

Liquid Starch Conditioner for Hair & Skin Care

Technical Bulletin

Amylomer™ Care Fusion – Synergistic Care

Product description

Dual-polymer technology that combines targeted care for damaged areas with balanced conditioning from root to tip

The low-molecular-weight, highly cationic polymer selectively deposits on small, deeply damaged areas of the hair, while the high-molecular-weight polymer with a lower charge density smooths the hair surface and provides a pleasant feel. The combination of both polymers has been shown to perform significantly better than either component used individually.

Amylomer™ Care Fusion improves detangling, significantly enhances combability, and evenly smooths the hair surface from root to ends. It noticeably reduces hair roughness during and after washing, leaving the hair pleasantly soft, smooth and supple.

INCI

Aqua, **Hydroxypropyl Oxidized Starch PG-Trimonium Chloride**, **Starch Hydroxypropyl Trimonium Chloride**, Sodium Lactate, Sodium Chloride, Urea, Lactic Acid, Glycerin, Levulinic Acid, p-Anisic Acid.

Chemical and physical properties

Appearance	Colourless and slightly hazy
Molecular weight of polymer 1:	~ 260 kDa
Molecular weight of polymer 2:	~1,300 kDa
Cationic D.S. of polymer 1:	~ 0.4
Cationic D.S. of polymer 2:	~ 0.2
Dry content	32% ± 2.0%
Active content	20.5–24.5%
Gardner colour	< 2
Viscosity at 20°C, Brookfield	100–1,000 mPa·s
pH value, DIN 19268	~4.3–6.0

Environmental

Inherently biodegradable according to OECD 302
Low aquatic toxicity
Natural Index according to ISO 16128: 90.40%
Short, transparent supply chain
Non-critical raw material sources
Locally grown, harvested, and produced in Germany

Intended use

Suitable for a wide range of surfactant-based rinse-off and leave-on applications, delivering outstanding conditioning performance.

Amylomer™ Care Fusion enhances overall care performance and helps smooth and balance the hair structure across different hair types and levels of damage, while maintaining a lightweight feel on the hair.

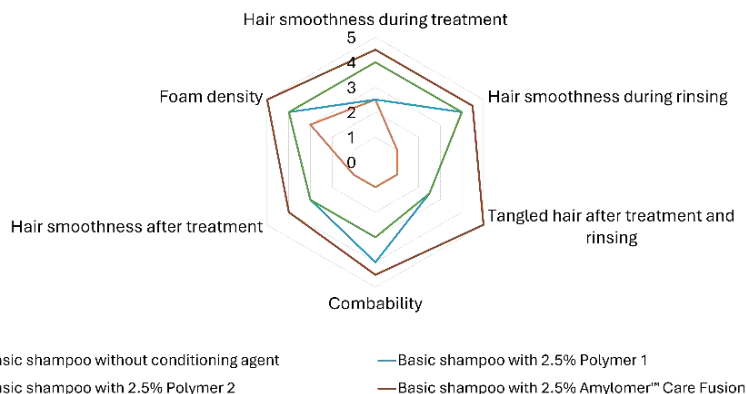
Test results – sensory evaluation and foam test

The following graph shows the sensory profiles of the individual polymers (1 and 2), as well as Amylomer™ Care Fusion incorporated into a basic shampoo formulation, compared with the control (basic shampoo without conditioning agents).

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Sensory evaluation

Comparison of **basic shampoo with polymer 1, polymer 2 and Amylomer™ Care Fusion** (2.5% as product) vs. **control** (without conditioning agent) on bleached hair.



Experienced master hairdressers conducted the evaluation by subjecting pre-moistened, standardized European bleached hair strands to repeated cycles of synchronized shampooing. (left vs. right)

One gram of shampoo was lathered with water on the hair tresses for one minute and rinsed out under standardised conditions. During and after the procedure, the evaluators rated the sensory parameters on a scale of 1 (very poor) to 5 (very good).

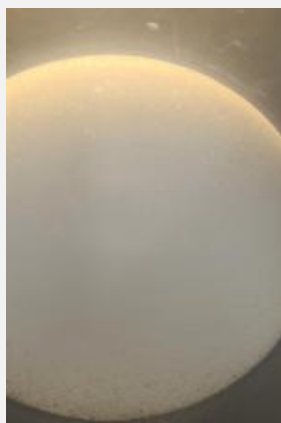
Hair treated with Amylomer™ Care Fusion exhibits clearly improved smoothness and softness, both during and after treatment, compared with the individual polymers and the control formulation. Similar benefits are observed for wet combability: hair treated with Amylomer™ Care Fusion appears considerably less tangled and shows fewer knots.

In addition, the test formulation demonstrates improved foam properties.

A second objective foam test confirmed the results of the sensory evaluation.



Basic shampoo without conditioning agent (control).



Basic shampoo with 2.5 % Amylomer™ Care Fusion

The images show the effect of Amylomer™ Care Fusion on foam quality when used in a surfactant system. In this objective test, we compared:

- a 1% solution of the basic shampoo without a conditioning agent with
- a 1% solution of the basic shampoo with 2.5% Amylomer™ Care Fusion.

The solutions were mixed with a stirrer for 10 seconds. The images were taken immediately after flash foaming.

While the surfactant system without a conditioning agent formed a relatively coarse foam with large bubbles, the formulation containing Amylomer™ Care Fusion produced a creamier and denser foam.

Test results – Deposition test and combing force measurement

The following images and graphs demonstrate the synergistic performance of Amylomer™ Care Fusion compared to its individual polymer components, based on deposition testing and combing force measurements.

Deposition test

Pre-damaged (bleached) hair tresses were washed under standardised conditions with a basic shampoo containing either no conditioning agent or 2.5% of the respective conditioning agent. After washing, the tresses were immersed in a 1% anionic dye solution for 1 minute, rinsed with water and air-dried. The intensity and distribution of the colour indicate the amount and distribution of the conditioning polymer deposited onto the hair surface.

The results clearly demonstrate the benefit of combining two differently structured cationic polymers:

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Amylomer™ Care Fusion provides effective and well-balanced deposition along the hair fibre, supporting targeted conditioning of damaged areas while improving overall hair care performance.



- 1: Untreated hair
- 2: Hair treated with basic shampoo
- 3: Hair treated with basic shampoo containing 2.5% polymer 1
- 4: Hair treated with basic shampoo containing 2.5% polymer 2
- 5: Hair treated with basic shampoo containing 2.5% Amylomer™ Care Fusion

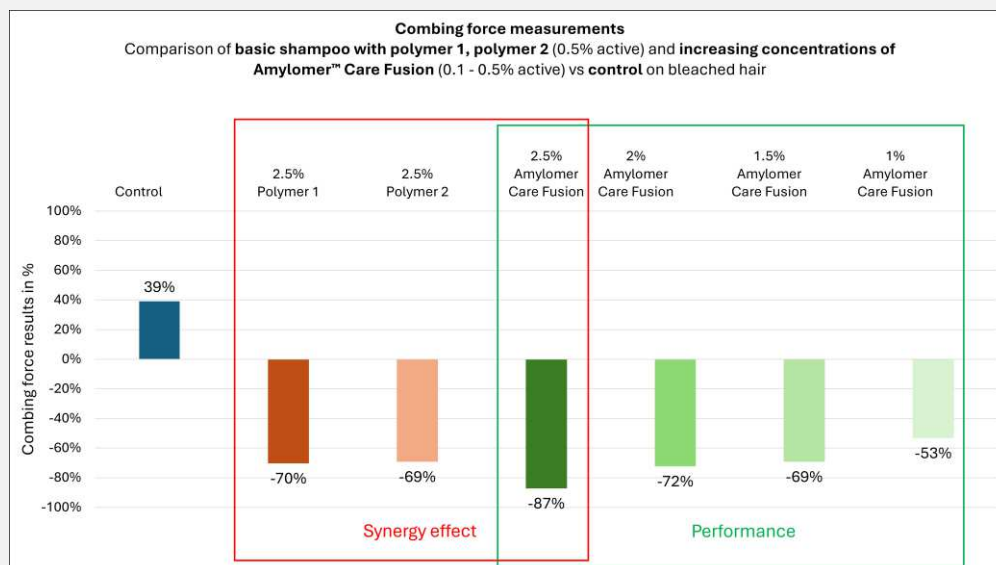
➔ The synergistic polymer complex of Amylomer™ Care Fusion targets different levels of hair damage, providing optimal conditioning from root to tip.

Combing force measurement

Combing force measurements on the same pre-damaged hair tresses further demonstrate the synergistic performance of the polymer combination. The following graph presents the results:

- the individual polymers incorporated into the basic shampoo formulation (synergy effect); and
- increasing concentrations of Amylomer™ Care Fusion (performance).

The results are expressed as percentages of the measured reductions in combing force.



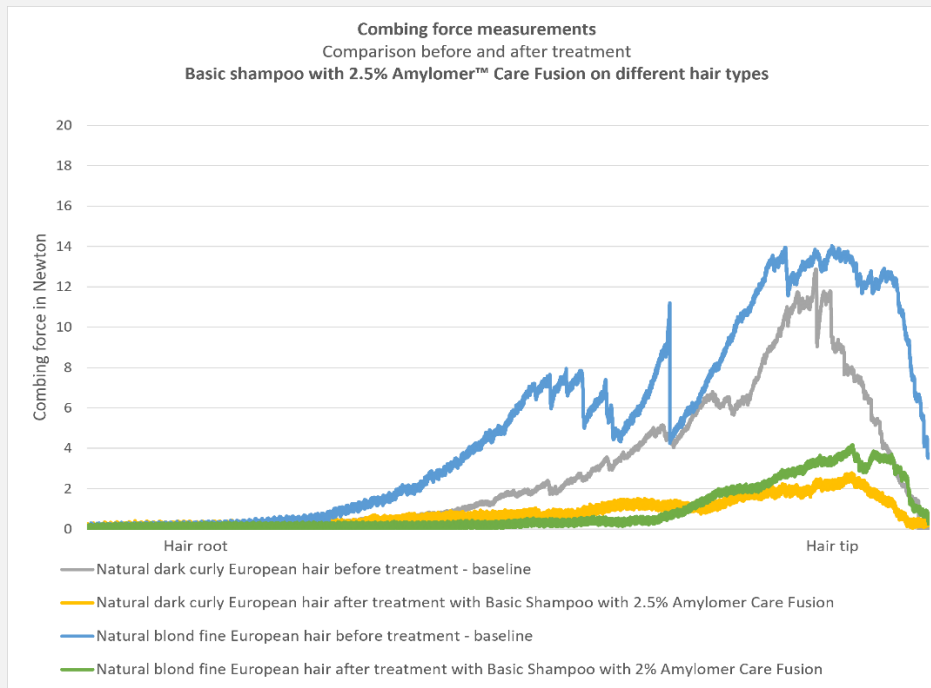
At the same use concentration, the individual polymers (1 and 2) provide a smaller reduction in combing force than the polymer combination in Amylomer™ Care Fusion. Furthermore, a clear concentration-dependent improvement in performance is observed when the use level of Amylomer™ Care Fusion is increased. In addition to testing on chemically damaged natural hair, Amylomer™ Care Fusion was also evaluated on different types of chemically untreated hair.

For these tests, the standard combing force method was modified by using a wide-tooth comb. This setup better simulates the detangling process after washing and allows the conditioning performance to be evaluated under more realistic conditions.

The following graph shows the combing force results of 2.5% Amylomer™ Care Fusion on two different types of European, chemically untreated hair: fine, blond hair and thick, curly hair.

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The results demonstrate that Amylomer™ Care Fusion provides effective conditioning across different hair types and damage levels, whether the hair is chemically damaged or exposed to the stresses of daily styling.



Before treatment with the test products, both fine, straight hair and thick, curly hair show high and strongly increasing combing forces, reflecting the pronounced tangling of uncombed hair after washing.

In contrast, after treatment with Amylomer™ Care Fusion, both hair types show a clearly smoother combing force profile with consistently low force values. These results demonstrate the effective conditioning performance of Amylomer™ Care Fusion: it improves hair smoothness and clearly facilitates detangling.

Advantages

- Balanced hair care from root to tip
- Improved detangling effect with significantly easier combing
- Lightweight, reversible film formation
- Suitable for different hair types and degrees of damage
- Improved sensory and foam properties in surfactant-based formulations
- Versatile and easy to dose
- Good balance of dosage, performance, and price
- No build-up effect

Application

Amylomer™ Care Fusion is recommended as a conditioning agent in leave-on and rinse-off hair and body care applications:

- Shampoos
- Conditioners
- Body washes and shower gels
- Liquid soaps
- Sprays

Formulation tips

- Amylomer™ Care Fusion is a liquid conditioning agent, making it easy to use.
- It can be easily added to the aqueous phase at any stage of production, regardless of temperature.
- Compatible with ethanol concentrations up to 50%
- Good compatibility across a wide pH range; ideal pH: 3–8
- May cause slight cloudiness in strongly anionic surfactant systems
- Higher total WAS levels are preferable (ideally >15%)
- Adding 2–3% co-surfactants improves clarity
- The product contains electrolytes. A careful selection of ingredients is recommended.

Suggested concentration

1.0–3.0% Amylomer™ Care Fusion

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Guideline formulation – 2-in-1 conditioning shampoo for damaged hair

26-001-R1-06

PHASE	TRADE NAME	INCI NAME	SUPPLIER	% W/W
A	Water	Aqua	-	62.30
A	Texapon® N 70	Sodium Laureth Sulfate	BTC	14.00
A	Potassium Sorbate	Potassium Sorbate	Robert E.M. Tilge	0.20
A	Dehyton® K	Cocamidopropyl Betaine	BTC	14.00
B	Lanette® 16	Cetyl Alcohol	BTC	1.00
B	Tegin® G 1100 Pellets	Glycol Distearate	Evonik	1.50
B	Citropol® H	Polycitronellol	Connect Chemicals	0.50
	Amylomer™ Care Fusion	Hydroxypropyl Oxidized Starch PG-Trimonium Chloride, Starch Hydroxypropyltrimonium Chloride	Gräfe Chemie	2.00
C	Dermosoft® OMP	Methylpropanediol; Caprylyl Glycol; Phenylpropanol	Evonik	4.00
D	Sodium Chloride (10% sol.)	Sodium Chloride	-	0.50

Manufacturing procedure

1. Mix phase A in the order listed and heat to 60°C.
2. Melt the phase B ingredients at approximately 70°C and add them to phase A using high-shear mixing.
3. Cool to approximately 40°C under low-shear mixing and add the phase C ingredients.
4. Add phase D and adjust pH if necessary.

Packing and storage

Store at 5 - 25°C in the original sealed container.

Amylomer™ Care Fusion is available in 22 kg pails, 210 kg drums, and 1.100 kg IBCs.

Specification values

Appearance: white, creamy shampoo

pH: 5.2 – 5.4

Viscosity: ~16,000 mPa·s

Stability: proven (3 months at 20°C, 40°C, and 4°C)

Microbiological stability: proven

Hazardous goods classification

The safety and technical data sheets provide information on:

- classification and labelling requirements for the transport of chemicals,
- protective measures for storage and handling,
- actions in the event of accidents or fire, and
- ecotoxicology and biodegradability.

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