Meet the need for longer-lasting hair care and protection

Repeated washing, combing and heat styling; bleaching and coloring; air pollution; and the sun’s UV rays all conspire to damage the hair.

Damaged hair is frizzy ... dry and dull ... split and broken. It's also difficult to comb and style. No wonder there’s a consistent need for hair care products that offer promise for long-lasting care and protection.

**Restore hair’s hydrophobic state**
Many of today’s hair repair solutions target damaged sites on the hair cuticle. However, selected Dow Corning® brand silicones not only restore hair’s hydrophobic state, but they also provide long-lasting conditioning and protect the entire shaft from hair breakage.

Forming a homogeneous silicone film that mimics the hydrophobic lipid layer on the cuticle of virgin hair, these silicones remain on the hair for long-lasting performance. Just as importantly, when used with a clarifying shampoo, they do not create buildup on the hair, even after repeated use.
Test results attest to the effectiveness of Dow Corning silicones

Specifically designed care testing protocols were developed to assess different silicone technologies to determine which were most effective in delivering:
- A combination of hair restoration and protection through homogeneous coverage – not only of damaged sites on the hair, but also of the undamaged areas.
- Hydrophobicity and conditioning benefits that last through multiple washes.
- The potential to protect against many kinds of hair damage and to limit further damage.

The power to restore hair’s hydrophobic state
Healthy hair is naturally hydrophobic. Using a combination of absorption and sink testing, Dow Corning has demonstrated the ability of specific Dow Corning silicones to restore damaged hair’s hydrophobic state.

The ability to achieve more durable hair hydrophobicity
Water contact angle is an excellent indicator of hydrophobicity. The greater the contact angle, the more hydrophobic the substrate. In testing, damaged hair treated with Dow Corning silicones retained a greater degree of hydrophobicity over multiple washes than the control and commercial benchmarks. Similar benefits were observed when testing at 0.5% and 1% silicone active levels in rinse-off conditioner.

Procedure: Measurements of contact angle were taken between a water drop and the surface of bleached hair tresses treated with rinse-off conditioner containing 2% silicone active versus the surface of tresses treated with a control conditioner (no silicone) and with two commercial benchmarks. The measurements were repeated after 6, 10 and 15 washes with diluted surfactant solution.

Results: Tresses treated with Dow Corning silicones demonstrated durable hair hydrophobicity compared to tresses treated with the control or with the commercial benchmarks; additionally, this benefit was maintained up to 15 washes.

Figure 1. Water absorption test

Procedure: Water droplets were deposited on damaged hair tresses, and the time required for the water to be absorbed was measured.

Results: Tress treated with Dow Corning® CE-7081 Smart Style demonstrated a much higher degree of hydrophobicity as evidenced by the longer time required for absorption.

Figure 2. Hair sink test

Procedure: Portions of hair tresses were released in beakers of water, and the hair’s behavior was observed.

Results: Damaged hair treated with the dilution of Dow Corning® CE-7081 Smart Style remained on top of the water, demonstrating hydrophobicity.

Figure 3. Contact angle on hair treated with rinse-off conditioners containing 2% silicone active

Results: Tresses treated with Dow Corning silicones demonstrated durable hair hydrophobicity compared to tresses treated with the control or with the commercial benchmarks; additionally, this benefit was maintained up to 15 washes.
### The benefit of long-lasting conditioning

Efficient conditioning reduces combing forces and can help reduce hair breakage over time.

**Figure 4. Wet and dry combing forces on bleached hair**

<table>
<thead>
<tr>
<th>Conditioner Type</th>
<th>Wet Combing Force</th>
<th>Dry Combining Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dow Corning® 8500 Conditioning Agent</td>
<td>0.10</td>
<td>0.30</td>
</tr>
<tr>
<td>Dow Corning® Emulsion</td>
<td>0.30</td>
<td>0.60</td>
</tr>
<tr>
<td>Control rinse-off conditioner (no silicone)</td>
<td>0.40</td>
<td>0.70</td>
</tr>
<tr>
<td>Dow Corning® 8500 Conditioning Agent</td>
<td>0.50</td>
<td>0.80</td>
</tr>
<tr>
<td>Dow Corning® Emulsion</td>
<td>0.60</td>
<td>0.90</td>
</tr>
<tr>
<td>Control rinse-off conditioner (no silicone)</td>
<td>0.70</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Statistical significance: ***≥99.9%, **≥99%, *≥95%* 

### Protection against breakage

Anti-breakage is one of the most popular claims made for damage care products. The film formed by silicone on the hair can prevent damage caused by everyday grooming – thus significantly reducing hair breakage.

**Figure 5. Repeated combing test**

<table>
<thead>
<tr>
<th>Conditioner Type</th>
<th>% Reduction in Broken Hair vs. Control (no Silicone)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dow Corning® 969 Emulsion</td>
<td>-79%</td>
</tr>
<tr>
<td>Dow Corning® 8500 Conditioning Agent</td>
<td>-83%</td>
</tr>
<tr>
<td>Dow Corning® CE-7081 Smart Style</td>
<td>-43%</td>
</tr>
</tbody>
</table>

**Procedure:** Tresses of bleached hair were treated with rinse-off conditioner containing 2% silicone active versus tresses treated with a control rinse-off conditioner (no silicone). Combing forces were measured using a Dia-Stron automated combing instrument; measurements were repeated after 15 washes with diluted surfactant solution.

**Results:** Rinse-off conditioner containing *Dow Corning* silicones significantly reduced both wet and dry combing forces compared to the control; additionally, the dry combing force reduction benefit persisted after 15 washes.

### Homogeneous silicone coverage

Silicone deposition is a key element of hair protection. *Dow Corning* silicones offer damage care and protection by depositing homogeneously – from the root of the hair to the tip.

**Figure 6. Fourier transform infrared spectroscopy (FT-IR) analysis of silicone distribution and quantification**

Chemical distribution of Si-C band (1,258 cm⁻¹) for the root, middle and tip regions of bleached hair.

**Procedure:** Bleached hair tresses were treated with rinse-off conditioner containing 2% silicone active and with a control rinse-off conditioner (no silicone). Treated tresses were subjected to 10,000 comb strokes at a speed of 80 strokes/minute; the broken hairs were weighed, and percent reduction in broken hair (versus the control) was calculated.

**Results:** Tresses treated with rinse-off conditioner containing *Dow Corning* silicones displayed significantly less breakage than the tress treated with the control.
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我们正在创造差异化特种硅基解决方案，帮助保持头发在最自然、最美丽的状态，并且为延长时期的损伤擦拭伤疤。有关产品数据表和Dow Corning®硅基产品所提供的样品，请访问dowcorning.com/DamagedHairCare。

**Product** | **INCI Name** | **Additional Benefits**
---|---|---
*Dow Corning® CE-7081 Smart Style* | Silicone Quaternium-16/Glycidoxy Dimethicone Crosspolymer (and) Undeceth-11 (and) Undeceth-5 | - Wet and dry combing
- Friction reduction
- Improve sensory performance (smoothness, friction and glide)
- Flexible hold
- Curl definition and retention
- Frizz control
- Long-lasting color protection

*Dow Corning® 969 Emulsion* | Amodimethicone (and) Cetrimonium Chloride (and) Trideceth-3 (and) Trideceth-15 | - Wet and dry combing
- Heat protection
- Ease of styling
- Long-lasting styling
- Fast drying

*Dow Corning® 8500 Conditioning Agent* | Bis (C13-15 Alkoxy) PG Amodimethicone | - Wet and dry combing
- Volume
- Color protection
- Enriched foam lather
- Improve sensory performance (glide, combing, friction and smoothness)
- Fly-away reduction
- Heat protection
- Shine
- Enable clear formulations

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