



# PRODUCT DATA SHEET

## Admex<sup>®</sup> 6985

*Admex<sup>®</sup> 6985 is a medium molecular weight, polymeric adipate. It is characterized by a mild ester odor and light color. It is the standard against which all other polymeric plasticizers are compared.*

### SPECIFICATIONS

Acid number, mg KOH/g, max.....	2.0
Appearance .....	Clear, viscous liquid
Color, GARDNER, max.....	1
Hydroxyl number, mg KOH/g, max.....	25

### SOLUBILITY

In water ..... Nearly insoluble

### TYPICAL PROPERTIES

Acid number, mg KOH/g.....	1.0
Boiling point, °C .....	> 287
Color, GARDNER.....	1
Flash point, °C, COC .....	277
Hydroxyl number, mg KOH/g.....	18
Kinematic Viscosity, @ 99°C, cst.....	108
Molecular weight .....	6400
Odor .....	Mild ester-like
Pour point, °C .....	4
Refractive index, 25°C .....	1.466
Specific gravity, 25°C/25°C .....	1.080

### REGULATORY INFORMATION

<b>Global Inventory Status</b> All chemical substances in this material are included on or exempted from listing on the following inventories:	Canada (DSL) China (IECSC) Europe (EINECS) Japan (ENCS) Korea (KECI) New Zealand (NZIoC) United States (TSCA)
<b>U.S. FDA Approvals</b>	21 CFR 175.105 21 CFR 175.300 21 CFR 177.1210 21 CFR 177.2600
<b>U.S. OSHA Communication Standard</b>	Not regulated as a hazardous substance.
<b>Canadian WHMIS Classification</b>	Not regulated as a hazardous substance.

GS(9/08)

MARKETED BY  
**HARWICK STANDARD  
DISTRIBUTION CORPORATION**  
60 S. Seiberling Street • Akron, Ohio 44305



**GENOVIQUE<sup>™</sup>**  
SPECIALTIES

### World Headquarters

Rosemont, Illinois USA  
Customer Service:  
+1-800-843-7759 or  
+1-847-298-9000

customerservice@genovique.com

Sample Requests  
+1-866-458-8195  
Technical Support  
Sales Inquiries:  
+1-847-768-3208  
sales@genovique.com

### Europe

Kohtla-Järve, Estonia  
Customer Service:  
+372-33-25916

customerservice@genovique.ee

### Sample Requests

Sales Inquiries:  
+372-33-25915  
sales@genovique.ee

### Asia Pacific

Taipei, Taiwan  
Customer Service:  
+372-33-25916

customerservice@genovique.ee

### Technical Support

Sample Requests  
Sales Inquiries:  
+1-847-768-3208  
sales@genovique.com

[www.genovique.com](http://www.genovique.com)

Benzoflex<sup>®</sup> and Admex<sup>®</sup> are registered trademarks of Genovique Specialties<sup>™</sup> Corporation. All rights reserved.

The information in this data sheet is, to the best of our knowledge, true and accurate. The representations about the product are based upon test results achieved under laboratory practices supervised and controlled by Genovique Specialties. Since formulations, preparation or conditions of use may vary, Genovique is unable to guarantee the same performance as indicated.

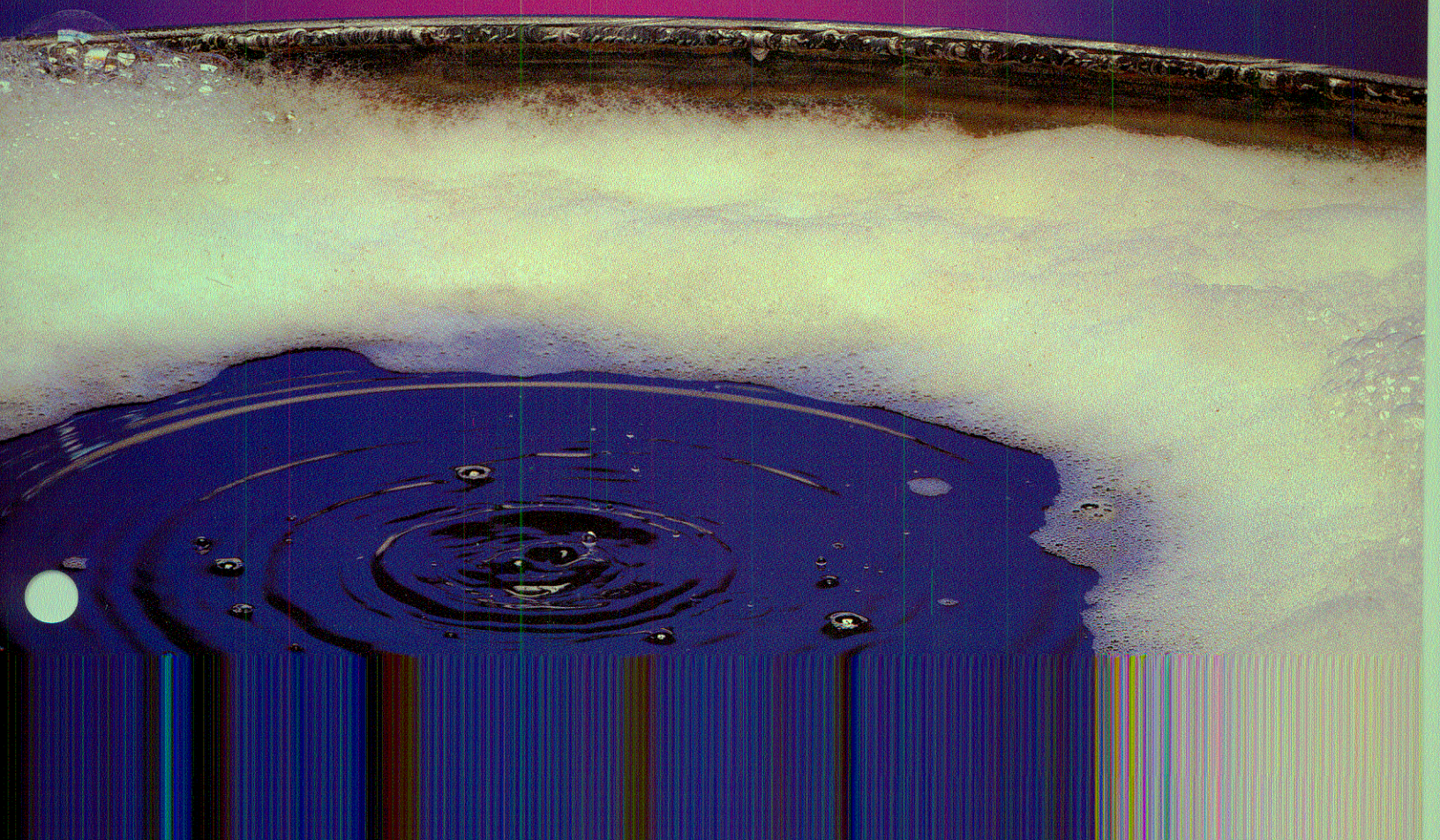
Nothing contained herein shall constitute a guarantee or warranty with respect to the product or its uses, nor does Genovique assume any liability therefore. The user is responsible for determination of suitability of any material or practice for a specific purpose and for adoption of such safety precautions as may be necessary. A Material Safety Data Sheet is available for this product. Users of this product are urged to study and use the information in the Material Safety Data Sheet. Genovique does not warrant against infringement of any patent which might arise by the use of Genovique's product in any combination with other products or arising in the operation of any process.





*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.

## **Table of Contents**

GE Silicones Antifoams: Use and Selection . . . . .	2
Non-Aqueous Antifoams . . . . .	3-4
I. Dimethyl Fluids	
II. Fluorosilicone Fluids	
III. Compound	
Aqueous Antifoam Emulsions . . . . .	5
GE Silicones Antifoam Selector Flow Chart . . . . .	6
GE Silicones Antifoam Selector Guide by Application . . . . .	7
GE Silicones Antifoam Selector Guide for the Petroleum Industry . . . . .	8-9
Dilution of Antifoam Emulsions . . . . .	10
Stable Low Solid Emulsions . . . . .	10
Emulsion Terminology and Tests . . . . .	10
How to Determine Total Solids Content . . . . .	11
Freeze/Thaw Stability . . . . .	11
Storage Warranty Period . . . . .	12
Handling and Safety . . . . .	12
How to Obtain Samples . . . . .	13



# 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**<sup>®</sup> polydimethylsiloxane fluids available in 50, 100, 200, 350, 500 and 1000 centistoke viscosities.

**VISCASIL**<sup>®</sup> 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<sup>®</sup> fluids.

### TYPICAL PRODUCT DATA

Property	Value*			
	SF18 (350)	SF96 <sup>®</sup> (50-1000)	VISCASIL <sup>®</sup> 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*
	<b>AF9000</b>
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.

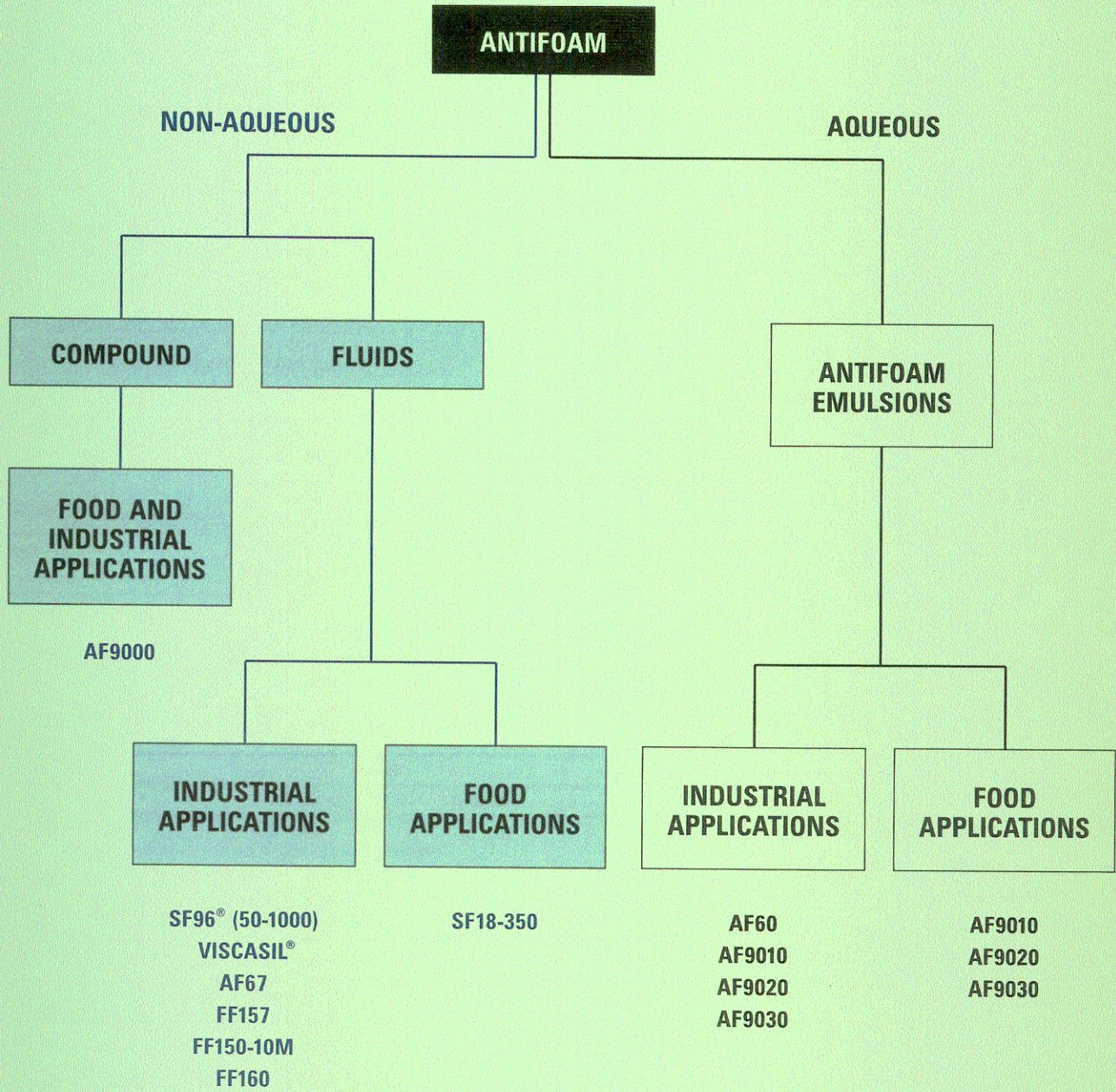
### TYPICAL PRODUCT DATA

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.

		COMPOUND			FLUIDS		EMULSIONS			
		AF9000	FF157	FF150-10M	SF18-350	SF96 (50-1000 cstk)	AF60	AF9010	AF9020	AF9030
<b>ATTENTION: Not for Injection into Humans</b>										
<b>Chemical Processing</b>	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	■									
<b>Food Processing</b>	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	■			■			■	■	■	
<b>Plastic and Rubber</b>	Latex Binders						■	■	■	■
	Vinyl-Latex Emulsions						■	■	■	■
<b>Paper</b>	Brown Stock Washer						■	■	■	■
	Paper Coating						■	■	■	■
	Paper Making						■	■	■	■
	Pulp Dewatering						■	■	■	■
<b>Solvents</b>	Aliphatic Hydrocarbons		■	■						
	Aromatic Hydrocarbons		■	■						
	Chlorinated Solvents		■	■						
<b>Textiles</b>	Textile Dyeing						■	■	■	■
	Textile Finishing						■	■	■	■
	Textile Sizing						■	■	■	■
	Lagoon Aeration						■	■	■	■
	Dry Cleaning		■	■						
<b>Waste Treatment</b>	Aeration						■	■	■	■
	Neutralization						■	■	■	■
	Settling Ponds						■	■	■	■
<b>Miscellaneous</b>	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
<b>Gas-Oil Separators</b>	Foaming may cause oil carry-over and interfere with the accurate metering of crude oil produced.		■		■	■
<b>Glycol Dehydrators</b>	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.	■				
<b>Delayed Cokers</b>	Severe foaming in the coke drum limits production and may allow coke to carry-over and plug the gas recovery system.				■	■
<b>Udex Units Sufolane Units Aromex Units</b>	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.	■				
<b>Vacuum Tower Units</b>	Excessive foaming increases processing cycle and expense.	■			■	■
<b>Propane Deasphalting</b>	Foam formation in the flash drum with possible carry-over into overhead lines hinders efficient operation of these units.	■				
<b>Unit Start-Up</b>	In the start-up of refinery units, pumps may lose suction during heating period due to foam caused by condensed water in the unit.				■	■
<b>Amine Scrubbing Units</b>	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.					
<b>Furnace Tube Antifoulant</b>	Coke build-up on furnace tubes limits length of runs and capacity of these units.			■	■	■
<b>Motor Oils</b>	Modern additives in motor oils cause foaming of the oil and reduce its lubricating properties.			■		
<b>Asphalt Processing</b>	Loading, mixing, and spraying of asphalt are impeded by foaming.	■			■	■
<b>Hot Residuum Storage Tanks</b>	Foaming limits capacity of tank and may cause froth-overs outside storage tanks.				■	
<b>PVC Production</b>	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<sub>2</sub>O  
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<sub>2</sub>O (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

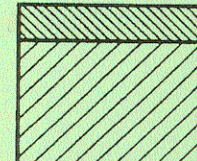
A silicone antifoam is an oil-in-water dispersion where the oil phase is a polydimethylsiloxane fluid.

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  $2.0 \pm 0.1$  grams of sample into the aluminum cup. Weigh the initial gross weight to the nearest milligram ( $W_1$ ).
3. Place samples in oven at  $100^\circ\text{C} \pm 5$  ( $212^\circ\text{F} \pm 5$ ) 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:

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

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**

General Electric Company  
260 Hudson River Road  
Waterford, NY 12188  
Technical Assistance  
800-255-8886  
Customer Service  
800-332-3390

General Electric Canada, Inc.  
2300 Meadowvale Blvd.  
Mississauga, Ontario  
Canada L5N 5P9  
Phone: 800-332-3390

GE Plastics Pacific, Ltd.  
GE Pacific PTE Ltd.  
240 Tangong Pagar Rd.  
GE Towers #09-00  
Singapore, 0208  
Phone: 65-290-1322

GE Silicones Korea  
c/o Dongyang Silicones Co., Ltd.  
GEPK Bldg. 4 Fl.  
231-6 Nonhyun-dong  
Kangnem-Ku  
Seoul, Korea 135-010  
Phone: 82-2-518-2826

GE Silicones  
1 Plasticlaan  
P.O. Box 117  
4600 AC Bergen op Zoom  
The Netherlands  
Phone: 31-1640-31172

GE Silicones  
Av. 9 De Julho, 5229  
10•Andar  
CEP 01407-907 Sao Paulo-J.P.  
Brazil  
Phone: 55-011-897-8144

GE Silicones  
175 Hammond Road  
Dandenong,  
Victoria, 3175  
Australia  
Phone: 61-39-794-4205

General Electric Technical Service Co., Inc.  
Taiwan Branch—GE Silicones  
Hung Tai Center—13th Floor #168  
Tun Hua North Road  
Taipei, Taiwan  
Phone: 886-2-514-9849

GE Silicones Mexico  
Av. Prolongacion Reforma  
#490-Piso 4  
Col. Santa Fe  
C.P. 01207 Mexico, D.F.  
Phone 52-5-257-6095

General Electric Plastics  
Room 1008, Tower 1  
The Gateway  
25 Canton Road  
Tsimshatsui Kowloon, Hong Kong  
Phone: 852-2629-0888

General Electric Company  
Boulevard de Sabana Grande  
Cruce Don Calle Villaflor  
Centro Comercial Sabana Grande  
Piso 3  
Caracas 1010-A, Venezuela  
Phone: 58-2-708-5162

General Electric Technical  
Service Co., Inc.  
25th Floor UBN Tower, Letter Box 42  
No. 10 Jalan P Ramlee  
50250 Kuala Lumpur, Malaysia  
Phone: 603-238-2344

General Electric International Operations  
Unit 1103, 11F Diethelm Tower (B)  
93/1 Wireless Road  
Lumpinee, Pathumwam, Bangkok 10330  
Thailand  
Phone: 662-255-3369  
Phone: 662-256-7766

General Electric Company  
Lippo Plaza, 8th Floor  
J1. Jend. Sudirman Kav 25  
Jakarta 12920, Indonesia  
Phone: 62-21-520-3353

MARKETED BY  
**HARWICK STANDARD  
DISTRIBUTION CORPORATION**  
60 S. Seiberling Street • Akron, Ohio 44305



**GE Silicones**

CDS-5071 (8/95)

General Electric Company, U.S.A. is not connected with the English company of a similar name.

© Copyright 1995 General Electric Company



**VERSICOL CHEMICAL CORPORATION**  
**SPECIALTY BENZOATE ESTERS**

**HIGH COMPATIBILITY ● LOW VISCOSITY ●**

**MODERATE TO HIGH SOLVATING ● LOW**

**VOLATILITY ● STAIN RESISTANCE ●**

**EXTRACTION RESISTANCE ● FAST SET**

**TIMES ● FLEXIBILITY ● SPECIALTY**

**PERFORMANCE ● HIGH COMPATIBILITY**

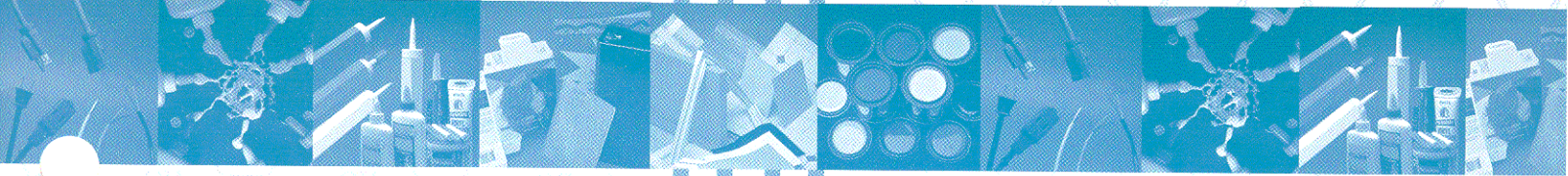
**● LOW VISCOSITY ● MODERATE TO**

**HIGH SOLVATING ● LOW VOLATILITY ●**

**STAIN RESISTANCE ● EXTRACTION**

**RESISTANCE ● FAST SET TIMES ● FLEXIBILITY**

**● SPECIALTY PERFORMANCE ● HIGH COMPATIBILITY**



MARKETED BY  
**HARWICK STANDARD**  
**DISTRIBUTION CORPORATION**  
60 S. Seiberling Street • Akron, Ohio 44305



# VELSICOL CHEMICAL CORPORATION

*Velsicol is a growing, global corporation focused on producing high performance specialty chemicals based on benzoic acid and cyclopentadiene that serve a variety of niche markets.*

*Top-selling products include a full line of specialty plasticizers ranging from innovative benzoate esters to high performance polymeric and monomeric. With such a broad line, we are able to serve the adhesives, caulks, sealants, coatings and PVC resins markets.*

*Velsicol also is proud to be the world's largest marketer of refined benzoic acid and derivatives. Our investments in this area ensure that you can expect only the highest quality derivatives and continual development of new products from Velsicol.*

*Cyclopentadiene is the basis for the third line of chemicals we manufacture. These derivatives are used in the production of flame retardants and agricultural pesticides.*



# Specialty Benzoate Esters

Velsicol's Specialty Liquid and Solid Benzoate Esters ..... 2-3

## Applications of Specialty Esters

Polyvinyl Chloride Plastics ..... 4

Polyurethane ..... 4

Varnishes ..... 4

Adhesives ..... 5

Latex Coatings ..... 5

Hot Melt Adhesives ..... 5

Application Guide ..... 6

FDA Status ..... 7



VELSICOL CHEMICAL CORPORATION  
SPECIALTY BENZOATE ESTERS



## Specialty Benzoate Esters

Benzoflex® esters are used extensively in many applications ranging from floor tile to roto-molded children's toys. Benzoflex esters, as a class, are considered high-solvating plasticizers that are compatible enough to be used as a sole or primary plasticizer, but more often are used in blends to provide specialty performance characteristics.

### SPECIALTY LIQUID BENZOATE ESTERS

#### Benzoflex® 9-88 SG

Benzoflex® 9-88 SG is recommended as a plasticizer for cast urethane applications that require a minimum cure interference and maximum in compatibility. The excellent degree of compatibility in cast polyurethane systems allows use at high levels to achieve durometer readings ranging as low as 20-25 Shore A hardness for graphic art painting rolls.

#### Benzoflex® 131

Benzoflex® 131 isodecyl benzoate is a clear, low viscosity organic liquid that reduces the viscosity of vinyl plastisols. Benzoflex 131 is moderately volatile when compared to primary plasticizers such as Benzoflex 9-88. The volatile nature of Benzoflex 131 may be used to advantage in such applications as vinyl compounding. It is a moderate solvator for vinyl and has excellent stain resistance.

#### Benzoflex® 2-45

Benzoflex® 2-45, diethylene glycol dibenzoate, is a plasticizer industrially known for its excellent compatibility with polyvinyl acetate (PVA) homopolymer and copolymer emulsions. Benzoflex 2-45 plasticizer-based adhesives have excellent quick grab and set times. While Benzoflex 2-45 does thicken polyvinyl acetate emulsions, the adhesives are comparatively stable.

#### Benzoflex® 284

Benzoflex® 284, propylene glycol dibenzoate, is an effective high solvating plasticizer. Its exceptional stain resistance makes Benzoflex 284 ideal for resilient polyvinyl chloride (PVC) flooring top coats. PVC formulations containing Benzoflex 284 can be processed at lower temperatures and/or a quicker production rate.

#### Benzoflex® 354

Benzoflex® 354 is the benzoic acid diester of 2,2,4-trimethyl-1,3-pentanediol. The diester is compatible with a wide range of synthetic resinous materials, and it imparts a softening and flexibilizing effect to these resins. Benzoflex 354 is suggested for use as a resin plasticizer/modifier in the formulation of specialty coatings and adhesives and PVC plastisols.



## Specialty Benzoate Esters

### **Benzoflex® 400**

Benzoflex® 400 is a low volatile, moderately solvating plasticizer. It was designed to be used in applications requiring a plasticizer lower in volatility than low molecular weight esters. Benzoflex 400 is an efficient, cost/performance alternate to the high alkyl benzyl phthalate.

### **Benzoflex® P-200**

Benzoflex® P-200, polyethylene glycol dibenzoate, is a clear, low volatile plasticizer. It is compatible with several polymers such as PVC, PVA, phenolformaldehyde and some alkyds. The low volatility and polar nature of Benzoflex P-200 make it useful in formulations containing thermosetting polymers, such as phenolics resins.

### **Benzoflex® 1046**

Benzoflex® 1046 is a specialty benzoate plasticizer imparting excellent stain resistance in PVC or PVC acetate copolymers. Its high resin solvation at elevated temperatures, coupled with its tolerance for fillers, makes it the plasticizer of choice for wall coverings and vinyl floor coverings. In addition, its excellent rheological properties make it highly desirable for plastisol and organosol applications.

### **Benzoflex® 6000**

Benzoflex® 6000 has excellent compatibility in PVC, promoting fusion and building physical properties. It imparts excellent stain resistance when formulated into vinyl flooring and wall coverings. Due to minimal migration from the PVC polymer, Benzoflex 6000 provides excellent paintability of plasticized surfaces.

### **Velate® 262**

Velate® 262 isodecyl benzoate is a low viscosity, low odor organic compound that is useful as a latex paint coalescing aid. It has been evaluated thoroughly in a variety of types of latex paints versus an alcohol/ester coalescent to demonstrate its utility as a coalescent.

## SPECIALTY SOLID BENZOATE ESTER

### **Benzoflex® 352**

Benzoflex® 352 is a white crystalline solid with the very high melt point of 118°C that can offer significant performance advantages in a variety of hot melt adhesive applications.



## *Polyvinyl Chloride Plastisols*

Velsicol's specialty Benzoflex® products are very useful for flooring and general purpose vinyl plastisol formulations.

Benzoflex 1046 and 284 are used in flooring in vinyl top coat formulations and as stain resistant plasticizers.

Benzoflex 131 is an effective product for plastisol viscosity reduction and low odor. Benzoflex 400 is very low in volatility while Benzoflex 354 works well in vinyls with exceptional resistance to fabric dye migration.

Benzoflex 2-45 also is compatible with and an excellent solvator for polyvinyl chloride. Flexible vinyl formulations based on Benzoflex 2-45 can be processed quicker and/or at lower temperatures than vinyls based on di-2-ethylhexyl phthalate. Benzoflex 2-45 is resistant to extraction from the vinyl by aliphatic and oily solvents.

## *Polyurethane*

Benzoflex 9-88 SG is recommended for cast polyurethane applications that require minimum cure interference and maximum compatibility. The excellent degree of compatibility in cast polyurethane systems allows the use of Benzoflex 9-88 SG at high levels in order to achieve durometer readings ranging as low as 20-25 Shore A hardness for graphic art printing rolls. Benzoflex 9-88 SG demonstrates excellent inert filler acceptance, which generally provides both good wear characteristics and lower formulation costs. Benzoflex 9-88 SG also contributes improved tear strength, better rebound and reduced swell with certain solvents. It is adaptable to both metering and hand batch polyurethane mix systems.

Benzoflex 9-88 SG is recommended for polyurethane uses such as business machine rolls, printing rolls, duplicating rolls, gaskets and seals, coating rolls, drive rolls, low and medium durometer mechanical goods and feed rolls.

## *Varnishes*

Benzoflex® P-200 is a clear, low volatility plasticizer, which is compatible with several polymers such as polyvinyl chloride, polyvinyl acetate, phenolformaldehyde and some alkyd resins.

Use of Benzoflex P-200 provides improvement in flexibility, flex strength and heat distortion values without sacrificing electrical properties.



## Adhesives

Benzoflex® P-200 also is used in PVA adhesives to improve adhesion characteristics to polyolefin surfaces. Milk carton adhesives, for example, is the type of latex adhesive in which the Benzoflex P-200 may be used.

The Benzoflex P-200 also is useful in alkyd-modified phenolformaldehyde varnishes.

Benzoflex 2-45, diethylene glycol dibenzoate, is a plasticizer known for its excellent compatibility with polyvinyl acetate homopolymer and copolymer emulsions. Benzoflex 2-45 plasticizer-based adhesives have excellent quick grab and set times. While Benzoflex 2-45 does thicken polyvinyl acetate emulsions, the adhesives are comparatively stable.

## Latex Coatings

Velate® 262 is an effective, efficient coalescent for all latex paints. The advantage of using Velate 262 as a coalescent versus the alcohol/isobutyric acid ester is Velate 262's good, low odor characteristics. When incorporated into paint and then applied, the odor dissipates quickly.

In all the paint systems tested, Velate 262 performed overall as well or better than the other coalescents. Velate 262 is clearly efficient at providing low-temperature coalescence to a variety of paint systems.

## Hot Melt Adhesives

Benzoflex 352 is a white crystalline solid with a very high melt point that can offer performance advantages in polyamide-based hot melts. Incorporating Benzoflex 352 into hot melt adhesive systems provides fast set times due to its high degree of crystallinity and high melt point. Additionally, the white color tends not to darken light polyamides and the flaked form is easily incorporated in mixing or extrusion equipment.

Benzoflex 352 reduces viscosity and improves wetting while extending the bond-forming window without dramatically slowing setting speed as dimer acid and most other solid and liquid plasticizers do.

Additionally, Benzoflex 352 serves as a flow improvement additive in powder coatings as well as a processing aid in plastics.

In hot melt systems, Benzoflex 352 can provide:

- fast set times, good open times
- effective molten viscosity reduction
- high SAFT fail temperatures
- high block temperatures of delayed tack adhesives
- excellent strength of bonds.



# Application Guide

## Specialty Benzoate Application Guide

	Benzoflex 9-88 SG	Benzoflex 131	Benzoflex 2-45	Benzoflex 284	Benzoflex 354	Benzoflex 400	Benzoflex 6000	Benzoflex P-200	Benzoflex 1046	Velate 262
<b>Adhesives</b>										
PvAc Polyalethin	◆	◆	◆	◆		◆		◆		
<b>Caulk</b>										
Acrylic		◆		◆						
<b>Sealants</b>										
Automotive				◆		◆	◆		◆	
<b>Vinyl</b>										
PVC Plastisol	◆	◆	◆	◆	◆	◆				
Flooring	◆	◆	◆	◆			◆		◆	
<b>Other</b>										
Castable Polyurethane	◆			◆		◆	◆			
Reactive Systems	◆			◆						
Acrylic Coating					◆	◆				
Plastisols		◆		◆	◆		◆		◆	
Peroxide Carrier		◆								◆
Latex Paints										◆
Floor Polish										

Benzoflex® and Velate® are registered trademarks of Velsicol Chemical Corporation.



## *FDA Status*

Benzoflex® 9-88 SG and 2-45 are not considered a hazardous substance as defined by either the Federal Hazardous Substances Act or by the Department of Transportation under 49CFR. Both are approved for use in food packaging adhesives to the limitations defined in 21CFR175.105. Benzoflex 9-88 SG and 2-45 also are approved by the FDA for use as a component of paper and paperboard packaging directly in contact with food subject to the limitations as defined in 21CFR176.170 and 21CFR176.180.



VELSICO CHEMICAL CORPORATION  
SPECIALTY BENZOATE ESTERS



*Velsicol has developed guidelines to help ensure the safe handling, storage and transportation of its products. Information is available through Storage and Handling guidelines and Material Safety Data Sheets. Should there be any questions or concerns about the use or handling of Velsicol products, contact the worldwide headquarters at (800) 843-7759 or fax to (847) 298-9014.*

*The information in this brochure is, to the best of our knowledge, true and accurate. The representations about the products are based on test results achieved under laboratory practices supervised and controlled by Velsicol Chemical Corporation. Since preparation or conditions of use of their formulations may vary, Velsicol is unable to guarantee the same performance as indicated. Nothing contained herein shall constitute a guarantee or warranty with respect to the products or its formulations' uses, nor does Velsicol assume any liability therefore. The user is responsible for determination of suitability of any material or practice for a specific purpose and for adoption of such safety precautions as may be necessary. Material Safety Data Sheets are available for Velsicol products mentioned in this brochure. Users of these products are urged to study and use the information in the Material Safety Data Sheets. Velsicol does not warrant against infringement of any patent which might arise by the use of Velsicol's products in any combination with other products or arising in the operation of any process.*



MARKETED BY  
**HARWICK STANDARD  
DISTRIBUTION CORPORATION**

60 S. Seiberling Street • Akron, Ohio 44305



**VELSICOL**  
CHEMICAL CORPORATION

**10400 W. Higgins Road, Suite 600  
Rosemont, Illinois 60018-3713 USA  
[www.velsicol.com](http://www.velsicol.com)**

