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SF A-348

PRODUCT DESCRIPTION

SF A-348 organosilicone is a proprietary copolymer that represents a class of aminosilicone polyalkyleneoxide copolymers for hair conditioning. Conventional organomodified polysiloxanes have pendant organic groups on a silicone backbone, while SF A-348 organosilicone is a block copolymer, having an (AB)_n structure, with repeating silicone and organic segments. The new molecular architecture of SF A-348 copolymer helps result in excellent absorption on surfaces, unique tactile properties, and uniform surface coverage. Each component of SF A-348 organosilicone copolymer has a distinct function.

KEY FEATURES AND TYPICAL BENEFITS

The aminosilicone portion may help provide...

- Substantivity
- Conditioning
- Excellent feel
- Fly-away control
- Lubricity

The polyalkyleneoxide portion may help provide...

- Prevention of build-up
- Water solubility
- Hair color overdyeability
- Moisture retention

The INCI name for SF A-348 organosilicone copolymer is Bisamino PEG/PPG-41/3 Aminoethyl PG-Propyl Dimethicone.

TYPICAL PHYSICAL PROPERTIES

Appearance	Translucent liquid
Viscosity at 25C, mPa's	5000
Refractive Index, 25C	1.4335
Solids Content, %	30
Flash Point, C (F)	67 (152)
Solubility (10%) in	
Water	Dispersible
Isopropanol	Soluble
White Mineral Oil	Insoluble
Cyclomethicone	Insoluble

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Propylene Glycol	Soluble
Isopropyl Myristate	Soluble

POTENTIAL APPLICATIONS

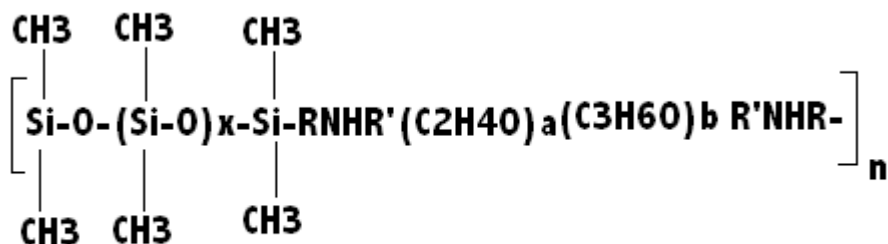
- Exceptional hair conditioning without build-up in products such as shampoos, conditioners and styling products
- Clear shampoos and styling product formulations where silicone emulsions would cloud the formulation
- Hair care products that require superior wet combability
- Treated hair that has been damaged by color treatment, permanent wave, sun or blow drying
- Improved hair conditioning in hair color products

PERFORMANCE

SF A-348 organosilicone copolymer generally offers the following properties to enhance the performance of hair care products:

- Silky softness
- Wet/dry combability
- Fly-away control
- Sheen/gloss
- Moisture control

CHEMICAL STRUCTURE



PERFORMANCE DATA

Hair Testing Procedures

The following performance data demonstrates that SF A-348 organosilicone copolymer typically offers excellent performance in wet and dry combability, as well as in fly-away control. Also, SF A-348 organosilicone has been rated higher than amodimethicone and dimethicone in softening properties as determined by an in-house hand panel evaluation. Below is a description of the performance tests:

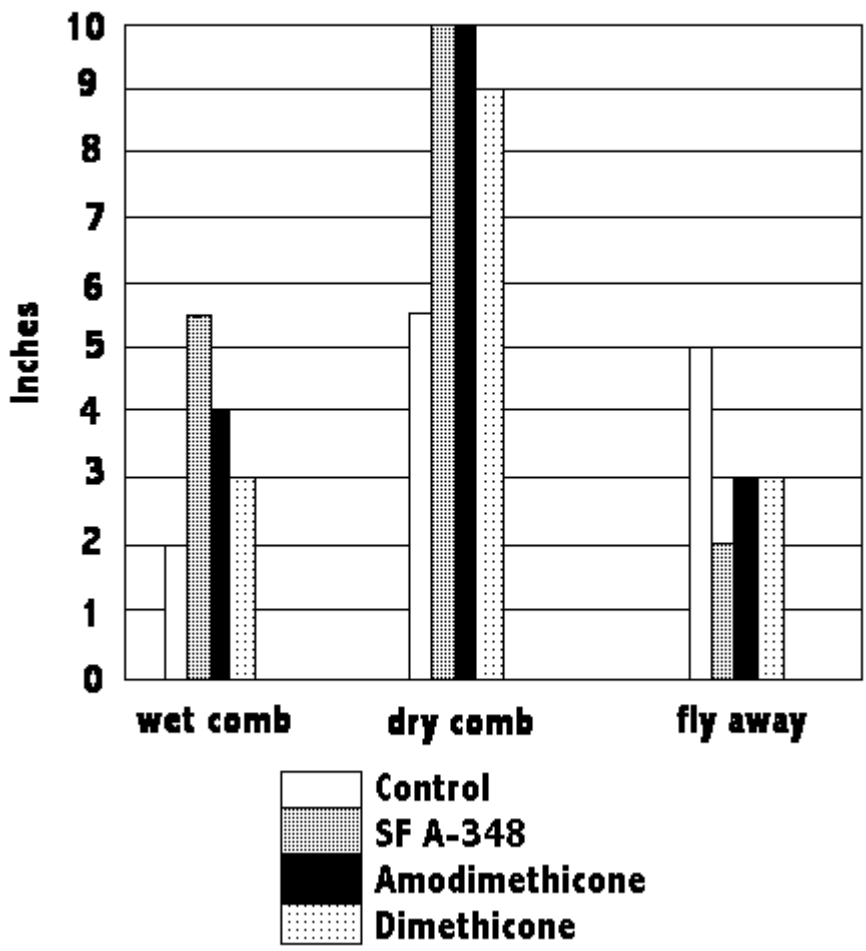
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- Wet and dry combability are measured as the number of inches a comb travels when a 10-inch long hair tress, placed on a calibrated chart, is combed from top to bottom.
- Fly-away is reported as the difference between the total width of the entire tress and the width of the hair bundle after the tress is combed quickly 10 times
- Graphs on the following pages show a side by side comparison of SF A-348 organosilicone copolymer, amodimethicone and dimethicone applied to different types of hair from a shampoo containing 1% silicone actives

Blonde Bleached Hair

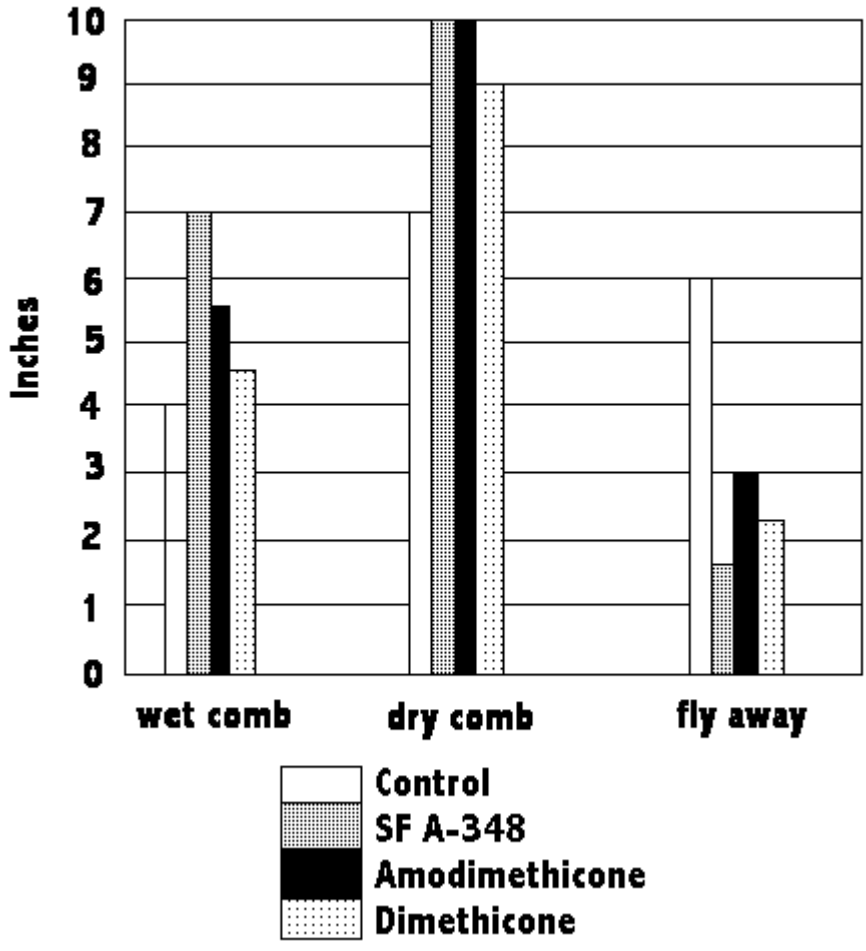
Figure 1: Performance of SF A-348 Copolymer vs Other types of Silicones



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 Brown Caucasian Hair

Figure 2: Performance of SF A-348 Copolymer vs Other Types of Silicones

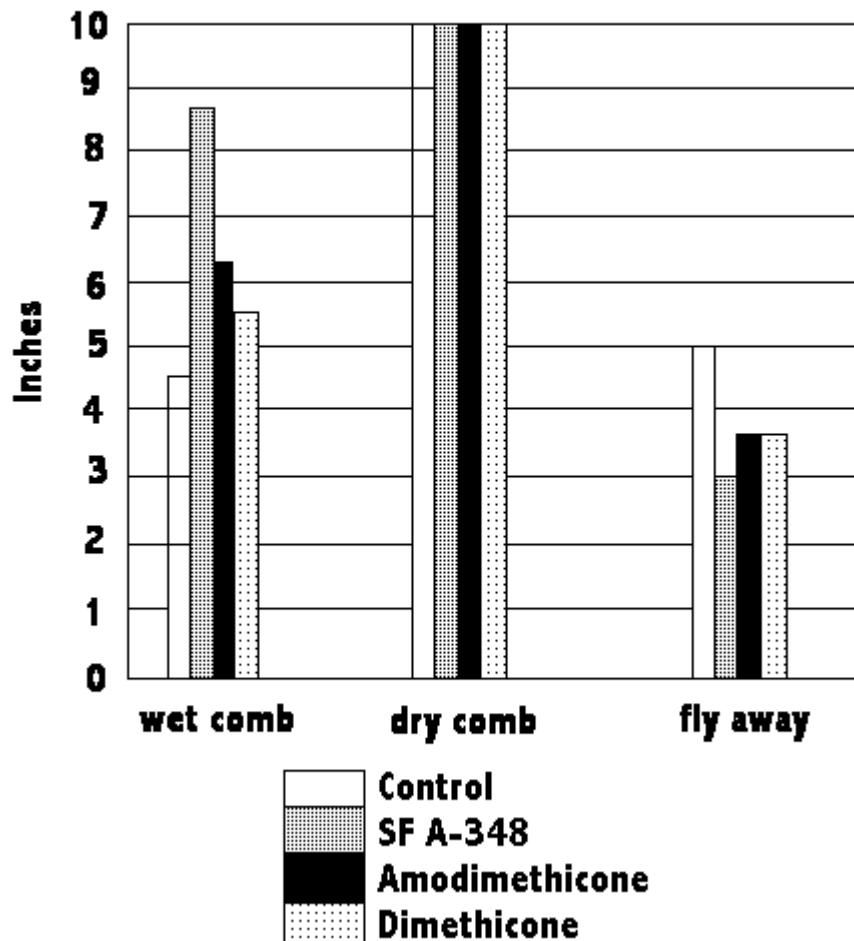


Asian Hair

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Figure 3: Performance of SF A-348 Copolymer vs Other Types of Silicones



Build up

The following four shampoo variations were evaluated for build up:

1. Control shampoo
2. Control shampoo with a 1% active level of SF A-348 organosilicone polymer
3. Control shampoo with a 1% active level of amodimethicone and
4. Control shampoo with a 1% active level of dimethicone

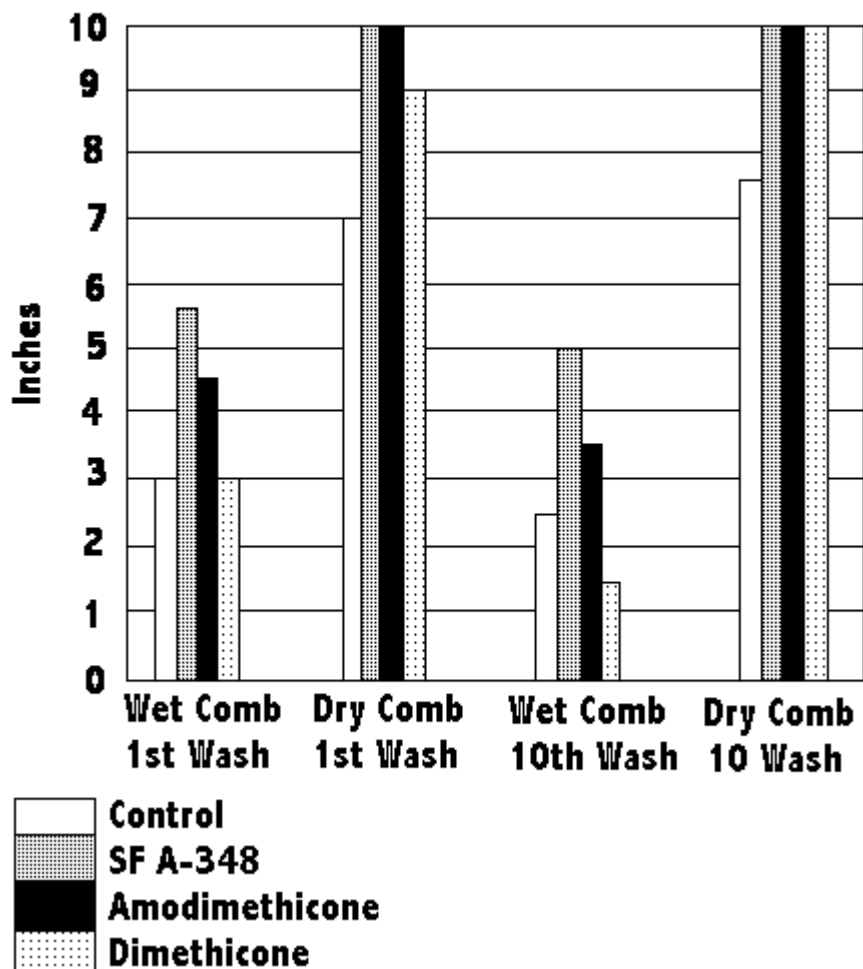
Two hair tresses were used to generate data for each shampoo variation. Build up was noted as the change in the wet and dry combability after 1 wash and 10 washes. Figure 4 shows that after 10 consecutive washes with the shampoo variations, only the hair washed with the SF A-348 copolymer shampoo

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formulation retains consistent wet and dry combability; amodimethicone shows a measurable decrease in wet combability; and dimethicone shows a measurable decrease in wet combability; becoming worse than the control shampoo. After the tenth wash, in a sensory evaluation, hair shampooed with the dimethicone variation was characterized as draggy and dirty, while other samples felt soft and smooth. These results suggest that dimethicone builds up on hair after repeated applications, amodimethicone may present a problem after extended use and SF A-348 copolymer has virtually no build up tendency.

Figure 4: Silicone Build-Up on Bleached Hair



MODEL FORMULATIONS
 Clear Conditioning Shampoo

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Description: Conditioning shampoo for daily use. SF A-348 organosilicone copolymer contains and helps retain moisture on the hair.

Ingredients	Wt Percent
Ammonium Lauryl Sulfate, 28% (b)	35.7
Cocamide DEA	3.0
PEG-120 Methyl Glucose Dioleate	2.0
SF A-348 organosilicone copolymer (c)	3.3
Citric Acid, Anhydrous	0.4
Cocamidopropyl Betaine, 35%	10.0
Deionized Water	Qs
Preservative	Qs

Mixing Instructions: With propeller agitation, mix Deionized water and ammonium lauryl sulfate: add remaining ingredients in the order listed, waiting for each ingredient to dissolve before adding the next step. SF A-348 organosilicone copolymer is a combustible liquid. Use caution while heating mixture. Use non-sparking tools and equipment.

If the viscosity of the shampoo needs to be adjusted, we recommend the following thickeners (see table for details):

PEG-150 Distearate, PEG-120 Methyl Glucose Dioleate and Sodium Chloride

- (a) Opaque shampoos can be also formulated by incorporating common pearlescent agents in the formula.
- (b) In systems with other primary surfactants, formulation may not be completely clear: clarity can be improved by pre-blending SF A-348 with isolaureth-6 or trideceth-6 at 1:1 ratio.
- (c) Is SF A-348 copolymer is post added, temporary haze may result.

Thickeners for Commercial Shampoos with SF A-348

It is a well-known phenomenon that the addition of water-soluble or water dispersible silicones to shampoo causes a reduction in viscosity. The following chart demonstrates this effect on four commercial shampoos that do not contain silicone additives. When SF A-348 copolymer is post added to these shampoos, the viscosity drops dramatically (see line 2). Line 3 through 6 show the variation thickening systems that can be used to adjust the shampoos back to their original starting viscosity.

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	Commercial Shampoo I	Commercial Shampoo II	Commercial Shampoo III	Commercial Shampoo IV
Viscosity (1) as received	14,700	3,860	16,300	4,400
Viscosity of the shampoo containing 3.3 parts SF A-348 copolymer	300	600	750	500
Viscosity of the shampoo containing 3.3 parts SF A-348 copolymer + 3 parts PEG_150 Distearate	36,000	3,900	7,300	35,000
Viscosity of the shampoo containing 3.3 parts SF A-348 copolymer + 3 parts PEG-120 Methyl Glucose Dioleate	26,700	4,100	4,900	71,000
Viscosity of the shampoo containing 3.3 parts SF A-348 copolymer + 1 part NaCl	2,100	1,260	1,680	2,500

(1) cps, DV-I #4, 10RPM

Hair Conditioner

Description: Unique formulation exhibiting excellent wet-and-dry combability plus minimal fly-away.

Ingredients	Weight
SF A-348 organosilicone copolymer	6.0
Cetearyl Alcohol	2.0
Dicetyldimonium Chloride	2.5
Stearamidopropyl Dimethylamine	0.5
Panthenol	0.2
Citric Acid	0.05
Deionized Water	Qs
Preservative	Qs

Procedure: While agitating the water, add 0.05 g of the citric acid, Cetearyl alcohol, Dicetyldimonium chloride, and Stearamidopropyl Dimethylamine. With

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mixing, heat to 75-80C and add remaining ingredients except preservative. SF A-348 organosilicone copolymer is a combustible liquid. Use caution while heating mixture. Use non-sparking tools and equipment. Cool to room temperature while mixing. Adjust to pH 4.5-5 with citric acid if necessary. Add preservative.

Leave-in Conditioner

Description: Clear gel-providing conditioning, soft feel, good wet and dry combability and gloss.

Ingredients	Wt Percent
Phase A	
Deionized Water	40.0
Carbomer	0.5
Phase B	
Trimethanolamine (50%)	1.0
Phase C	
Propylene Glycol	50.0
Methylgluceth-20	5.0
Phase D	
Cyclomethicone and Dimethiconol	2.0
SF A-348 Copolymer	1.5

Procedure: Combine ingredients of Phase A and mix until uniform. Add Phase B. Combine components of Phase C and add slowly with mixing. Add Phase D in the order listed. SF A-348 organosilicone copolymer is a combustible liquid. Use caution while heating mixture. Use non-sparking tools and equipment.

PRODUCT SAFETY, HANDLING AND STORAGE

Customers considering the use of this product should review the latest Material Safety Data Sheet and label for product safety information, handling instructions, personal protective equipment if necessary, and any special storage conditions required. Material Safety Data Sheets are available upon request from your representative. Use of other materials in conjunction with primers may require additional precautions. Please review the following safety information provided by the manufacturer of such other materials.

LIMITATIONS

Customers must evaluate and make their own determination as to fitness of use in their particular applications.



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ORDERING INFORMATION

To order or to request samples, contact:

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Fax: 817-303-7070

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