

# SILSOFT\* Q/SILSOFT Q PMF conditioning agents

SPECIALTY FLUIDS - PERSONAL CARE



INCI Name: *Water (and) Silicone Quaternium-18 (and) Trideceth-6 (and) Trideceth-12*

Silsoft Q/Silsoft Q PMF conditioning agents are the same product with different preservation systems. The PMF version is produced without the use of parabens and MIT. [Throughout this document, all information applies to both products.](#)

Silsoft Q/Silsoft Q PMF conditioning agent is a non-yellowing, 20% active microemulsion of a patented quaternized silicone terpolymer ("silicone quat") that can help deliver a unique dry softness and volume to hair. Silsoft Q/Silsoft Q PMF conditioning agent's unique phase behavior with water relates to excellent lubricity in wet combing and unique softening performance benefits. They are very versatile candidates to consider for a broad range of hair care applications. Silsoft Q/Silsoft Q PMF conditioning agent also demonstrated unique sensory attributes in shower and bath products by modifying lather properties and providing a differentiated after-wash skin feel.

## Key Features and Typical Benefits

- Differentiated softness
- Superior conditioning during wet combing
- Increased volume
- Unique dry sensory
- Easy to formulate; capable of formulating into clear products
- No discoloration (yellowing) over time

## Potential Applications

Hair Care  
Skin Care  
Shampoo  
Shower Gel  
Developer Solution for Hair Dyeing  
Body Wash  
Ethnic Hair Care  
Soap Bar  
Pre-treatment to Hair Dyeing  
Shower Conditioner  
Conditioner (leave-in, rinse-off)

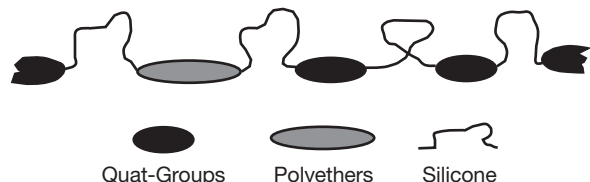
## Typical Physical Properties

Silicone Content, %	20
Appearance	Clear to slightly hazy
Viscosity at 25 °C, mPas	<1000
Emulsifier	Non-ionic
pH Range	6-10

Typical properties are average data and are not to be used as or to develop specifications.

## SILSOFT\* Q and SILSOFT Q PMF conditioning agent

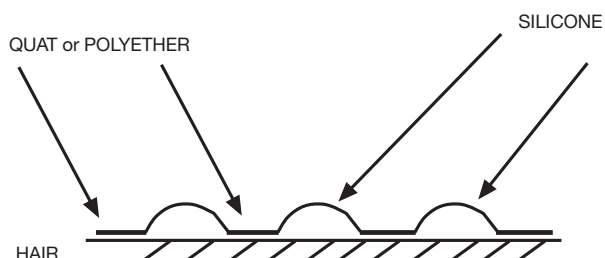
### Generic Structure of Silsoft Q/Silsoft Q PMF conditioning agent



#### ■ Block Copolymers

- Quat Density
- Polyether Blocks
- Polydimethylsiloxane Blocks
- Surface Affinity, Antistatic
- Hydrophilicity, Antistatic, Formulability
- Lubricity, Spreading

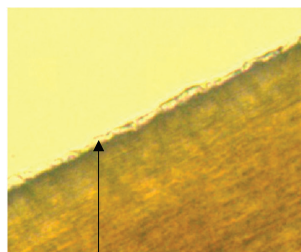
### Orientation of Linear Block Copolymers



Linear structures are favored for their sensory benefits. The cationic quaternary ammonium is substantive to keratinaceous substrates, such as hair, forming a soft, flexible film with no build-up. The silicone aligns itself along the hair shaft to help provide a smooth, healthy-looking shine and a dry, soft feel to hair.

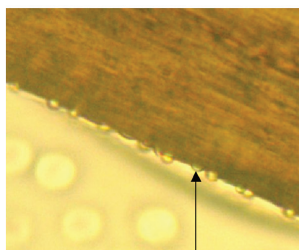
Its unique affinity with water allows the polymer to spread very well during rinse in contrast to silicone gum. This confers a very high lubricity in wet combing and unique softness feel, triggered by fingertip moisture.

#### Silicone Quaternium-18



**Silicone film forms a continuous coat**

#### Silicone Gum (dimethiconol/dimethicone)



**Gum droplets: Silicone film dewets the hair surface**

### Performance from a Conditioner Formulation

#### Wet Combing Performance

Reducing damage to the hair shaft during wet combing is important to maintain the appearance of smooth, healthy-looking hair that shines. The conditioning benefits of Silsoft Q/Silsoft Q PMF conditioning agent were evaluated by comparing the conditioning formulation containing Silsoft Q/Silsoft Q PMF conditioning agent at 1% active silicone content versus a commercial benchmark formulation. The Simple Conditioner control formulation contained no silicone.

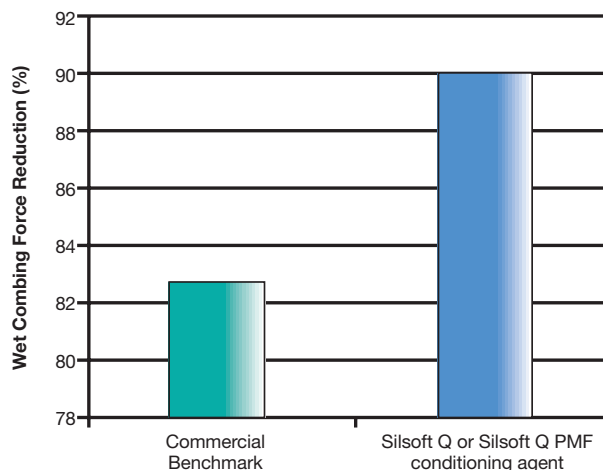
#### Simple Conditioner

	Weight %
Glyceryl stearate (and) cetareth-20 (and) cetareth-12 (and) cetaryl alcohol (and) cetyl palmitate	10%
Silsoft Q or Silsoft Q PMF conditioning agent	5%
Water	q.s. to 100%

#### Commercial Benchmark Conditioner

Water, Stearyl Alcohol, Cyclopentasiloxane, Cetyl Alcohol, Stearamidopropyl Dimethylamine, Panthethyl Ethyl Ether, Panthenol, Dimethicone, Glutamic Acid, Sodium Chloride, DMDM Hydantoin, Benzyl Alcohol, EDTA, Perfume.

### Wet Combing Force Reduction Analysis



Note: Test data. Actual results may vary.

Silsoft Q/Silsoft Q PMF conditioning agent significantly reduced the force required during wet combing in comparison to a commercial benchmark.

Product formulations are included as illustrative examples only. Momentive makes no representation or warranty of any kind with respect to any such formulations, including, without limitation, concerning the efficacy or safety of any product manufactured using such formulations.

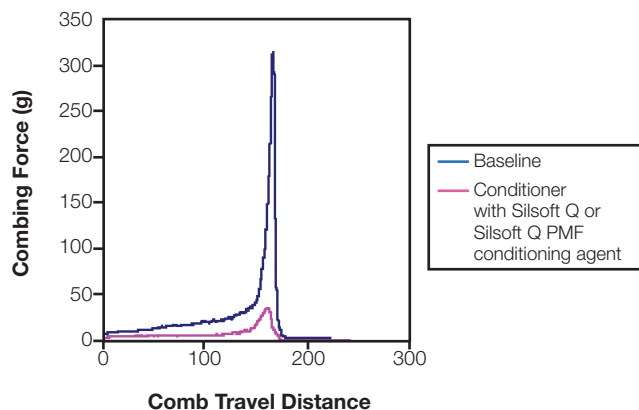
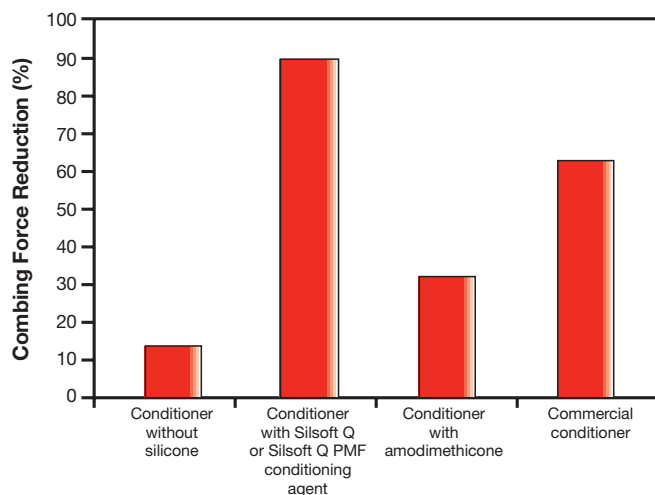
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## SILSOFT\* Q and SILSOFT Q PMF conditioning agent

### Performance from a Conditioner Formulation (continued)

#### Dry Combing Performance

Silsoft Q/Silsoft Q PMF conditioning agent was formulated into the conditioning base described above at 1.4% active and compared against amodimethicone. Dry combing force was determined using virgin Caucasian hair tresses with a Diastron apparatus in a humidity controlled chamber at 50% RH. Reduction of combing force was calculated with respect to the combing force of the baseline tresses washed with 10% SLES solution. Reduction of combing force was also compared to commercial benchmark conditioner. The Ultra peak force correlated with a remarkable soft feel at the hair tips.

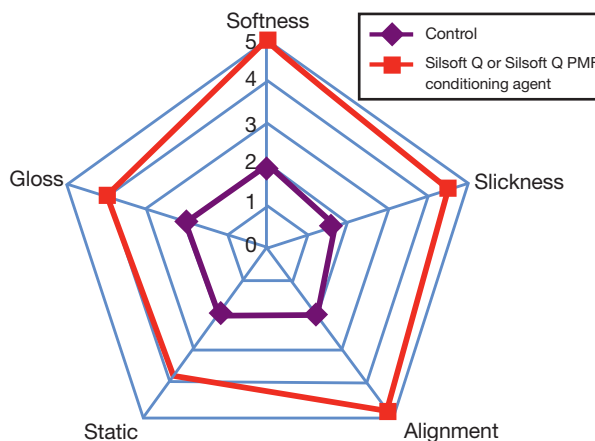


Note: Test data. Actual results may vary.

### Performance from a Shampoo Formulation

Silsoft Q/Silsoft Q PMF conditioning agent was also formulated into a conditioning shampoo at 1.0% active and compared against a set of control tresses treated with the same conditioning shampoo formulation, minus the silicone.

Conditioning Shampoo	%wt/wt
Water	q.s. to 100%
Sodium Lauryl Sulfate (29%)	10.0
Sodium Laureth Sulfate (25%)	20.0
Cocoamidopropyl Betaine (35%)	10.0
Silsoft Q or Silsoft Q PMF conditioning agent	5.0
Sodium Chloride	1.5
Hydrolyzed Wheat Protein (40%)	1.0
Glycerin	0.5
Phenolphthalein (10% in Ethanol)	0.25
Preservative	Per manufacturer's recommendation
Citric Acid	to pH 5.5-6.0



Silsoft Q/Silsoft Q PMF conditioning agent offered an ultra soft, light and natural feel to dry hair while also providing the performance benefits of increased gloss and alignment.

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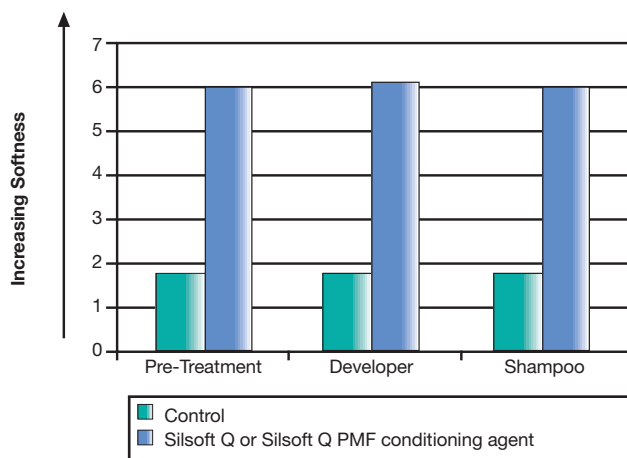
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## SILSOFT\* Q and SILSOFT Q PMF conditioning agent

### Performance from a Shampoo Formulation (continued)

#### Improved Dry Sensory

It was observed during a preliminary study that the hair tresses treated with Silsoft Q/Silsoft Q PMF conditioning agent were remarkably softer than the control tresses. A sensory panel evaluated the dried tresses from a study that evaluated the resulting softness through extreme delivery systems, such as hair coloring. Results were analyzed on a scale of 1 - 8, with 8 being the softest.



Note: Test data. Actual results may vary.

*Silsoft Q/Silsoft Q PMF conditioning agent delivered the softest dry feel regardless of treatment.*

#### Shower and Bath

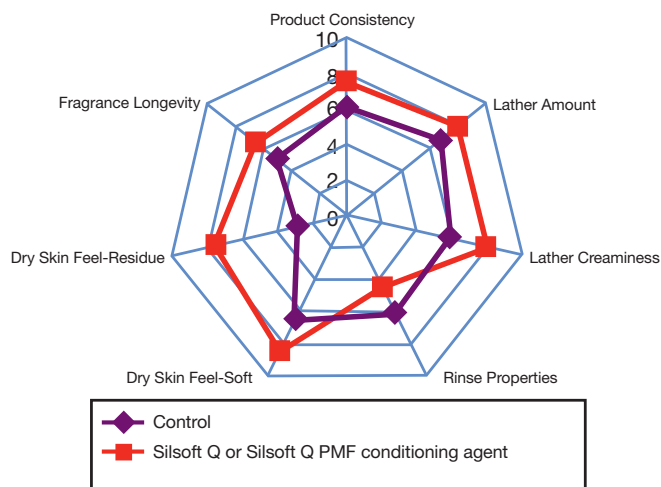
Since Silsoft Q/Silsoft Q PMF conditioning agent has a quaternary functional substitution, its positive charge is able to interact with surfaces that are negatively charged, such as skin and hair. This attribute establishes Silsoft Q/Silsoft Q PMF conditioning agent as an excellent candidate to consider for shower and bath products and it can improve the creaminess of lather and deliver a luxurious after-wash skin feel.

#### Shower Gel Sensory Panel

To discover the true sensory benefits of Silsoft Q/Silsoft Q PMF conditioning agent in shower & bath applications, our sensory panel participated in an at-home study utilizing a simple shower gel formulation. Silsoft Q/Silsoft Q PMF conditioning agent was added to the control Shower Gel at 1.0% active silicone.

Conditioning Shower Gel	wt/wt%
Sodium Laureth Sulfate (25%)	12.0
Cocoamidopropyl Betaine (35%)	3.0
Carbomer	1.0
Preservative	0.1
Sodium Hydroxide (10% solution)	to pH 6.5 - 7.0
Water	q.s. to 100%

#### Sensory Panel Results – Shower Gels and Moisturizing Body Washes



When used in a shower gel, Silsoft Q/Silsoft Q PMF conditioning agent can help deliver a profusion of lather with a creamier texture than the control, with a quicker rinse off. Silsoft Q/Silsoft Q PMF conditioning agent can also help provide a differentiated after-wash experience that leaves skin with a soft dry feel.

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## SILSOFT\* Q and SILSOFT Q PMF conditioning agent

### Sample Formulations

Silsoft Q/Silsoft Q PMF conditioning agent is a low viscosity 20% active silicone microemulsion that can easily be added to a formulation with low shear and at low temperature. Typical use levels for Silsoft Q/Silsoft Q PMF conditioning agent in both hair care and skin care is 2-5% as received.

#### Sample Color Protection Shampoo

A clear color-fast protection shampoo that utilizes Silsoft Q/Silsoft Q PMF conditioning agent to help reduce the loss of hair color and provide a silky, smooth appearance to the hair with a soft natural dry feel.

Ingredient	INCI Name	wt/wt%
Sodium Lauryl Sulfate (27%)		30.0
Cocoamidopropyl Betaine		10.0
Silsoft Q or Silsoft Q PMF conditioning agent	Water (and) Silicone Quaternium-18 (and) Trideceth-6 (and) Trideceth-12 <sup>(1)</sup>	2.5
Lauryl Glucoside		2.0
Water		q.s. to 100%
Sodium Chloride		0.35
Fragrance		As needed
Preservative		Per manufacturer's recommendations

#### Procedure:

1. Combine and mix raw materials in the order given, at room temperature until blended.

#### Sample Deep Conditioning for Dry, Damaged Hair

This rinse-off conditioner contains Silsoft Q/Silsoft Q PMF conditioning agent to help provide soft, smooth and silky feeling hair. Such a conditioner may be beneficial for damaged, chemically processed and hard to condition hair.

Ingredient	INCI Name	wt/wt%
<b>Part A</b>		
Glyceryl Stearate (and) Ceteareth-20 (and) Ceteareth-12 (and) Cetearyl Alcohol (and) Cetyl Palmitate		10.0
<b>Part B</b>		
Water		q.s. to 100%
Silsoft Q or Silsoft Q PMF conditioning agent	Water (and) Silicone Quaternium-18 (and) Trideceth-6 (and) Trideceth-12 <sup>(1)</sup>	5.0
<b>Part C</b>		
Preservative		Per manufacturer's recommendations

#### Procedure:

1. Heat Part A to 75°C
2. Combine Part B and heat to 75°C
3. Add Part B to Part A while stirring, homogenize
4. Cool mixture to 30°C, add Part C

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## SILSOFT\* Q and SILSOFT Q PMF conditioning agent

### Sample Formulations (continued)

#### Sample Creamy Lathering Soap Bars

The addition of Silsoft Q/Silsoft Q PMF conditioning agent to a soap base can help create a soap bar with the properties of a syndet bar by increasing the creaminess and amount of lather during washing and also providing a perception of enhanced deposition on dry skin.

Ingredient	INCI Name	wt/wt%
85:15 Tallow: Coconut Oil soap chips		90
Element14* PDMS 60 K	Dimethicone	5
Silsoft Q or Silsoft Q PMF conditioning agent	Water (and) Silicone Quaternium-18 (and) Trideceth-6 (and) Trideceth-12 <sup>(1)</sup>	2.5
Fragrance		Per manufacturer's recommendations
Water		q.s. 100%

#### Procedure:

1. Blend soap chips, Element14 PDMS 60 K, Silsoft Q/ Silsoft Q PMF conditioning agent, fragrance and water in a Hobart mixer until ingredients are well dispersed.
2. Extrude blended soap mixture through a screen and refining plate to mix and form small blended noodles (twice). Then pass through extruder and extrusion cone and die plates to form soap billets.
3. Cut billets into 4 inch pieces and stamp into 50g bars.

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