

# Conditioning POLYMERS

Next-generation conditioning polymer technology for hair.

In this multitasking world, personal care products must serve multiple functions. Lotions moisturize and provide sun protection; shampoos cleanse the scalp, condition the hair and protect it from damaging elements such as the sun and pollution. To increase a cosmetic's efficiency in delivering the desired benefits, formulators have to work with ingredients that allow for unique combinations, maximizing the effectiveness of each individual component in the final formulation. By listening to the needs of customers and consumers, Dow Personal Care, a business of The Dow Chemical Company and its consolidated subsidiaries, provides a comprehensive portfolio of ingredients for hair, skin and sun care. Dow Personal Care takes

customer success personally and, by listening, learns how to meet the needs of its customers today ... and as they change in the future. In today's competitive personal care market, there is an increasing need for superior, high quality, high performance ingredients for hair care products. As a global leader in the conditioning polymer market, Dow Personal Care is living up to its brand promise of leveraging its scientific innovation by introducing the first groundbreaking conditioning polymers in many decades.

## CONDITIONING POLYMERS

EcoSmooth Conditioning Polymers are a new family of conditioning polymers that have been designed to provide exceptional benefits and embody a fresh, new approach to providing

conditioning benefits in hair care products. Have you been looking for new ways to provide conditioning benefits in hair care products? As a non-cationic polymer, EcoSmooth Silk, the first product in this new family of polymers, represents a new tool in the formulator's toolbox and delivers an excellent balance of cost and performance benefits in formulations. EcoSmooth Silk provides personal care brand owners an alternative to silicone in shampoo formulations. EcoSmooth Silk is especially effective in formulations for use with Asian and European virgin (non-dyed) hair types and has been proven by an independent lab to match silicone in wet and dry combing, as well as improve hair strength, on damaged

hair. In independent laboratory testing, formulations based on EcoSmooth Silk were shown to provide minimized hair breakage and equivalent conditioning. Internal testing also showed reduced build-up and volume-down effects, and cost the same as formulations with silicone.

## CHEMISTRY: NOVEL CONDITIONER

EcoSmooth Silk Conditioning Polymers (INCI Name: Ethylene/Octene Copolymer (and) Ethylene/Sodium Acrylate Copolymer) consist of non-cationic ethane-1-copolymer (polyolefin) dispersed in water with an acrylic-based proprietary polymer dispersant. EcoSmooth Silk has a typical pH range of 9.5-10.5, as delivered, and its solids

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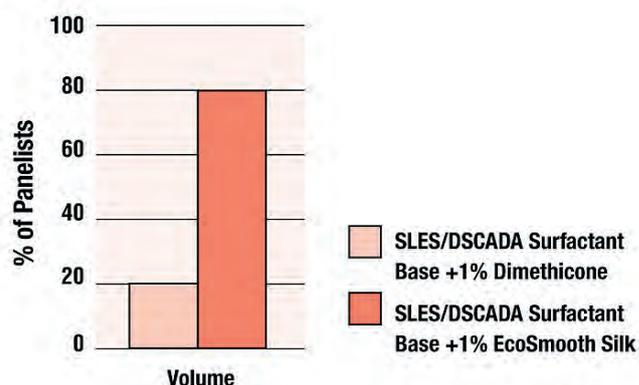
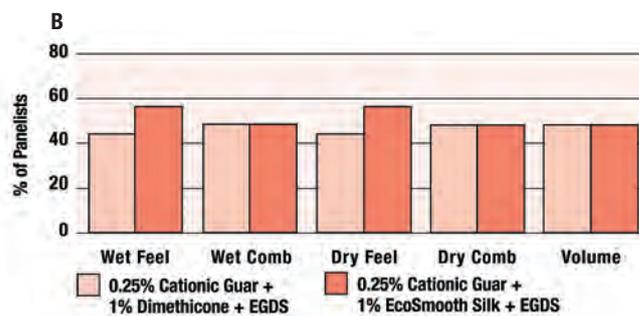
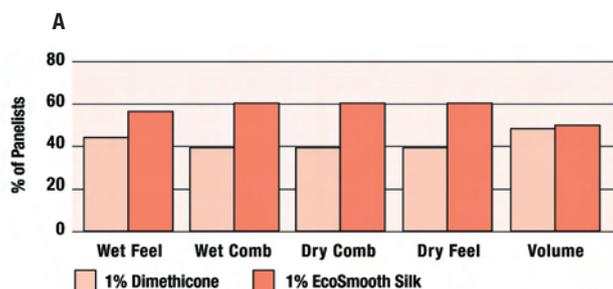


Figure 1: Volume testing after 10 washes.

EcoSmooth™  
re invent conditioning



**Figure 2:** Panel study test of EcoSmooth Silk versus silicone on Asian virgin hair (A: ammonium lauryl ether sulfate/ammonium lauryl sulfate/betaine/coco monoethanolamide [AL ALS/betaine/CMEA] with 0.25% cationic guar) and European damaged brown hair (B: sodium lauryl ether sulfate/disodium cocoamphodiacetate [SLES/DSCADA] with ethylene glycol distearate [EGDS] with 0.25% cationic guar).

content ranges between 40 and 44%. EcoSmooth Silk polymers do not use the traditional co-acervate mechanism associated with cationic conditioners. Because EcoSmooth Silk is not cationically charged, it is believed that hydrophobic forces, instead of ionic forces, bind it to the hair shaft and give hair a softer feel. EcoSmooth Silk contains a proprietary dispersion technology that is sulfate-free and ethylene oxide-free.

**PERFORMANCE: ACTIONS SPEAK LOUDER THAN WORDS**

**Improved volume:** In a series of comparative performance tests, formulations containing EcoSmooth Silk were shown to provide improved volume, suggesting less product build-up when compared with silicone-containing shampoos. In a build-up study comparing EcoSmooth Silk with dimethicone, hair treated with EcoSmooth Silk has significantly more volume after 10 washes (Figure 1). The volume-down build-up effects of silicone are well known. As build-up on hair is a common consumer concern, the performance benefits offered by EcoSmooth Silk represent a distinct advantage to formulators looking to address the issue of build-up as they develop new formulations.

**Equivalent to silicone conditioning performance:** When comparing EcoSmooth Silk and silicone, subjective test results indicate that their conditioning performance is the same, as is the cost. Panel

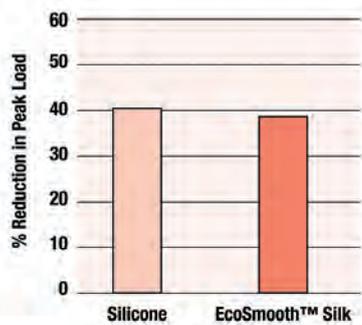
studies show that EcoSmooth Silk performs as well as silicone in two-in-one shampoos for Asian virgin hair, 8-hour bleached hair and on European brown hair (Figure 2). In tests conducted by an independent laboratory evaluating wet comb and dry hair breakage on bleached hair, it was found that the performance of EcoSmooth Silk was equivalent to dimethicone. When comparing the wet comb force reduction and reduction in hair breakage provided by both the conditioning polymer and silicone on bleached European brown hair, results indicate that in wet comb testing, the polymer reduced the peak load by 39% compared with silicone's 41% reduction (Figure 3). Regarding hair breakage, the polymer reduced the number of broken hair fibres by 59%, compared with silicone's 51% (Figure 4).

**Environmental health and safety:** Reflecting on The Dow Chemical Company's 2015 Sustainability Goals, EcoSmooth Silk is considered to be non-toxic by single oral and dermal exposure, slightly irritating to the skin and eyes (that is, not classified as an irritant in EEC) and not a sensitizer. The polymer is considered to be safe and appropriate for use in a broad range of rinse-

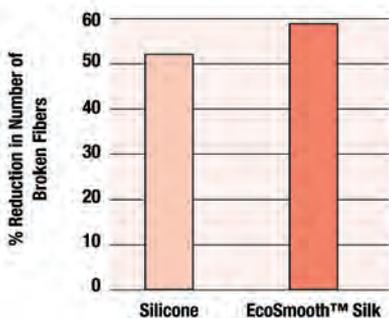




*EcoSmooth Silk provides personal care brand owners an alternative to silicone in Shampoo formulations.*



**Figure 3:** Wet comb testing of EcoSmooth Silk versus silicone on bleached European brown hair (15.5 SLES/3.5 DSCADA/0.25% cationic guar/EGDS/1% EcoSmooth Silk or silicone).



**Figure 4:** Repeated grooming of EcoSmooth Silk versus silicone on bleached European brown hair (15.5 SLES/3.5 DSCADA/0.25% cationic guar/EGDS/1% EcoSmooth Silk or silicone).

off personal care applications. EcoSmooth Silk is one example of how Dow Personal Care is delivering on its commitment to use resources more efficiently, provide value to customers and stakeholders, deliver solutions for customer needs and enhance the quality of life of current and future generations. Dow Personal Care is dedicated to providing solutions based on sustainable chemistry and is able to leverage the technologies and capabilities of the company to develop and refine solutions. As a result, our technologies enable our customers — and their customers — to develop more sustainable products and services, which is good for business and good for the world.

**MEETING TOMORROW'S CUSTOMER NEEDS TODAY**

In summary, the new innovative EcoSmooth Silk Conditioning Polymers from Dow Personal Care provide multiple benefits and excellent value to formulators in the hair care

market. In the same way that collaboration spurred the innovation of EcoSmooth Silk Conditioning Polymers, Dow Personal Care continues to integrate valuable, effective and cost-efficient hair care options and solutions. EcoSmooth Satin, an alternative to cationic guar in clear shampoo for mild conditioning, is the next product in the EcoSmooth Conditioning Polymers portfolio and is expected to be launched in May 2011. PHM

**FOR MORE INFORMATION**

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