

TILAMAR® *Quat* 2240

Deep conditioning with weightless
feel for clear shampoos



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dsm-firmenich 

TILAMAR® *Quat* 2240

Deep conditioning with weightless feel for clear shampoos

- Product Specifications and Uniqueness
- Performances
- Formulation properties
- Application & Formulation Concepts

TILAMAR® Quat 2240

INCI:	Polyquaternium-22
CAS Number:	53694-17-0
Chemical Name:	Acrylic acid / Diallyl dimethyl ammonium chloride copolymer

Key benefits:

- Deep conditioning based on superior sensorial attributes
- Weightless feel and look due to easy removability without build-up
- Clear to formulate in shampoos with low pH of 4,9

TILAMAR® Quat 2240

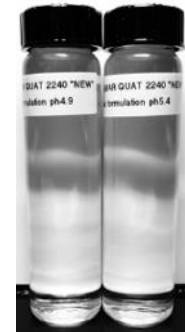
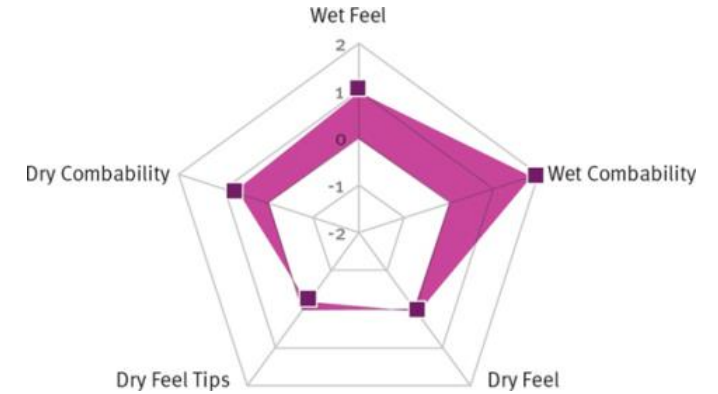
Unique Selling Points

- **General qualifiers**

- Good feel and combability at wet and dry hair including tips
- Broad usage in various products such as **colorants, relaxers, hair treatments and shampoos**
- Very broad stability at pH ranges from 2-14

- **Differentiators**

- Significant better **wet** performances than benchmark
- **Clear and transparent shampoo** formulations at relevant pH
- Excellent wash out and no build-up



Crystal Clear Shampoo
with TILAMAR® Quat 2240

TILAMAR® Quat 2240

Specifications

External Characteristics

Appearance	clear to hazy, viscous liquid
Color	white to off-white
Shelf life	18 Months

Composition

Total solids	39.0% – 43.0% m/m
Preservative	Sodium benzoate
Residual Monomer: Diallyl dimethyl ammonium chloride	max 3.5 %
Acrylic Acid	max 100 ppm
Heavy metals	max 10 ppm
Arsenic	max 1 ppm
Lead	max 1 ppm

Chemical-physical properties

pH	4.0 – 6.0
Molecular Weight	1.0 – 1.7 x10 ⁵ Da
Viscosity	1.000 – 10.000 mPa.s



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Benchmark Comparison

Specifications comparison with 'best in class' benchmark

TILAMAR® Quat 2240 is **paraben-free** and **easy to handle** thanks to a **low molecular weight** and a **low viscosity**.

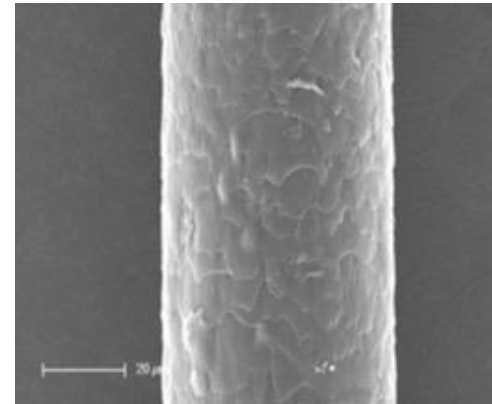
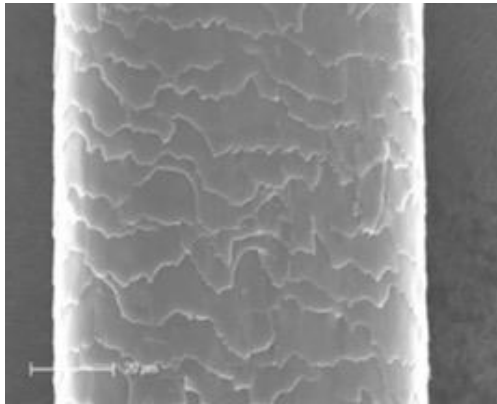
Features	TILAMAR® Quat 2240	Benchmark 1
Color	Clear to hazy, white to off white, viscous liquid	Clear to slightly hazy, white to off-white, viscous liquid
Total Solids	39 – 43 %	39 – 43 %
pH	4.0 -6.0	4.2 – 5.3
Molar ratio DADMAC: Acrylic acid (mol/mol)	65 : 35	65 : 35
Viscosity (spindle 4 @ 60 rpm)	1.000 – 10.000	3.000 – 6.000
M _w (Daltons)	1.0 –1.7 x 10 ⁵	4.5 x 10 ⁵
Preservatives	Paraben-free	Methyl-, Propyl Paraben

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Performance

Excellent wash out and no build-up (no accumulation on hair)

- Assessment by Scanning Electron Microscopy (SEM) for the deposition and wash out properties on hair.
- SEM pictures show an excellent wash out performance of TILAMAR® Quat 2240, which does not lead to any build-up effects and is even better than used benchmark.



Procedure: hair switches were dipped into a water solution of 1% TILAMAR® Quat 2240 and respectively 1% of the benchmark polymer for 10 minutes. Then the switches were pulled and washed with warm water for 90s.

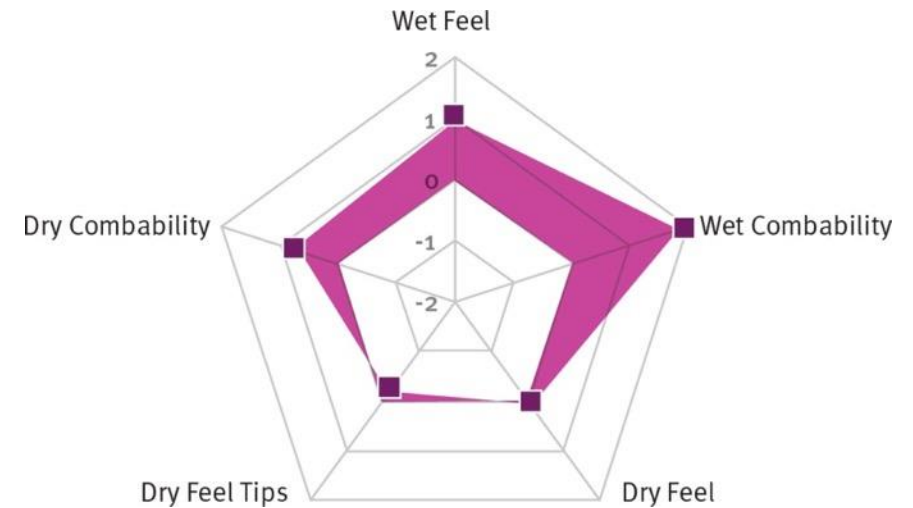
SEM pictures: left: TILAMAR® Quat 2240; right: benchmark 1

TILAMAR® Quat 2240

Performance

Better Combability and Feel than benchmark

- Excellent wet and dry combability in sensory assessment.
- Ahead of benchmark in particular at **wet combability**.



Procedure: 2-times bleached Caucasian hair (Kerling) was used at 2g per hair switch. Switches are pre-washed with standard shampoo (10% SLES) and dried for 24 hours at 20°C/65% rel. humidity. Afterwards each switch was washed two times with 0.25 ml test shampoo/g hair (30s foaming/90s rinsing). Test shampoos had the same base formulation and contain 1% of polymer solution, which means 0.4% TILAMAR® Quat 2240 and 0.4% benchmark 1.

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Formulation: Ideal for crystal clear shampoo

TILAMAR® Quat 2240 provides crystal clear shampoo at relevant pH



Crystal Clear Shampoo with
TILAMAR® Quat 2240

Crystal Clear Shampoo with
TILAMAR® Quat 2240 at pH 4.9 and 5.4



Hazy Shampoo with
benchmark

Hazy Shampoo with benchmark 1 at pH
4.9 and 5.4

TILAMAR® Quat 2240

Formulation Stability

Excellent formulation stability

- ✓ Solubility (in formulation) better than benchmark
- ✓ Easy to handle thanks to its low viscosity
- ✓ Very broad pH compatibility from about 2 to 14
- ✓ No discoloration at standard formulations
- ✓ No odor development
- ✓ Viscosity remains stable
- ✓ Compatibility with other ingredients

TILAMAR® Quat 2240 is stable at all tested criteria and at least as good as 'best in class' benchmarks.

Procedure: Stability data were assessed in standardized shampoos over 3 month at 5°C, RT and 43°C with 1% and 3% of respective polymer. As comparison 'best in class' benchmarks were used.

TILAMAR® *Quat* 2240

Recommendations

Formulation features and recommendations:

- TILAMAR® *Quat* 2240 is a water-soluble polymer that can easily be formulated without restrictions.
- TILAMAR® *Quat* 2240 is
 - effective over a wide pH range of 2 – 14
 - suitable for hot and cold processes.
- TILAMAR® *Quat* 2240 has the ability to build up viscosity in shampoo formulation.
- TILAMAR® *Quat* 2240 gives clear formulation in shampoos (pH 4.9 and higher).
- The suggested starting concentrations are 1% in shampoo and conditioner and 3% in other formulations.
- In skin or body care formulations such as soaps the suggested starting concentration is 1.5%.

TILAMAR® Quat 2240

Applications

Application and Benefits for Hair Care Products

Shampoos, conditioners, hair treatments, colorants and styling products and permanent waves.

- Provides silky feel, luster and softness
- Confers excellent wet and dry combability
- Compatible with most anionic and amphoteric surfactants
- Delivers superior conditioning properties under wide range of pH
- Does not negatively affect the mechanism of hair coloring
- Helps to hold curl without curling

Application and Benefits for Skin Care Products

Bar soaps, shower products, face and body care products (moisturizing lotions, shaving products, antiperspirants and deodorants)

- Contributes excellent moisturizing properties
- Imparts a smooth, velvety feel, reduce tightness after drying skin
- Provides lubricity and could improve easier application of skin care products
- Enhances stability and foam formation when added to liquid cleansing products

Concept formulations ColorLock Shampoo

- Keeps fresh & vibrant color
- Provides silky feel, luster and softness
- Rich & nourishing texture
- Sulfate-free

Phase	Ingredients	% w/w
A	AQUA	ad 100
	ACRYLATES/BEHENETH-25 METHACRYLATE COPOLYMER	4.00
	AQUA, SODIUM HYDROXIDE	0.18
	COCAMIDOPROPYL BETAINE, AQUA, SODIUM CHLORIDE	16.00
B	PERFUME	q.s.
	PARSOL® SLX	0.25
	Phytantriol	0.10
	SODIUM LAUROYL SARCOSINATE, SODIUM LAURYL SULFOACETATE, AQUA	26.00
C	AQUA	5.00
	TILAMAR® Quat 2240	1.00
D	AQUA	5.00
	PRESERVATIVE	q.s.
	TILAMAR® OP 40	1.00
E	CITRIC ACID, AQUA	0.47

Concept formulations

Rescue Calm Shampoo

- Crystal clear formulation
- Excellent detangling properties on wet hair
- Provides silky feel and softness
- For dry and itchy scalp

Phase	Ingredients	% w/w
A	WATER DEM.	ad 100
	TILAMAR® Quat 2240	1.5
B	PERFUME	q.s.
	PARSOL® Guard	0.1
	SODIUM LAURETH SULFATE	27
C	SODIUM COCOAMPHOACETATE	8
D	SODIUM BENZOATE	0.5
E	PENTAVITIN®	1
F	CITRIC ACID	0.5
G	CI 42090	0.2
H	SODIUM CHLORIDE	2



TILAMAR® *Quat* 2240

offers formulations that are clear, even at a low pH. This makes it particularly suitable for shampoos designed to deliver tangible and visible benefits.

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