 and SRE
 For solvent-borne products, we recommend the relatively high-molecular and readily compatible defoamer SILFOAM® SC 132. In water-based systems, we advocate SILFOAM® SRE and SD 650. SILFOAM® SRE and SD 650 also make ideal filling aids during production operations.

Floor Polishes

SILFOAM® SD 650 and SILFOAM® SRE
 SILFOAM® SD 650 or, alternatively, our SILFOAM® SRE is available for this application.

Carpet Cleaners

SILFOAM® SRE
 Here, we recommend our SILFOAM® SRE

Sanitary Cleaners

SILFOAM® SE 47
 The non-ionic, alkali-stable and low-viscosity antifoam emulsion SILFOAM® SE 47 is especially suitable here.

Disinfectant Cleaners

SILFOAM® SD 650
 Here, you can achieve ideal results with SILFOAM® SD 650

Glass Cleaners

SILFOAM® SD 650
 For this application, we recommend relatively hydrophilic, polar products, such as SILFOAM® SD 650.

PULPSIL® STRIKES A BALANCE BETWEEN STABILITY AND EFFICIENCY



High and stable product quality and efficient processes are the best prerequisites for optimal pulp manufacture. PULPSIL® offers the all-round, sustainable solution.

PULPSIL® products make for ideal foam control throughout the pulp manufacturing process and also enhance product quality.

PULPSIL® foam-control agents not only increase production capacity and reduce water and energy consumption; they also reduce the amounts of bleaching chemicals needed and optimize pulp washing. At the same time, despite their outstanding effectiveness, PULPSIL® products are formulated to produce virtually no deposits during pulp production. All PULPSIL® emulsions show exceptionally well balanced properties, ensuring excellent performance during pulp production processes and also a long shelf life at 0-40 °C.

The most important process for producing chemical pulp is the kraft process. Foaming problems often occur because of the high mechanical shear forces and the large amount of air entrained in the liquor. To ensure pulp manufacturing processes run smoothly and consistently, therefore, it is essential to use defoamers with good dewatering properties.

The PULPSIL® line from WACKER includes antifoam agents specially tailored to the pulp industry's needs, to ensure that processes run reliably and smoothly. Our silicone foam-control agents can be used in almost all production stages in which foaming occurs, such as pulp washing, bleaching and wastewater treatment.

PULPSIL®	Application	Dosage recommendation kg Product/t pulp	Solids content, approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	Dispersibility in water	Product type
160 C	Defoamer formulation	0.02 – 0.20	100	Colorless, opaque	20,000	No	Compound
235 C	Defoamer formulation	0.01 – 0.15	100	Colorless, opaque	60,000	No	Compound
270 C	Defoamer formulation	0.01 – 0.15	100	Colorless, opaque	30,000	No	Compound
246 C	Defoamer formulation	0.01 – 0.15	100	Colorless, opaque	60,000	No	Compound
763 E	Pulp production process	0.08 – 0.80	36	White	400	Yes	Emulsion
733 E	Pulp production process	0.06 – 0.60	33	White	200	Yes	Emulsion
745 E	Pulp production process	0.06 – 0.60	35	White	400	Yes	Emulsion
955 S	Defoamer formulation Pulp production process	0.01 – 0.05	100	Clear, yellowish	800	Yes	Surfactant
960 S	Defoamer formulation Pulp production process	0.01 – 0.04	100	Clear, yellowish	1,300	Yes	Surfactant
968 S	Defoamer formulation Pulp production process	0.01 – 0.03	100	Clear, yellowish	6,000	Yes	Surfactant

Advantages

- Higher pulp quality thanks to improved washing
- Faster dewatering
- Increased production capacity
- Reduced deposits during the pulp manufacturing process
- Sustainable production thanks to less soda loss and reduced washing-water and bleaching-chemicals consumption.

Service

WACKER assists you in choosing and fine-tuning the ideal PULPSIL® product by conducting preliminary tests in our application labs. With our many years of experience in pulp defoaming, we can simulate pulp production under realistic conditions. The results from our labs can be directly applied to pulp mills. Our customers also have access to our sophisticated silicone analytical facilities, which can be used at any time for product development or process optimization.

Product Recommendation

PULPSIL® 160 C
PULPSIL® 235 C
PULPSIL® 270 C
PULPSIL® 246 C
PULPSIL® 763 E
PULPSIL® 733 E
PULPSIL® 745 E
PULPSIL® 955 S
PULPSIL® 960 S
PULPSIL® 968 S

PULPSIL® 160 C, 235 C, 270 C and 246 C

PULPSIL® 160 C, 235 C, 270 C and 246 C feature a good balance of properties such as handling, emulsification, fast knock-down and persistence, making them ideal for efficient foam-control formulations in the pulp industry. Choose the appropriate PULPSIL® product for your particular requirement:

- PULPSIL® 160 C – fast knockdown (foam collapse), persistence (foam suppression) and deposit control
- PULPSIL® 235 C – good persistence (foam suppression)
- PULPSIL® 270 C – very fast knockdown (foam collapse)

- PULPSIL® 246 C – high persistence together with very fast knock-down

The amounts required are of the order of 0.01 to 0.20 kg per metric ton of pulp. However, the precise quantity depends to a large extent on the medium to be defoamed and the process conditions.

PULPSIL® 763 E, 733 E and 745 E

Silicone antifoam emulsions PULPSIL® 763 E, PULPSIL® 733 E and PULPSIL® 745 E are based on tried-and-tested emulsifier technology. Low viscosity and optimum particle distribution together with high efficiency make them ideal, ready-to-use emulsions for pulp mills. PULPSIL® antifoam emulsions are preferably added to the washing water or fiber feed. The required concentration is of the order of 0.06 to 0.8 kg/metric ton of pulp. However, it is highly dependent on the medium to be defoamed and the process conditions. Choose the appropriate PULPSIL® product for your particular requirement:

- PULPSIL® 763 E – excellent deposit characteristics, fast knockdown and persistence, our first recommendation for viscose pulp
- PULPSIL® 733 E – highly effective antifoam emulsion particularly suitable for softwood
- PULPSIL® 745 E – highly effective antifoam emulsion particularly suitable for hardwood

PULPSIL® 955 S, 960 S and 968 S

PULPSIL® 955 S is a water-soluble silicone surfactant, PULPSIL® 960 S is a water-dispersible silicone surfactant and PULPSIL® 968 S can be dispersed in water at low shear rates. Above their cloud points, all three have a slight defoaming effect and outstanding dewatering properties. The cloud point of PULPSIL® 955 S is approx. 39 °C, that of PULPSIL® 960 S is approx. 23 °C and that of PULPSIL® 968 S is <10 °C. PULPSIL® 955 S, PULPSIL® 960 S and PULPSIL® 968 S are particularly suitable for foam-control formulations that are required to have a good defoaming effect and also improved drainage properties.

SILFOAM® STRIKES A BALANCE BETWEEN MEETING REGULATIONS AND OVERALL OPTIMIZATION



SILFOAM® and SILFAR® Can Turn Your Innovative Technologies into Marketable Products.

You need specifically customized foam control systems if you want to keep that vital step ahead of the competition in the growing agricultural, food and pharmaceutical markets. Antifoam agents from WACKER can help you to do just that because they are designed to improve your processes and products. All our foam control products conform to specific regional requirements.

Chewing gum, beverages, plant protection agents, pills and medical equipment are just a few examples of products that affect our daily lives in more ways than we might realize at first glance. Current developments, particularly in the agricultural, food and pharmaceutical industries, have changed the way we live and made life easier.

Many medications, enzymes and foodstuffs could not be manufactured at all without the help of classical fermentation and modern biotechnology processes. Most of these highly specialized, life science processes, however, have serious problems with foam generation. Foam can adversely affect the quality of sensitive products and processes. For this reason, among the numerous additives needed to control these complex processes, foam control systems play a decisive role in their efficacy.

WACKER SILFOAM® and SILFAR® foam control products offer a tailored problem-solving system for a wide variety of highly specialized applications. They can be used as selected process auxiliaries or even as active ingredients. Classic life science appli-

cation areas for our antifoam agents include:

- Fermentation processes for the manufacture of antibiotics, pharmaceutical raw materials, food products, enzymes, bioethanol and biogas
- Agrochemical formulations such as suspension concentrates
- Food industry processes such as the manufacture of beverages.

Our SILFAR® and SILFOAM® products are continuously and systematically enhanced to meet rapidly changing market and user demands in the life-sciences sector. Our antifoam agents meet the high regulatory requirements and certification conditions specific for each country. They are produced to very high quality standards and undergo extensive quality controls.

Advantages

- Highly efficient
- Conforms to specific national requirements
- Wide range of applications
- Improved manufacturing processes and product quality
- Certified production of some WACKER silicone antifoam agents as per, for example, GMP and HACCP.

We Are Specialists in Optimizing Pharmaceutical Products and Processes

The efficient active ingredients and auxiliary substances of our SILFAR® foam control products for the pharmaceutical industry ensure high pharmaceutical quality and meet the highest regulatory standards.

If pharmaceutical companies are to manufacture innovative high-quality pharmaceuticals, they must meet the legal standards of each country, down to the last detail. Particularly important is compliance with regulations describing the chemical composition of these products. WACKER has created a benchmark for pharmaceutical quality: SILFAR®

Our special products from the SILFAR® product line have been in successful use for years as active ingredients and auxiliary substances in human and veterinary medicine. Without SILFAR®, there are some pharmaceutical and medical products that would not be available – or could not be manufactured – at all. Our products meet the requirements of regulatory standards

such as the monographs of the European Pharmacopoeia (Ph. Eur.) or the US Pharmacopoeia (USP). The same also applies to the individual ingredients that make up SILFAR® products.

SILFAR®	Application	Regulatory Standards	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH	Density approx. g/cm³ (25 °C)	Shelf life, min. (months)	Product type
100	Antiflatulence, antacid	Ph. Eur., USP/NF compliant	100	Colorless, clear	100	n.a.	0.97	12	Dimethicone
350	Antiflatulence, antacid, biotechnology processes	Ph. Eur., USP/NF compliant	100	Colorless, clear	350	n.a.	0.97	12	Dimethicone
1000	Antiflatulence, antacid, biotechnology processes	Ph. Eur., USP/NF compliant	100	Colorless, clear	1,000	n.a.	0.97	12	Dimethicone
S 184	Antiflatulence, antacid, liquid pharmaceutical preparations biotechnology processes	Ph. Eur., USP/NF compliant, GMP	100	Colorless, opaque	3,000	n.a.	1.0	12	Simethicone
SE 4	Antiflatulence, antacid, liquid pharmaceutical preparations biotechnology processes	Ingredients Ph. Eur., USP/NF compliant, GMP	30	White	–	3.0 – 5.0	1.0	6	Simethicone emulsion

n.a. = not applicable

Service

Special products for the pharmaceutical industry require selected manufacturing methods, which WACKER provides as part of its GMP (Good Manufacturing Practices). We support these products with the required documentation, as laid down in the regulatory requirements, and issue approval test certificates confirming this. WACKER is committed to Responsible Care® and is a member of this initiative. We are also certified to ISO 9001 and ISO 14001. The WACKER healthcare policy shows you which applications WACKER supports in this area.

More information about this is available online at www.wacker.com/pharma, under “WACKER Healthcare Policy.” Our expert teams will of course support you in modifying formulations and provide you with test procedures and analytical methods customized to your needs.

Product Recommendations

SILFAR® 100
SILFAR® 350
SILFAR® 1000
SILFAR® S 184
SILFAR® SE 4

GMP Standard

For applications requiring the GMP standard, we recommend our SILFAR® S 184 silicone-based antifoam agents and the corresponding emulsion SILFAR® SE 4, which are produced according to cGMP (current Good Manufacturing Practices) for APIs (Active Pharmaceutical Ingredients).

Note

The applications mentioned in the table from the human sector also apply by analogy to related areas from veterinary medicine.

We Are Specialists in Perfect Food Processing

SILFOAM® and SILFAR® specialty foam control products are tailor-made to the demands of the food-processing industry and will provide you with effective foam control.

In the food-processing industry, foam is generated at various points in a production chain. This is caused mostly by surface-active substances such as proteins, fatty acids, and sugars. Invariably, the resulting foam impairs product properties in many different ways and greatly disrupts the process flow. WACKER has an answer to exactly these problems: the SILFAR® and SILFOAM® lines of silicone-based antifoam agents, which have been specially developed and continuously optimized for the food-processing industry.

Our high-quality product range ensures processes run smoothly and product qualities are improved in specific applications in the beverages industry, alcohol distillation, in the production of deep-frozen foods, deep-frying oils, and gelatin as well as in fruit conservation and vegetable washing. A distinction, though, is made between food additive and food contact applications. When used as a food additive, the antifoam agent is added directly to the food and remains in it, e.g. during defoaming of juices. In a food-contact application, by contrast, the antifoam agent is contained in the packaging, such as plastic or paper, from which it can migrate into the food.

Our our antifoam agents SILFAR® and SILFOAM® are available as highly pure silicone fluids, highly efficient compounds, or antifoam emulsions specially tailored to water-based applications. Special production and quality controls ensure the high standard of these food-sector products at all stages of production.

Application	Regulatory Standards	Dosage (ppm)	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH	Density approx. g/cm ³ (25 °C)	Shelf life, min. (months)	Product type
WACKER® FG 350	Fat-based systems Food additive: FDA §173.340, Regulation (EC) No. 1333/2008 on food additives and food contact: BfR XIV, XV, XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011, FDA: §175.105, 175.300, 176.170, 176.180, 176.200, 176.210; kosher	10	100	Colorless, clear	350	n.a.	0.97	12	Silicone fluid
WACKER® FG 1000	Fat-based systems Food additive: FDA §173.340, Regulation (EC) No. 1333/2008 on food additives and food contact: BfR XIV, XV, XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011, FDA: §175.105, 175.300, 176.170, 176.180, 176.200, 176.210; kosher	10	100	Colorless, clear	1,000	n.a.	0.97	12	Silicone fluid
SILFAR® S 184	Fat- or water-based systems Food additive: FDA §173.340, Regulation (EC) No. 1333/2008 on food additives and food contact: BfR XIV, XV, XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011, FDA: §175.105, 175.300, 176.170, 176.180, 176.200, 176.210; kosher	10	100	Colorless, opaque	3,000	n.a.	1.0	12	Compound
SILFAR® SE 4	Water-based systems Food additive: FDA §173.340, Regulation (EC) No. 1333/2008 on food additives and food contact: BfR XIV, XV, XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011, FDA: §175.105, 175.300, 176.170, 176.180, 176.200, 176.210; kosher	20	30	White	3,000	3.0 – 5.0	1.0	6	Emulsion
SILFOAM®									
SE 2	Water-based systems Food contact: BfR XIV, XV XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011, FDA: §175.105, 175.300, 176.170, 176.180, 176.200, 176.210, kosher	30	20	White	10,000	3.5 – 6.5	1.0	6	Emulsion
SE 2660	Water-based systems Food additive: Regulation (EC) No. 1333/2008 on food additives, Food contact: BfR XIV, XXXVI., Plastics Implementation Measure (PIM) (EU) No. 10/2011, FDA: §175.105, 175.300, 176.170, 176.180, 176.200, 176.210; kosher	30	20	White	12,000	3.0 – 5.0	1.0	6	Emulsion
SE 2661	Water-based systems Food additive: FDA §173.340 Food contact: BfR XIV, XV XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011, FDA: §175.105, 175.300, 176.170, 176.180, 176.200, 176.210; kosher	30	20	White	12,000	4.0 – 6.0	1.0	6	Emulsion
SE 9	Water-based systems Food contact: BfR XIV, XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011, FDA: §175.105, 175.300, 176.170, 176.180, 176.200, 176.210; kosher	50	10	White	9,000	3.0 – 6.0	1.0	6	Emulsion

n.a. = not applicable

Service

Foam control agents used in the food-processing industry are subject to special regulations: The products must conform to national legislation (such as EU guidelines and FDA regulations), as well as meeting

a wide range of specifications. We offer SILFAR®- and SILFOAM® antifoam agents tailored to your individual needs. Our expert teams will be glad to help you choose the right silicone-based foam control product.

Product Recommendations

WACKER® FG 350
WACKER® FG 1000
SILFAR® S 184
SILFAR® SE 4

SILFOAM® SE 2
SILFOAM® SE 2660
SILFOAM® SE 2661
SILFOAM® SE 9

We Are Specialists in Good Yields

SILFOAM® grades ensure effective foam control in all agrochemical production processes and a wide range of applications for plant protection agents.

The world's population is growing steadily. Whereas, in 1950, only 2.5 billion people needed to be fed, that figure had already risen to 7.0 billion by 2011. This has created ever greater challenges for agriculture and agrochemistry. The problem would be almost impossible to solve without efficient processing aids. With its process-optimizing SILFOAM® antifoam agents, WACKER has made an important contribution to solving this problem.

These specialized products provide effective and long-lasting foam control in production processes for various plant protection formulations. For manufacturers of plant protection agents, SILFOAM® facilitates smooth production and can be used in a wide variety of applications. Each of our SILFOAM® foam control products is available as a liquid concentrate (compound) or emulsion.

Service

Our SILFOAM® products are customized to specific plant protection formulations and agrochemical production processes. Many of our antifoam agents (see Table) comply with EPA inert ingredient regulations and are adapted to fully meet specific legislative requirements. Our expert teams will be happy to provide support with product pre-selection and give you processing tips as well as formulation recommendations for your specific application.

Product Recommendations

SILFOAM® SC 120
SILFOAM® SC 132
SILFOAM® SC 369
SILFOAM® SE 3060
SILFOAM® SRE
SILFOAM® SE 39
SILFOAM® SE 2
SILFOAM® SE 9
SILFOAM® SE 47
SILFOAM® SD 882
SILFOAM® SP 150

SILFAR® S 184

WACKER® AK 350
WACKER® AK 1000
WACKER® AK 12500

SILFOAM®	Application	Dosage (ppm)	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH	Density approx. g/cm³ (25 °C)	Shelf life, min. (months)	Product type
SC 120	SL, SC, SE, EW, SP, WP, WDG	0.1	100	Colorless, opaque	2,500	n.a.	1.0	12	Compound
SC 132	SL, SC, SE, EW, SP, WP, WDG	0.1	100	Colorless, opaque	20,000	n.a.	1.0	12	Compound
SC 369	SL, SC, SE, EW	0.1	100	Colorless, opaque	2,000	n.a.		12	Compound
SE 3060	SL, SC, SE, EW, SP, WP, WDG	0.5	20	White	150	5.0 – 8.0	1.0	6	Emulsion
SRE	SL, SC, SE, EW, SP, WP, WDG	0.5	20	White	150	5.0 – 8.0	1.0	6	Emulsion
SE 39	SL, SC, SE, EW, SP, WP, WDG	0.5	20	White	150	5.0 – 8.0	1.0	6	Emulsion
SE 2	SL, SC, SE, EW	0.5	20	White	-	3.5 – 6.5		6	Emulsion
SE 9	SL, SC, SE, EW	1.0	10	White	9,000	3.0 – 6.0	1.0	6	Emulsion
SE 47	SL, SC, SE, EW	1.0	10	White	50	5.0 – 8.0	1.0	6	Emulsion
SD 882	SL, SC, SE, EW	0.5	100	Yellowish, opaque	20	n.a.	1.0	12	Self-dispersing
SP 150	SP, WP, WDG	0.8	15	White	n.a.	n.a.	0.8*	12	Powder

SILFAR®									
S 184	SL, SC, SE, EW	0.1	100	Colorless, opaque	3,000	n.a.	1.0	12	Compound

WACKER®									
AK 350	EC	0.1	100	Colorless, clear	350	n.a.	1.0	12	Silicone fluid
AK 1000	EC	0.1	100	Colorless, clear	1,000	n.a.	1.0	12	Silicone fluid
AK 12500	EC	0.1	100	Colorless, clear	12,500	n.a.	1.0	12	Silicone fluid

*Bulk density
n.a. = not applicable

SILFOAM®	EPA Regulation 40 CFR			Product type
	180.910 (post and pre-harvest)	180.920 (pre-harvest)]	180.930 (animal feed)	
SC 120	✓	✓	-	Compound
SC 132	✓	✓	-	Compound
SC 369	-	-	-	Compound
SE 3060	-	✓	-	Emulsion
SRE	-	-	-	Emulsion
SE 39	-	-	-	Emulsion
SE 2	✓	✓	-	Emulsion
SE 9	✓	✓	-	Emulsion
SE 47	-	-	-	Emulsion
SD 882	-	-	-	Self-dispersing
SP 150	✓	✓	-	Powder

EC = Emulsifiable concentrates
SL = Water-miscible concentrate
SC = Suspension concentrate
SE = Suspo-emulsion
EW = Water-based emulsion
WP = Water-dispersible powder
WDG = Water-dispersible granules

SILFAR®				
S 184	✓	✓	✓	Compound

WACKER®				
AK 350	✓	✓	✓	Silicone fluid
AK 1000	✓	✓	✓	Silicone fluid
AK 12500	✓	✓	✓	Silicone fluid

SILFOAM® STRIKES A BALANCE BETWEEN PROCESS RELIABILITY AND APPLICATIONS



SILFOAM® Antifoam Agents Give Clear Results in Wastewater Treatment – Effectively and Reliably.

WACKER foam control systems regulate foaming in the purification stages of industrial and municipal wastewater and sewage treatment facilities.

Whether it is household sewage, wastewater from industry and agriculture, factories or rainwater runoff – most of the time this wastewater contains surface-active chemicals that generate foam. Foam build-up can adversely affect and significantly disrupt wastewater treatment in these facilities. SILFOAM® solves these problems reliably and permanently.

SILFOAM® antifoam agents from WACKER regulate and control the formation of foam during the various purification stages of water treatment facilities. Our foam control systems can also be used to treat highly alkaline wastewater in the semiconductor sector as

well as cooling water or textile-industry effluents. With their high efficiency, SILFOAM® antifoam agents enhance process reliability in the plant, permitting economical wastewater treatment.

Advantages

- Highly efficient
- Wide range of uses, even in highly alkaline wastewater and cooling water
- Higher process reliability
- Economical wastewater treatment

Service

Wastewater – regardless of type or origin – needs to be treated. With SILFOAM® products, this can be done in an ecologically sound manner. Antifoam agents are discharged sooner or later to the environment, either as part of the solid waste from wastewater treatment or as antifoam agents deliberately added to the wastewater. Our antifoams are formulated to minimize their impact on the environment.

- The emulsifier in antifoam emulsions is biodegradable.
- Silica (SiO₂) is an inorganic substance that occurs as such in Nature.
- Polydimethylsiloxanes are initially bound in the sludge in wastewater treatment plants and subsequently, under appropriate conditions, undergo “abiotic” degradation, i.e. chemical degradation that is not assisted by microbes.

Product Recommendations

SILFOAM® SE 39
SILFOAM® SE 47

Our standard product is the antifoam emulsion SILFOAM® SE 47 and will give you optimum value for money. For particularly challenging requirements or difficult foaming problems, we recommend SILFOAM® SE 39. Our experts will be glad to help you select the antifoam agent best suited to your needs.

SILFOAM®	Application	Dosage (ppm)	Solids content, approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH	Density approx. g/cm ³ (25 °C)	Shelf life, min. (months)	Product type
SE 2260	Municipal and industrial wastewater treatment Paper industry	50	28	White	6,000	6.5 – 8.0	1.0	6	Emulsion
SE 47	Industrial and municipal waste treatment Textile industry	100	17	White	50	5.0 – 8.0	1.0	6	Emulsion



SILFOAM® STRIKES A BALANCE BETWEEN VERSATILITY
AND PROCESS RELIABILITY

With SILFOAM[®], You Can Produce, Process and Refine Crude Oil while Benefiting from Reliable Processes and Versatile Applications

Silicone-based antifoam agents from WACKER optimize your production, refining and processing of oil and natural gas.

Oil and natural gas are among the most important raw materials of modern industrial society. As a result, the petroleum industry has enormous economic significance. Most processes in this sector are very sophisticated and designed for optimal yields and high volumes. Oil and natural gas must undergo several processing steps before they reach the end user.

Even at the drilling stage, these valuable raw materials must be produced as efficiently and as free from impurities as possible in order to avoid intermediate reactions that would reduce quality. In the refining and processing of petroleum products, too, trouble-free production conditions are essential if operations are

to be cost-effective. Unwanted foam formation during these processes leads to inefficient production and lowered product quality.

With its innovative SILFOAM[®] antifoam agents, WACKER offers you a tailor-made, economical and effective way to maintain control over unwanted foam build-up in all major manufacturing processes within the petroleum industry. Due to their superior properties and wide range of applications, our products can be used at any stage of processing, from the initial drilling through to the final products.

Advantages

- In oil and gas production, they optimize drilling fluid additives, drilling mud, well cementation, separation of crude oil and gas, and water separation
- In refineries, they are deployed effectively in distillation, gas sweetening and drying, deasphalting and in cracking processes.
- In processing and enhancing, they permit smooth and more efficient production conditions.
- They are available worldwide in a variety of different packaging sizes.

Produce Pure Oil and Natural Gas

SILFOAM® antifoam agents permit the reliable and efficient extraction of petroleum and natural gas.

Gas/Oil Separation

In oil production, the gas dissolved in the crude oil is separated by pressure relief in gas/oil separators. Because of crude oil's complex composition, foam builds up. If foam emerges through the gas outlet, it seriously disrupts the downstream processes. The use of SILFOAM® antifoam agents and WACKER® AK silicone fluids keeps the foam safely and reliably within low volumes and ensures that the plant operates at full capacity.

Drilling Muds

Density is an important criterion for drilling mud. Deaeration with SILFOAM® antifoam agents effectively reduces the gas content and thereby decreases the compressibility.

Natural-Gas Production with Surfactants

To prevent the gas flow failing, surfactants are used in low-pressure natural-gas fields to foam the reservoir water. The resulting foam can be cost-effectively removed above ground by means of our silicone antifoam emulsions.

Well Cementation

To achieve the necessary stability and impermeability, entrained air must be avoided at all costs during well cementation. For this purpose, self-dispersing SILFOAM® products are added to concrete during processing to remove any contained gas.

Deaeration of Sea Water

In areas near the sea, seawater is a cost-effective source of process water. Its permanent contact with air results in a relatively high oxygen content, which leads to corrosion and fouling in the treatment processes. The seawater is therefore degassed in vacuum deaerators. The foam that is generated during this process can be effectively reduced by means of SILFOAM® products.

SILFOAM®	Application	Dosage (ppm)	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH, approx.	Density approx. [g/cm³], 25 °C	Shelf life, min. (months)	Product type
SE 39	Deaeration of seawater	5 - 200	20	White	150	7.0	1.0	6	Emulsion
	Natural-gas production with surfactants	10 - 500	20	White	150	7.0	1.0	6	Emulsion
SE 47	Aqueous drilling mud	50 - 500	10	White	50	7.0	1.0	6	Emulsion
	Natural-gas production with surfactants	10 - 500	10	White	50	7.0	1.0	6	Emulsion
	Deaeration of seawater	10 - 500	10	White	50	7.0	1.0	6	Emulsion
SD 670	Well cementation	20 – 500	100	Yellowish, opaque	150	n.a.	1.0	6	Self-dispersing
SD 860	Well cementation	20 – 500	100	Colorless, opaque	100	n.a.	0.9	12	Self-dispersing
SD 986	Gas/oil separation	20 - 200	6	Colorless, clear	5	n.a.	0.8	12	Self-dispersing
	Non-aqueous drilling mud	30 - 300	6	Colorless, clear	5	n.a.	0.8	12	Self-dispersing
WACKER®									
AK 12500	Non-aqueous drilling mud	10 – 100	100	Colorless, clear	12500	n.a.	1.0	12	Silicone fluid
	Gas/oil separation	10 – 100	100	Colorless, clear	12500	n.a.	1.0	12	Silicone fluid
AK 60000	Non-aqueous drilling mud	5 – 100	100	Colorless, clear	60000	n.a.	1.0	12	Silicone fluid
	Gas/oil separation	5 – 100	100	Colorless, clear	60000	n.a.	1.0	12	Silicone fluid

*Bulk density
n.a. = not applicable

Service

Our experts are available to provide comprehensive assistance in the selection and fine-tuning of the SILFOAM® antifoam agent best suited to your individual needs. Our services include not only laboratory tests and production trials, but also pilot plants and test apparatus specially tailored to the requirements in oil production

Product Recommendation

SILFOAM® SE 39
SILFOAM® SE 47
SILFOAM® SD 670
SILFOAM® SD 860
SILFOAM® SD 986

WACKER® AK 12500
WACKER® AK 60000

Non-Aqueous Applications

The ready-to-use antifoam agent SILFOAM® SD 986 is already optimized for gas/oil

separation and can also be used for non-aqueous drilling muds. WACKER® AK silicone fluids are available in a viscosity range to over 1 million mPa s for customers to make their own formulations.

Aqueous Applications

The relatively low-viscosity and therefore easy-to-dose SILFOAM® SE 47 is particularly recommended for aqueous drilling muds in natural-gas production and for deaeration of sea water. At high shearing rates and high surfactant concentrations, the highly active

SILFOAM® SE 39 can be used as an alternative. We recommend the self-dispersing SILFOAM® SD 860 and SD 670 for well cementation.

Enhance the Processes in Your Refinery

SILFOAM® antifoam products control and regulate undesirable foaming in the principal petroleum refinery processes.

Distillation

In distillation, both at atmospheric pressure and under a vacuum, foam affects separation quality and therefore reduces the available capacity. SILFOAM® antifoam agents effectively prevent foam generation.

Delayed Cokers

In the petroleum industry, delayed cokers are often subject to serious foaming under extreme conditions. Temperatures up to 500 °C require fast and effective foam control. High-molecular SILFOAM® antifoam agents minimize the amount of silicone that is transferred to downstream process stages.

Gas Sweetening with Amines

Corrosive components of gas streams, such as carbon dioxide and hydrogen sulfide, are removed by extraction. The various amines used for extraction have different foaming tendencies and require specifically tailored antifoam agents. Here, SILFOAM® will give you perfect results combined with good compatibility.

Extraction

Foam also reduces capacity in the UDEX and sulfolane processes. Using SILFOAM® antifoam agents effectively prevents unwanted foam build-up here.

SILFOAM®	Application	Dosage (ppm)	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH, approx.	Density approx. [g/cm ³], 25 °C	Shelf life, min. (months)	Product type
SC 132	UDEX-sulfolane process	1 – 50	100	Colorless, opaque	20,000	n.a.	1.0	12	Compound
SC 120	Gas sweetening with amines (H ₂ S/CO ₂)	5 – 20	100	Colorless, opaque	2,500	n.a.	1.0	12	Compound
	UDEX-sulfolane process	1 – 50	100	Colorless, opaque	2,500	n.a.	1.0	12	Compound
	Asphalt processing	1 – 20	100	Colorless, opaque	2,500	n.a.	1.0	12	Compound
SE 39	Gas sweetening with amines (H ₂ S/CO ₂)	10 – 50	20	White	150	7.0	1.0	6	Emulsion
SE 47	Gas sweetening with amines (H ₂ S/CO ₂)	20 – 100	10	White	50	7.0	1.0	6	Emulsion
	Wastewater treatment	10 – 500	10	White	50	7.0	1.0	6	Emulsion
SD 986	Vacuum distillation	50 – 200	6	Colorless, clear	5	n.a.	0.8	12	Self-dispersing
	Cokers/visbreakers	50 – 500	6	Colorless, clear	5	n.a.	0.8	12	Self-dispersing
	Deasphalting with propane	50 – 200	6	Colorless, clear	5	n.a.	0.8	12	Self-dispersing
WACKER®									
AK 1000	Asphalt processing	5 – 50	100	Colorless, clear	1,000	n.a.	1.0	12	Silicone fluid
AK 12500	Vacuum distillation	5 – 50	100	Colorless, clear	12,500	n.a.	1.0	12	Silicone fluid
	Deasphalting with propane	5 – 50	100	Colorless, clear	12,500	n.a.	1.0	12	Silicone fluid
AK 60000	Vacuum distillation	5 – 20	100	Colorless, clear	60,000	n.a.	1.0	12	Silicone fluid
	Cokers/visbreakers	10 – 50	100	Colorless, clear	60,000	n.a.	1.0	12	Silicone fluid
	Deasphalting with propane	1 – 20	100	Colorless, clear	60,000	n.a.	1.0	12	Silicone fluid

n.a. = not applicable

Service

Our experts will gladly provide individual, detailed advice to help you select and fine-tune the SILFOAM® antifoam agent best suited to your needs. Our services include laboratory tests and production trials, as well as realistic pilot plants and test equipment specially matched to requirements in the refinery sector.

Product Recommendation

SILFOAM® SC 132
 SILFOAM® SC 120
 SILFOAM® SE 39
 SILFOAM® SE 47
 SILFOAM® SD 986

WACKER® AK 1000
 WACKER® AK 12500
 WACKER® AK 60000

Non-Aqueous Applications

In vacuum distillation, delayed cokers or visbreakers, we recommend a solution specially developed by us: SILFOAM® SD 986, a pre-diluted high-viscosity silicone fluid in a suitable solvent.

We recommend the use of low-viscosity silicone fluids for use in asphalt processing and transport.

Aqueous Applications

For gas sweetening and wastewater treatment, we recommend SILFOAM® SE 47. It is added under low shear conditions. If that is not possible, the relatively high-viscosity, but alkali-resistant SILFOAM® SC 132 can be used for gas sweetening. For various BTX extraction processes, we recommend SILFOAM® SC 120 or SILFOAM® SC 132. These should be added under conditions of high shear.

Powerful Fuels and Lubricants

SILFOAM® antifoam products will ensure that you end up with powerful end products and a smooth-running application.

Engine Oils, Hydraulic Fluids, Transmission Oils and Cutting Fluids

These fluids and lubricants require low-viscosity silicone fluids. Aqueous cutting fluids can either use SILFOAM® antifoam emulsions or SILFOAM® antifoam compounds, depending on the type of oil they contain.

Biological Wastewater Treatment

Most companies that produce or process products for the petroleum industry operate their own industrial wastewater treatment plants. SILFOAM® antifoam emulsions are ideally suited for use in all aerobic and anaerobic process stages to effectively prevent unwanted foam build-up.

SILFOAM®	Application	Dosage (ppm)	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	pH, approx.	Density approx. g/cm ³ (25 °C)	Shelf life, min. (months)	Product type
SE 39	Production of bitumen emulsions	5 – 200	20	White	150	7.0	1.0	6	Emulsion
	Aqueous cutting fluids: • Basis: synthetic oil	20 – 500	20	White	150	7.0	1.0	6	Emulsion
	Biological wastewater treatment	5 – 200	20	White	150	7.0	1.0	6	Emulsion
SE 47	Production of bitumen emulsions	10 – 500	10	White	50	7.0	1.0	6	Emulsion
	Aqueous cutting fluids: • Basis: mineral oil	50 – 1,000	10	White	50	7.0	1.0	6	Emulsion
	Biological wastewater treatment	10 – 500	10	White	50	7.0	1.0	6	Emulsion
SD 670	Aqueous cutting fluids: • Basis: synthetic oil • Basis: mineral oil	10 – 500	100	Yellowish, opaque	150	n.a.	1.0	6	Self-dispersing

WACKER®									
AK 350	High-viscosity hydraulic fluids	5 – 100	100	Colorless, clear	350	n.a.	1.0	12	Silicone fluid
	Transmission oil: basis: mineral oil	5 – 100	100	Colorless, clear	350	n.a.	1.0	12	Silicone fluid
	Engine oil	5 – 200	100	Colorless, clear	350	n.a.	1.0	12	Silicone fluid
AK 12500	Non-aqueous cutting fluids	10 – 200	100	Colorless, clear	12,500	n.a.	1.0	12	Silicone fluid
	Low-viscosity hydraulic fluids	10 – 100	100	Colorless, clear	12,500	n.a.	1.0	12	Silicone fluid
	Transmission oil: Basis: synthetic oil	10 – 200	100	Colorless, clear	12,500	n.a.	1.0	12	Silicone fluid
AK 60000	Non-aqueous cutting fluids	5 – 100	100	Colorless, clear	60,000	n.a.	1.0	12	Silicone fluid
	Low-viscosity hydraulic fluids	10 – 100	100	Colorless, clear	60,000	n.a.	1.0	12	Silicone fluid
	Transmission oil: Basis: synthetic oil	5 – 100	100	Colorless, clear	60,000	n.a.	1.0	12	Silicone fluid

n.a. = not applicable

Product Recommendations

SILFOAM® SE 39
SILFOAM® SE 47
SILFOAM® SD 670

WACKER® AK 350
WACKER® AK 12500
WACKER® AK 60000

Engine Oils, Hydraulic Fluids, Transmission Oils

For these fluids, WACKER® AK silicone fluids will provide you the right degree of foam inhibition. In addition to the viscosity range listed in the table, we also offer products with a viscosity specially tailored to your needs.

Cutting Fluids (coolants)

For non-aqueous cutting fluids, a few ppm of WACKER® AK 60000 is enough for effective foam control. Aqueous cutting fluids can either use SILFOAM® antifoam emulsions or SILFOAM® antifoam compounds, depending on the type of oil they contain.

Biological Wastewater Treatment

To operate at optimum capacity, wastewater treatment plants need efficient foam control. For this purpose, we recommend our antifoam emulsions SILFOAM® SE 47 and SILFOAM® SE 39.



SILFOAM® STRIKES A BALANCE BETWEEN SPECIALIZATION
AND PROCESS DIVERSITY

Highly specialized products for diverse industrial applications are the basis of economical dispersions manufacture. SILFOAM® sets the tone in dispersion defoaming.

Our SILFOAM® product range includes the right foam-control agent for every type of dispersion, enabling cost-efficient dispersions manufacture and enhanced product properties.

Flawless processing, profitable production and optimal products are always crucial to business success. Why not let WACKER support you in improving your existing dispersion-production processes and the quality of dispersion-based products, such as paints, coatings, construction materials, paper coatings or adhesives?

SILFOAM® foam-control agents are tailored specifically to the demands of dispersion producers, substantially improving space-time yields. They facilitate the transport and filling of dispersions.

As valuable process aids, our SILFOAM® products combat and suppress bothersome foam formed as a result of stirring the dispersion and thereby introducing shearing forces, of removing residual monomers from the dispersion, of transferring the dispersion to downstream processing facilities or of filling it into merchandising containers.

As quality aids, SILFOAM® foam-control agents optimize the processing and use of dispersion-based products. Their ability to deaerate microfoams and their good compatibility with organic systems make SILFOAM® products particularly valuable for use in processing and modifying dispersions. In sensitive applications in the paints and surface coatings or paper sectors, too, SILFOAM® grades provide essential properties such as optimized flow and the formation of immaculate surfaces.

Emulsions, organically modified compounds or organofunctional self-dispersing silicone antifoam agents? No matter which of these you use, WACKER has the right SILFOAM® foam-control agent. Our broad product portfolio is fine tuned to meet every requirement so you can be sure of high levels of efficiency and compatibility.

SILFOAM®	Application	Dosage recommendation* for trials [%]	Active ingredient content approx. [%]	Appearance	Viscosity approx. [mPa s], 25 °C	Dispersibility in water**	Shelf life, min. (months)	Product type
SE 47	s-PVC, interior paints, exterior paints	0.02 – 0.5	10	White	50	++	6	Emulsion
SE 9	s-PVC, interior paints	0.02 – 0.5	10	White	9,000	+	6	Emulsion
SD 670	Printing inks, paper coatings, adhesives, construction materials	0.05 – 0.3	100	Yellowish, opaque	150	++	6	Self-dispersing
SD 860	Printing inks, high-gloss lacquers, adhesives, construction materials	0.05 – 0.3	100	Colorless, opaque	100	(+)	12	Self-dispersing
SD 882	Interior and exterior paint, paper coating	0.1 – 0.5	100	Yellowish, opaque	20	++	12	Self-dispersing
SC 369	Printing inks, adhesives	0.02 – 0.5	100	Colorless, opaque	2,000	(+)	12	Compound
SC 370	Interior paints, high-gloss lacquers	0.02 – 0.5	100	Yellowish, opaque	650	(+)	12	Compound
SC 385	Interior paints, high-gloss lacquers, construction materials	0.02 – 0.5	100	Yellowish, opaque	300	(+)	12	Compound

* The dosage recommendations are very highly dependent on the medium to be defoamed

** ++ very good; + good; (+) good in the presence of surfactants

Advantages

- Outstanding performance in almost all surfactant and protective colloid systems
- Good compatibility, enabling use also in sensitive applications such as paints and surface coatings
- Highly dispersible and shear-stable
- Do not cause loss of gloss in polymer films, and are therefore ideal for formulating high-gloss lacquers

Service

In our applications laboratories, we ensure that the optimum SILFOAM® product is chosen, and that it is fine-tuned to the customer's system. Here, we carry out tests on the compatibility and shelf life of our dispersion defoamers in the customer's environment, and determine density levels to measure their efficiency at different temperatures and applied shear forces. We are also equipped to simulate dynamic processes, such as pump circulation, by the CONTIFOAM® method.

Legal Requirements

Our product range also includes antifoam agents for applications that must satisfy special food-contact regulations.

The following products comply with the US Food and Drug Administration (FDA), the German Institute for Risk Assessment (BfR) or the EU Plastics Implementation Measure (PIM):

- SILFOAM® SC 370 BfR XIV, XV and XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011 (replaces Plastics Regulation (2002/72/EC))
- SILFOAM® SC 385 BfR XIV and XXXVI, FDA 21 CFR §175.105, 176.170, 176.180, 176.200 and 176.210
- SILFOAM® SE 9 BfR XIV and XXXVI, Plastics Implementation Measure (PIM) (EU) No. 10/2011 and FDA 21 CFR § 175.105, 175.300, 176.170, 176.180, 176.200 and 176.210.

Product Recommendations

SILFOAM® SE 47
 SILFOAM® SE 9
 SILFOAM® SD 670
 SILFOAM® SD 860
 SILFOAM® SD 882
 SILFOAM® SC 369
 SILFOAM® SC 370
 SILFOAM® SC 385

Dispersion Production

Our medium-to-fine particle o/w emulsions SILFOAM® SE 47 and SILFOAM® SE 9 or our self-dispersing SILFOAM® SD 670 silicone antifoam agent are ideal for this application. Particularly in systems subjected to high shear forces or with a high surfactant content, SILFOAM® SD 670 is superior to organic defoamers. If only a booster for organic defoamers is required, our organically modified compound SILFOAM® SC 369 is ideal for technical applications. The organically modified compounds SILFOAM® SC 370 and SILFOAM® SC 385 are first choice for applications subject to food safety regulations.

Dispersion-Based Products

Our polyether-functional compound SILFOAM® SC 370 or self-dispersing compounds SILFOAM® SD 860 and SILFOAM® SD 882 are particularly suitable for this field of application. SILFOAM® SD 860 has proved ideal in high-solids systems.

Sensitive Applications

WACKER has developed the organically modified defoamers SILFOAM® SD 670 and SILFOAM® SD 882 specifically for this purpose. Particularly in SILFOAM® SD 882, the typical silicone properties have been attenuated by a high level of organic modification.

GLOSSARY

A

ABIOTIC DEGRADATION

Environmental degradation of substances by purely chemical/physical means, without the influence of living organisms (microbes).

ACTIVITY

Effectiveness of an antifoam agent

ALKALI RESISTANCE

Stability of an antifoam agent in an alkaline medium.

ANTIFOAM AGENT

Foam-preventing substance; foam control systems of the SILFOAM®, SILFAR®, PULPSIL® and WACKER® AK product series are multifunctional, i.e. they act as antifoam agents, defoamers, or both, depending on the application.

B

BfR

German Institute for Risk Assessment, successor to the former BgVV (Bundesinstitut für gesundheitlichen Verbraucherschutz und Veterinärmedizin) Federal Institute for Health Protection of Consumers and Veterinary Medicine

BLEACHING

Chemical treatment of textiles to lighten their color

BOD/COD

Biological/chemical oxygen demand

C

CONTIFOAM®

Fully automatic test instrument for characterizing the foaming behavior of test media, e.g. by pumping around a closed loop.

COMPATIBILITY

Property of an antifoam agent to mix with a given medium or other additives

CONTINUOUS PROCESS

Treatment of textiles in a continuous process

D

DISPERSIBILITY

The ease with which an antifoam agent can be dispersed in a given medium

E

E NUMBERS

Numbers for identifying substances that are approved direct food additives under EU law

EPA REGULATIONS

Mandatory requirements issued by the EPA – Environmental Protection Agency (USA)

F

FDA REGULATIONS

Regulations issued by the FDA – Food and Drug Administration (USA)

FILTRABILITY

Capability of antifoam agents to pass through filter materials

FOAM CONTROL SYSTEMS

Systems for regulating foams; may comprise one or more components

FOOD REGULATIONS

National regulations governing how products may be used in food or come into contact with it. See German Institute for Risk Assessment (BfR), EU E numbers, corresponding sections of chapter 21 of the CFR of the Food and Drug Administration in the USA, EPA and USDA provisions as well as similar national regulations

G

GMP

Abbreviation for Good Manufacturing Practice

H

HEALTHCARE POLICY

Guidelines issued by WACKER for describing the use of silicone products in the pharmaceutical sector (www.wacker.com/silfoam)

I

IONICITY

Describes either the property of surfactants to form ions or a property that is caused by ions; this term distinguishes between anionic, cationic and nonionic surfactants

K

KNOCK-DOWN

Describes the initial foam collapse in a given foam system

N

NF

Abbreviation for National Formulary, a compendium of drug standards published by the American Pharmaceutical Association

P

Ph. Eur.

Abbreviation for European Pharmacopoeia

PERSISTENCY

The ability of an antifoam agent to maintain its effect in a given application system

POST-ADDITION

Describes the addition of additives subsequent to the spray drying process during powder detergent production

PRODUCT DEFOAMER

Antifoam agent built into the formulation to prevent foam formation

PROCESS DEFOAMER

Antifoam agent added during a process to regulate the level of foam formation

R

RECIRCULATION PUMP TEST

CONTIFOAM®

S

SELF-DISPERSING

ANTIFOAM AGENT

Antifoam agents that disperse spontaneously on contact with foaming systems, sometimes also known as “self-emulsifying antifoam agents”

SHEAR STABILITY

Resistance of an emulsion to action of shear forces (e.g. rotating rolls, agitators, air entrainment, pumps)

SHELF LIFE

The period of time under defined storage conditions over which the quality of an antifoam agent remains stable

SPRAYING

Method of applying antifoam agents to powders, e.g. in the detergent industry

STORAGE STABILITY

The property of an antifoam agent present as an additive in a given system to remain stable and retain its effectiveness over relatively long periods, e.g. in laundry detergent formulations.

T

TREATMENT LIQUOR

A liquid for treating textiles

U

USP

Abbreviation for United States Pharmacopoeia

W

WETTING AGENT

Has the effect that aqueous formulations can be applied uniformly to hydrophobic surfaces; wetting agents are mediators between incompatible phases

EXPERTISE AND SERVICE NETWORK ON FIVE CONTINENTS



• Sales offices and production sites, plus 22 technical centers, ensure you a local presence worldwide.

WACKER is one of the world's leading and most research-intensive chemical companies, with total sales of €5.3 billion. Products range from silicones, binders and polymer additives for diverse industrial sectors to bioengineered pharmaceutical actives and hyperpure silicon for semiconductor and solar applications. As a technology leader focusing on sustainability, WACKER promotes products and ideas that offer a high value-added potential to ensure that current and future generations enjoy a better quality of life based on energy efficiency and protection of the climate and environment. Spanning the globe with 5 business divisions, we offer our customers highly-specialized products and comprehensive service via 25 production sites, 22 technical competence centers, 12 WACKER ACADEMY training centers and 50 sales offices in Europe, North and South America, and Asia – including a presence in China.

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All figures are based on fiscal 2015.

The background of the entire page is a close-up, macro photograph of water bubbles. The bubbles are of various sizes, from tiny specks to large, prominent spheres. They are set against a light blue, slightly hazy background, creating a sense of depth and movement. The lighting highlights the spherical shape and the thin, iridescent film of each bubble.

WACKER

Wacker Chemie AG

Hanns-Seidel-Platz 4
81737 München, Germany
info.silicones@wacker.com

www.wacker.com/silfoam

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