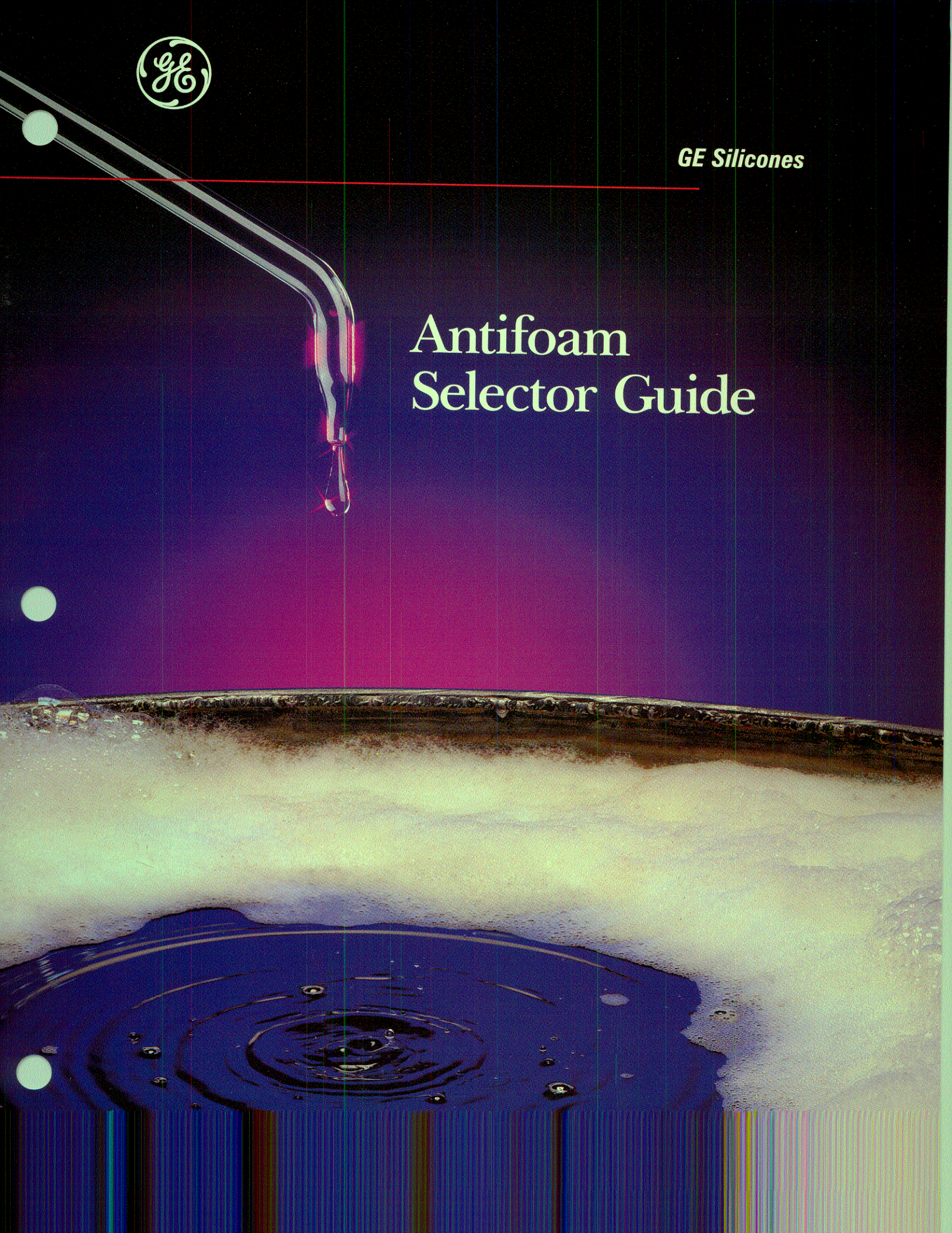
GE Silicones

Antifoam Selector Guide



A Vision for Tomorrow

The products you need – where and when you want them. Since 1940, when GE became the first company to successfully develop an economical process for silicone production at its Corporate Research and Development Laboratory, GE has been issued over 2,000 patents relating to silicones. We continue to invest in our business because silicones bring exceptional value to our customers. Silicone technologies help our customers grow their businesses faster and more profitably.

We are committed to being the best silicones supplier for your business.

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GE Silicones Antifoams: Use and Selection

Foam is a mass of bubbles created when certain types of gas are dispersed into a liquid and the dispersion is then stabilized. High-strength films of liquid surround the bubbles, forming large volumes of non-productive foam. While the actual cause of foam is a complicated study in physical chemistry, its existence presents serious problems in both the operation of industrial processes and the quality of finished products. If not properly controlled, foam can reduce equipment capacity and increase processing time and expense.

Foam can be controlled by making basic changes in the process itself or by using mechanical defoaming equipment. However, chemical defoamers have proven to be the most effective and economical.

An effective chemical defoaming agent must meet the following requirements:

- Possess lower surface tension than the system to which it is added.
- Disperse readily in the system.
- Possess poor or low solubility (incompatibility) in the system.
- Be inert.
- Leave no substantial residue or odor.
- Meet FDA and USDA requirements where applicable.
- Be certified kosher and pareve where applicable.

These requirements are met most effectively with silicone antifoams.

SILICONE ANTIFOAM SELECTION

Silicone antifoams are extensively used where product or process foaming problems are encountered. This selector guide describes a complete line of GE Silicones antifoams which have been found particularly useful in many applications.

In selecting the best type and quantity of silicone defoamer, each application must be considered separately. In addition to the primary differences of non-aqueous and aqueous system requirements, there are differences in the same process when formulations are changed.

Some of the factors to be considered in the selection process are:

- Chemical nature of the foam forming agent.
- Foaming tendency of the agent.
- Solubility and concentration.
- Electrolytes, colloids or other surface active agents present.
- Temperature, pH and viscosity of the system.
- Processing equipment involved.
- End use of product containing the antifoam.

It is therefore best to evaluate several antifoams in each system to determine type and concentration needed to assure optimum results.

AVAILABLE PRODUCTS

GE Silicones antifoams are available in a broad selection of viscosities and in three basic forms for matching specific products to specific performance requirements.

Non-Aqueous		Aqueous
Fluids	**Compound**	**Emulsions**
SF18-350	AF9000	AF60
SF96®(50-1000)		AF9010
VISCASIL®(5M-100M)		AF9020
AF67		AF9030
FF150-10M		
FF157		
FF160		

NON-AQUEOUS ANTIFOAMS

- Fluids
- Compound
  - Fluid product containing specially prepared fillers.

AQUEOUS ANTIFOAMS

- Emulsions
  - Water-based products which provide easy dispersibility for maximum defoaming efficiency.

Non-Aqueous Antifoams

I. Dimethyl Fluids

PRODUCT DESCRIPTIONS

GE dimethyl silicone fluids are available in a wide viscosity range and are designed for use in non-aqueous systems. They are easily dispersed in organic solvents.

SF18-350 silicone fluid may be used as an antifoam where FDA regulations apply and is also certified to be kosher and pareve. See GE Selector Guide #4256.

SF96® polydimethylsiloxane fluids available in 50, 100, 200, 350, 500 and 1000 centistoke viscosities.

VISCASIL® fluids are identical in chemical structure to the SF96 series of silicone fluids, but are higher in viscosity (5,000, 10,000, 12,500, 30,000, 60,000 and 100,000 centistoke viscosities).

AF67 silicone fluid is similar in structure to the SF96 and VISCASIL® fluids.

TYPICAL PRODUCT DATA

Property	Value*			
	SF18 (350)	SF96® (50-1000)	VISCASIL® Fluid (5000-100,000)	AF67
Silicone Content, %	100	100	100	100
Density, lbs/gal	8.0	8.0	8.0	8.0
Specific Gravity @ 25°C (77°F)	0.97	0.96-0.97	0.97	0.97
Viscosity @ 25°C (77°F), cstks	350	50-1000	5000-100,000	12,500
Flash Point, °C (°F) (Pensky-Martens Closed Cup)	204 (400)	204 (400)	204 (400)	204 (400)

**Typical product data values should not be used as specifications. Assistance and specifications are available upon contacting GE Silicones at 800/255-8886.*

II. Fluorosilicone Fluids

PRODUCT DESCRIPTIONS

Fluorosilicone fluids may be used in antifoam applications where the dimethyl fluid products have failed. These are generally applications in the petroleum industry or where the system to be defoamed contains aliphatic, aromatic or chlorinated solvents.

FF157 and **FF150-10M** fluids are trimethylsilyl-terminated fluorosilicone homopolymers which are insoluble in aliphatic, aromatic and chlorinated solvents.

FF160 fluid is a vinyl-terminated fluorosilicone copolymer which is partially soluble in aromatic solvents such as toluene.

TYPICAL PRODUCT DATA

Property	Value*		
	FF157	FF150-10M	FF160
Silicone Content, %	100	100	100
Density, lbs/gal	10.7	10.8	9.4
Specific Gravity @ 25°C/25°C (77°F/77°F)	1.28	1.30	1.13
Viscosity @ 25°C (77°F), cstk	1000	10,000	20,000

**Typical product data values should not be used as specifications. Assistance and specifications are available upon contacting GE Silicones at 800/255-8886.*

III. Compound

PRODUCT DESCRIPTION

AF9000 antifoam is a 100% silicone compound found useful as an antifoam in many non-aqueous direct and indirect food additive and industrial applications. It can be used in the manufacture of food packaging materials as a defoamer, lubricant, and as a direct food additive. AF9000 is certified to be kosher and pareve.

AF9000 antifoam provides maximum foam control in highly alkaline and highly acidic systems as well as neutral systems, and exhibits improved efficiency and longevity over conventional antifoam compounds. It is soluble in aliphatic, aromatic and chlorinated solvents. Typical solvents are toluene, xylene, mineral spirits, hexane, heptane, naphtha, amyl acetate, methyl ethyl ketone, 2-ethyl hexanol and cyclohexane.

TYPICAL PRODUCT DATA

Property	Value*
	AF9000
Silicone/Silica Content, %	100
Density, lbs/gal (kg/l)	8.4 (3.81)
Specific Gravity @ 25°C/25°C (77°F/77°F)	1.01
Viscosity @ 25°C (77°F), cps	2500 max
Flash Point, °C, (°F) min Open Cup	315 (600)

**Typical product data values should not be used as specifications. Assistance and specifications are available upon contacting GE Silicones at 800/255-8886.*

Processing Guidelines for Non-Aqueous Antifoams

Dilution of these materials prior to use provides an excellent means for incorporating low concentrations of antifoam accurately and economically into non-aqueous systems and provides greater ease of handling.

Antifoams may also be metered into continuous process systems, and it is suggested that evaluation be started at 10 ppm silicone. This starting point represents an average level of silicone found to be effective in many applications. The level can then be adjusted in either direction to determine the maximum effective concentration for the specific system requiring foam control.

For applications related to food processing, consult applicable FDA and USDA regulations for the maximum permissible level of silicone.

Equivalent Measures for Defoamers

Parts per Million (ppm)	Percent	Ounces per 1000 Gallons	Ounces per 1000 Pounds	Grams per 1000 Liters	Grams per 1000 Kilograms
1	0.0001	0.134	0.016	1.09	1.09
10	0.0010	1.340	0.160	10.90	10.90
100	0.0100	13.400	1.600	109.00	109.00
1000	0.1000	134.000	16.000	1090.00	1090.00

Aqueous Antifoam Emulsions

AF60, AF9010, AF9020, and AF9030

PRODUCT DESCRIPTIONS

Antifoam emulsions are aqueous emulsions of polydimethylsiloxane fluids. These antifoams have proved useful in many industrial applications, and certain grades comply with FDA regulations for use in food processing applications. AF9010, AF9020 and AF9030 are certified to be kosher and pareve.

AF60 antifoam is a 30% emulsion for use in industrial applications.

AF9010 antifoam is a 10% emulsion useful as an antifoam in many industrial and food processing systems. It is recommended as a defoamer for highly alkaline or acidic aqueous systems, exhibiting improved efficiency and longevity over conventional silicone antifoams. This emulsion also provides excellent defoaming properties in nonionic, cationic, and anionic systems. Its low viscosity and easy dispersibility assure optimum foam control and handling ease.

AF9020 antifoam is a 20% emulsion useful as an antifoam in many industrial and food processing systems. It is recommended as a defoamer for highly alkaline or acidic aqueous systems, exhibiting improved efficiency and longevity over conventional silicone antifoams. This emulsion also provides excellent defoaming properties in nonionic, cationic, and anionic systems. Its low viscosity and easy dispersibility assure optimum foam control and handling ease.

AF9030 antifoam is a 30% emulsion useful as an antifoam in many industrial and food processing systems. It is recommended as a defoamer for highly alkaline or acidic aqueous systems, exhibiting improved efficiency and longevity over conventional silicone antifoams. This emulsion also provides excellent defoaming properties in nonionic, cationic, and anionic systems.

Processing Guidelines for Antifoam Emulsions

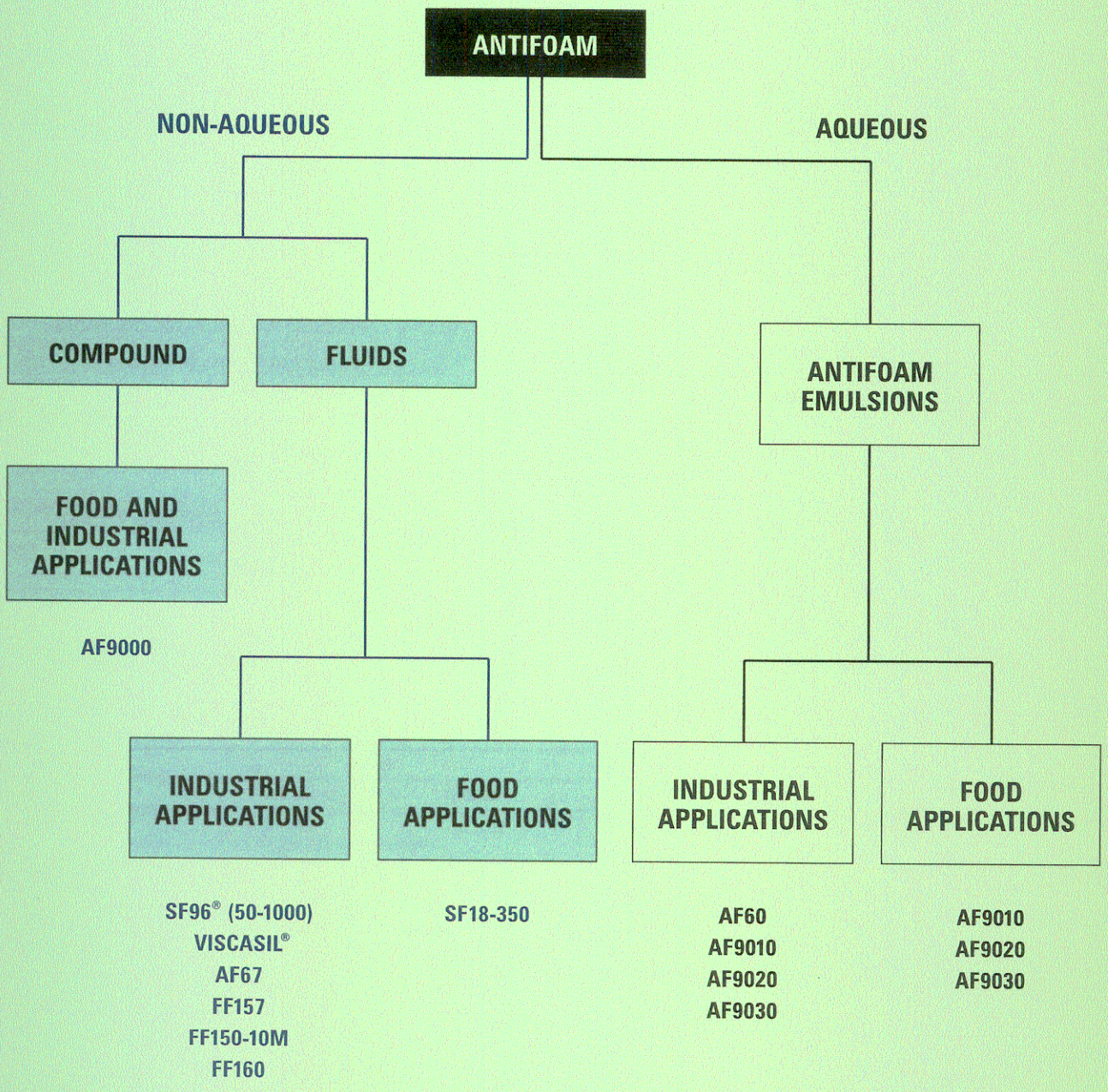
When evaluating antifoam emulsions, it is suggested that the evaluation be started at about 10 ppm silicone. This starting point represents an average level of silicone found to be effective in many applications. The level can then be adjusted in either direction to determine the minimum effective concentration for the specific system requiring foam control.

TYPICAL PRODUCT DATA

Property	Value*			
	AF60	AF9010	AF9020	AF9030
Total Solids, %	43.0-46.0	14.0-18.0	27.5-30.0	42.0-46.5
Silicone Content, %	30	10	20	30
Density, lbs/gal	8.4	8.4	8.4	8.4
Specific Gravity @ 25°C/25°C (77°F/77°F)	1.01	1.01	1.01	1.01
Viscosity @ 25°C (77°F), cps	1000	1500	3000	5000
Color	White	White	White	White
Heat Stability	Stable to 43°C (100°F) →			
Dilution Stability	Less than 2% Creaming and No Settling after 24 Hrs. @ 10% Silicone Content →			
Dispersibility	Readily Dispersible in Cold Water with Mild Agitation →			
Emulsifier Type	Nonionic →			

**Typical product data values should not be used as specifications. Assistance and specifications are available upon contacting GE Silicones at 800/255-8886.*

GE Silicones Antifoam Selector Flow Chart and Selector Guide



This chart is intended as a guide only, and the black square indicates the GE Silicones antifoam most frequently used in a given application providing maximum performance at a minimum cost.

ATTENTION: Not for Injection into Humans		COMPOUND	FLUIDS				EMULSIONS			
		AF9000	FF157	FF150-10M	SF18-350	SF96 (50-1000 cstk)	AF60	AF9010	AF9020	AF9030
Chemical Processing	Adhesive & Glue Manufacture	■					■	■	■	■
	Antifoam Formulating	■				■				
	Antifreeze						■	■	■	■
	Calcium Chloride Brines						■	■	■	■
	Hot Aqueous Systems						■	■	■	■
	Ink Manufacture - Solvent Base	■				■				
	Ink Manufacture - Water Base						■	■	■	■
	Insecticides	■					■			
	Latex Processing						■	■	■	■
	Paint Manufacture - Solvent Base	■								
	Paint Manufacture - Water Base						■	■	■	■
	Resin Polymerization	■								
	Soap Manufacture						■	■	■	■
	Starch Processing						■	■	■	■
	Wool Fats	■								
Food Processing	Fermentation				■			■	■	■
	Antifoam Formulating Food Grade	■			■			■	■	■
	Brine Systems							■	■	■
	Chewing Gum Base							■	■	■
	Corn Oil Manufacture	■			■					
	Deep-Fat Frying	■			■					
	Esterification of Vegetable Oil	■			■					
	Fermentation Systems							■	■	■
	Fruit Processing							■	■	■
	Instant Coffee & Tea Manufacture							■	■	■
	Jam & Jelly Making							■	■	■
	Juice Processing							■	■	■
	Pickle Processing							■	■	■
	Potato Processing							■	■	■
	Rice Processing							■	■	■
	Sauce Making							■	■	■
	Soft Drink Processing							■	■	■
	Sugar Refining							■	■	■
	Syrup Manufacture							■	■	■
	Vegetable Processing							■	■	■
	Whey Processing							■	■	■
	Wine Making							■	■	■
	Yeast Processing							■	■	■
	Kosher Applications	■			■			■	■	■
Plastic and Rubber	Latex Binders						■	■	■	■
	Vinyl-Latex Emulsions						■	■	■	■
Paper	Brown Stock Washer						■	■	■	■
	Paper Coating						■	■	■	■
	Paper Making						■	■	■	■
	Pulp Dewatering						■	■	■	■
Solvents	Alphatic Hydrocarbons		■	■						
	Aromatic Hydrocarbons		■	■						
	Chlorinated Solvents		■	■						
Textiles	Textile Dyeing						■	■	■	■
	Textile Finishing						■	■	■	■
	Textile Sizing						■	■	■	■
	Lagoon Aeration						■	■	■	■
	Dry Cleaning		■	■						
Waste Treatment	Aeration						■	■	■	■
	Neutralization						■	■	■	■
	Settling Ponds						■	■	■	■
Miscellaneous	Boiler Water Defoaming						■	■	■	■
	Leather Finishing						■	■	■	■
	Metal Working						■	■	■	■

GE Silicones Antifoam Selector Guide for the Petroleum Industry

Typical Application	Condition or Problem	AF9000	FF157 FF150-10M FF160	SF96® 350	VISCASIL® 12,500	VISCASIL® 60,000
Gas-Oil Separators	Foaming may cause oil carry-over and interfere with the accurate metering of crude oil produced.		■		■	■
Glycol Dehydrators	The diethylene glycol or triethylene glycol used in gas dehydration units may become contaminated and cause foaming in the unit. Foaming during regeneration can result in high glycol loss and a reduction in handling capacity.	■				
Delayed Cokers	Severe foaming in the coke drum limits production and may allow coke to carry-over and plug the gas recovery system.				■	■
Udex Units Sufolane Units Aromex Units	Foam formulations are usually encountered in the stripper and extractor in units using diethylene and dipropylene glycol as extractor solvents, thus reducing the capacity of the unit.	■				
Vacuum Tower Units	Excessive foaming increases processing cycle and expense.	■			■	■
Propane Deasphalting	Foam formation in the flash drum with possible carry-over into overhead lines hinders efficient operation of these units.	■				
Unit Start-Up	In the start-up of refinery units, pumps may lose suction during heating period due to foam caused by condensed water in the unit.				■	■
Amine Scrubbing Units	Amines used in gas sweetening units may become contaminated, causing severe foaming in the absorber and reactivator. Foaming seriously reduces gas-handling capacity of the unit.					
Furnace Tube Antifoulant	Coke build-up on furnace tubes limits length of runs and capacity of these units.			■	■	■
Motor Oils	Modern additives in motor oils cause foaming of the oil and reduce its lubricating properties.			■		
Asphalt Processing	Loading, mixing, and spraying of asphalt are impeded by foaming.	■			■	■
Hot Residuum Storage Tanks	Foaming limits capacity of tank and may cause froth-overs outside storage tanks.				■	
PVC Production	Dispersing agents used to disperse vinyl chloride in process water have a high foaming potential. A vacuum system is used to bail out unreacted vinyl monomer, and excessive foaming at this stage is common.	■				

SF96® 1000	AF67	AF60	AF9010 AF9020 AF9030	Suggested Silicone Concentrations	Antifoam Application Guide
	■			10 ppm Silicone	Silicone antifoam may be diluted in an appropriate solvent to obtain most efficient dispersion and injection ahead to the gas-oil separator to reduce foam formation.
		■	■	10 ppm Silicone	Silicone antifoam compounds may be diluted with petroleum solvents to permit easier injection into dehydrator units. Water should be used to dilute silicone antifoam emulsions. The antifoams may be added to the make-up glycol.
	■			10 ppm Silicone	VISCASIL® fluids may be diluted with a light aromatic hydrocarbon and injected through the top of the coker.
		■	■	5 ppm Silicone	Foam formations can be suppressed by adding the silicone antifoam compound or emulsion to the "aromatic rich" glycol solvent stream before it enters the stripper. Since the antifoam is selective to the glycol, it reduces foam in the extractor as well as the stripper.
	■			0.5 ppm Silicone	Application of silicone antifoam fluid or compounds to the process greatly reduces the carbon content of the side streams from the unit.
				0.5 ppm Silicone	The addition of a silicone antifoam compound suppresses foam formation in the flash drum and retards carry-over into the overhead line. Reduction of foam increases efficiency of the units.
	■			20 ppm Silicone	VISCASIL® fluid is an effective process aid in the start-up of refinery units. The antifoam should be dispersed in gas-oil and injected during the initial charge to the unit to suppress the foam.
		■	■	5 ppm Silicone	Water-diluted silicone antifoam emulsions are injected into the amine make-up solution.
■	■			5 ppm Silicone	SILICONE fluids retard coke build-up on furnace tubes, resulting in longer runs and increased capacity of the unit. Silicone antifoam fluids should be injected into heavy fractions immediately upstream from the furnace at the suction side of the pump. The silicone fluid may be diluted with kerosene – one part silicone to five parts kerosene.
■				10 ppm Silicone	The addition of silicone fluids to motor oils reduces foaming without changing the lubricating properties of the oil.
■	■			1 ppm Silicone	Addition of silicone antifoam fluids aids in cleaner separation of overhead produce from the residual. The antifoam also suppresses foaming in the loading of asphalt as well as mixing or spraying.
	■			2 ppm Silicone	VISCASIL® fluid may be added directly to the residuum or injected into the vacuum unit to reduce foaming and spreading of the frother outside the storage tank.
		■	■	10 ppm Silicone	Antifoam emulsion may be added to vessel before starting recovery process at end of polymerization. AF compound may be added prior to start of polymerization.

DILUTION OF ANTIFOAM EMULSIONS

Although GE Silicones antifoam emulsions are intended for use as supplied, some users may desire to utilize diluted versions because of the small amounts required. It should be noted that antifoam emulsions, such as AF60, AF9010, AF9020 and AF9030, are not designed to be dilution-stable for extended periods of time as are typical silicone release emulsions; i.e., antifoam emulsions will break when diluted with water. This feature is necessary for an antifoam emulsion; otherwise, if it were very stable, it would be a less efficient defoamer.

When an antifoam emulsion is added to a foaming system, the silicone emulsion breaks. This liberates the silicone fluid which is the actual defoaming agent. The major function of the emulsion is to enable the silicone fluid to be thoroughly dispersed throughout the aqueous medium to be defoamed.

This unique feature of silicone antifoam emulsions is the result of two factors:

- emulsion formulation
- emulsion processing procedures

Thus, although antifoam emulsions may separate when diluted with water, they can readily be redispersed with mild agitation prior to use and continue functioning as an effective defoamer.

The recommended procedure for usage of diluted antifoam emulsions is to maintain mild agitation prior to or while using the diluted product in order to assure uniform consistency.

STABLE LOW-SOLID EMULSIONS

In producing dilution-stable antifoam emulsions, the techniques below may be found useful. The final emulsion viscosity should be between 1000 and 2000 cps. Viscosity is controlled by percent of thickener/stabilizer. For best performance, thickeners should be well dispersed in water before the antifoam is added.

General Industrial

Typical GE procedure for reduction of antifoam emulsions to a 10% or lower **industrial grade** defoamer is as follows:

Part A: 62.3% H_2O
4.0% Acrysol ASE-108
(Rohm & Haas)
Part B: 2.7% of a 10% NaOH solution
Part C: 31.0% antifoam emulsion

1. Mix Part A.
2. Add Part B until clear viscous solution forms at pH of about 6-7.
3. Add Part C and stir until uniform.

Food Contact

Typical GE formulation for **food contact** applications using the antifoam emulsions which comply with FDA regulations.*

Part A: 49.0% H_2O (sterile)
Part B: 1.0% CMC-7HF (Hercules)
Part C: 50.0% antifoam emulsion

1. Heat Part A to 21°C/70°F (after sterilization).
2. Add Part B and mix until dissolved.
3. Begin cooling. Add Part C and stir until uniform.

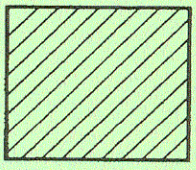
* All equipment used must be sterile.

EMULSION TERMINOLOGY AND TESTS

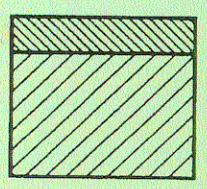
A silicone antifoam is an oil-in-water dispersion where the oil phase is a polydimethylsiloxane fluid.

This section describes some of the more commonly used terms regarding emulsion appearance.

Creaming – A state where an oil-rich phase of emulsion separates upon standing from the oil-lean phase. (Very similar to cream separation from milk).



Uniform Milky-White Emulsion
Good Emulsion



Dense White "Cream" Lighter Emulsion Layer
Upward Creaming

With silicone antifoam emulsions, upward creaming may occur.

Emulsions showing signs of creaming should be agitated before use to assure uniform consistency. Creaming is a natural occurrence depending upon age and storage conditions.

HOW TO DETERMINE TOTAL SOLIDS CONTENT OF SILICONE ANTIFOAM EMULSIONS

This section describes a general procedure which may be utilized for determining the total solids content of silicone emulsions.

Because a silicone antifoam emulsion consists of silicone fluid, a combination of emulsifiers, water and other additives such as anti-corrosives and preservatives, the total solids refers to the total percent of non-volatile material in the emulsion.

The total solids of silicone antifoam emulsions must be distinguished from the silicone solids which refers only to the percent of silicone fluids in an emulsion.

Equipment

Aluminum foil cup, 5.5 cm diam., filter paper, medicine dropper, analytical balance and an air-circulated oven at 100°C (212°F).

Procedure

(Run samples in duplicate)

1. Place a filter paper in an aluminum cup and then tare to nearest milligram. (Tare weight = T)
2. Agitate the sample jar thoroughly. Add 2.0± 0.1 grams of sample into the aluminum cup. Weigh the initial gross weight to the nearest milligram (W_1).
   NOTE: This initial weighing should be done rapidly to avoid error due to water evaporation.
3. Place samples in oven at 100°C±5 (212°F±5) for 60 minutes.
4. Allow sample to cool to room temperature following removal from oven (10 minutes).
5. Weigh the dried gross weight (W_2).
6. Calculate the percent solids as follows:

$$\text{Percent Solids} = \frac{W_2\text{-}T}{W_1\text{-}T} \times 100$$

7. Record the average if duplicate range is 0.5% or less. If the deviation is greater than 0.5% repeat procedure until a 0.5% range is obtained.

FREEZE/THAW STABILITY OF GE SILICONES ANTIFOAM

Freezing will not harm antifoam fluids (SF18-350, SF96,® VISCASIL,® AF67, FF150-10M, FF157, FF160) or the AF9000 antifoam compound; however, it can render antifoam emulsions (AF60, AF9010, AF9020, AF9030) unusable.

If freezing has occurred with any antifoam emulsion, it should be completely melted to a liquid state before any agitation of the product is attempted. The melting should be carried out at temperatures less than 66°C/150°F. Once thawed and agitated, a sample should be taken from the container to observe its physical appearance as compared to standard material.

If the sample is of uniform appearance, the emulsion may be suitable for use. If the emulsion is not uniform, it probably will not be suitable for use.

These comments apply only to the emulsion itself. As with any water-containing material, damage to the container may result from expansion of the liquid during freezing. Containers should therefore be inspected prior to thawing to insure that no leakage of liquid has or will occur.

It is recommended that all emulsions be shipped in heated vans. All precautions to prevent freezing must be made in the handling, transferring and shipping of emulsions.

STORAGE WARRANTY PERIOD

Storage conditions and warranty periods vary according to product type and product packaging. For specific information please call 1-800-255-8886.

HANDLING AND SAFETY

Material Safety Data Sheets are available upon request from GE Silicones. Similar information for solvents and other chemicals used with our products may be obtained from your suppliers. When solvents are used, proper safety precautions must be observed.

WARNING

It has been found that when silicone materials are used in conjunction with the manufacture of certain textile fibers (for example, synthetic polyester fibers) the flammability characteristics of these fibers can be altered by trace residues of such materials. Therefore, it is recommended that any silicone materials used in conjunction with fibers be evaluated fully as to any effect on the flammability of the fiber and of the finished product.

AVAILABILITY

Products may be ordered from GE Silicones, Waterford, N.Y. 12188, the silicone sales office nearest you, or where appropriate, an authorized GE Silicones product distributor.

GOVERNMENT REQUIREMENT

Prior to considering use of a GE Silicones product in fulfilling any government requirement, contact GE Silicones Customer Service department to determine if all government requirements can be met.

How to Obtain Samples and Information

For samples, literature and technical information call the GE Silicones Sourceline at

1-800-255-8886.

FAST FAX

GE Silicones FAST FAX System . . . 800-818-7FAX

GE Silicones FAST FAX System provides you with 24-hour, 7-day-a-week access to GE Silicones' new product literature system. Simply call 800-818-7FAX, follow the prompts, and within minutes you'll receive the product information that you need to get the job done.

MARKETED BY

HARWICK STANDARD DISTRIBUTION CORPORATION

60 S. Seiberling Street • Akron, Ohio 44305

Limited Warranty

GE Silicones warrants that its products will conform to GE Silicones' internal specifications at the time of application or use, provided that the product is stored in accordance with GE Silicones' recommendations and used or applied before the earliest of (1) any "Use Before Date" indicated on the product package, (2) one year from date of shipment by GE Silicones, or (3) expiration of such other period or recommended storage time stated in GE Silicones' product literature for such product. If notified in writing of a claim within six months of a product's use or application, GE Silicones will, at its option, replace, or refund the purchase price of any GE Silicones product which does not satisfy the foregoing warranty.

THE FOREGOING SHALL CONSTITUTE THE SOLE AND EXCLUSIVE REMEDY FOR DEFECTS IN, OR FAILURE OF, ANY PRODUCT, AND THE SOLE AND EXCLUSIVE LIABILITY OF GENERAL ELECTRIC COMPANY THEREFOR. THE WARRANTY STATED ABOVE IS IN LIEU OF ALL OTHER WARRANTIES, WRITTEN OR ORAL, STATUTORY, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE.

Limitation of Liability: GE Silicones shall in no event, whether the claim is based on warranty, contract, tort, strict liability, negligence or otherwise, be liable for incidental or consequential damages, or for any other damages in excess of the amount of the purchase price.

Note: For many products, GE Silicones may be able to offer a more extensive, application specific warranty. For further information, contact your GE Silicones field representative.

GE Silicones World Wide Offices

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Technical Assistance
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