

TILAMAR® *Quat 640*

Ultimate conditioning
with weightless feel



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dsm-firmenich 

TILAMAR® Quat 640

Product Overview

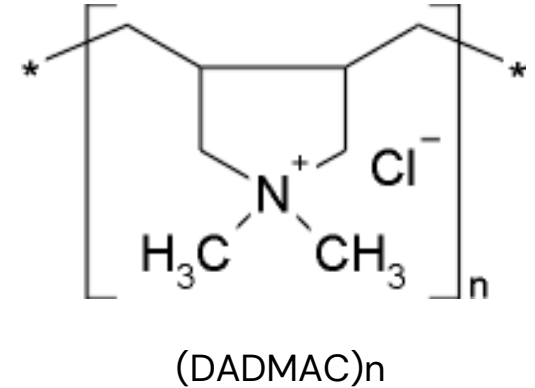
INCI:	Polyquaternium-6
Chemical Name:	Diallyldimethylammonium chloride homopolymer
CAS Number:	26062-79-3

Key benefits:

- Ultimate conditioning based on superior combability and sensorial attributes
- Weightless feel as easy to be removed without build-up
- Low viscosity promotes easier handling and processing of a finished product
- Acrylamide-free

➔ **For extra caring and moisturizing hair**

(i.e. chemically treated hair or leave-in detangling products)



TILAMAR® Quat 640

Specification

External Characteristics

Appearance	Clear liquid
Color	yellowish
Shelf life	27 Months

Composition

Total solids	34.0% – 36.0% m/m
Preservative	NONE
Residual Monomer: Diallyl dimethyl ammonium chloride	max 2 %
Heavy metals	max 10 ppm
Arsenic	max 1 ppm
Lead	max 1 ppm

Chemical-physical properties

pH	5.0 – 7.5
Molecular Weight	0.8 – 1.2 x10 ⁵ Da
Viscosity	900 – 2.200 mPa.s

Product Uniqueness

● General qualifiers

- Good feel and combability at wet and dry hair
- Broad usage at different pH ranges, different salt and detergent concentrations at various products such as conditioners, shampoos and colorants

● Differentiators

- Ultimate conditioning based on superior combability and sensorial attributes
- Weightless feel as easy to be removed without build-up and leaves even fine hair looking and feeling weightless
- Low viscosity promotes easier handling and processing of a finished product

TILAMAR® Quat 640

Benchmark Comparison

Lower viscosity (compared to market benchmarks)

- Lower molecular weight due to specific production parameters
- Considerably lower viscosity
- Clear handling and processing advantage for end product production

Features	Benchmark 1	TILAMAR® Quat 640	Benchmark 2
Appearance	Clear, slightly yellow & highly viscous liquid	Clear, slightly yellow & low viscous liquid	Clear, slightly yellow & highly viscous liquid
Odor	Mild, aldehydic	Mild, aldehydic	Mild, aldehydic
Color, APHA	125 max (Test Lot = 94.46)	125 max (Test Lot = 95.37)	125 max (Test Lot = 95.87)
Total Solids, %	39 % - 44 %	34 % - 36 %	38 % - 42 %
pH	5.5 - 7.0	5.0 - 7.5	
Viscosity (mPas) 25°C Brookfield #3 @ 6 rpm	8.000 - 12.000 (Test Lot = 10.200)	900 - 2.200 (Test Lot = 1.500)	7.000 - 11.000 (Test Lot = 11.500)
Molecular Weight	1.5×10^5	$0.8 - 1.2 \times 10^5$	N.A

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Formulation concepts

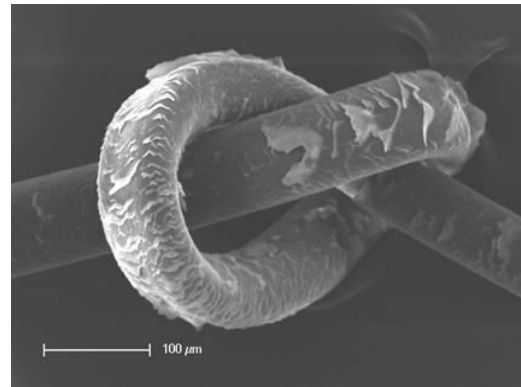
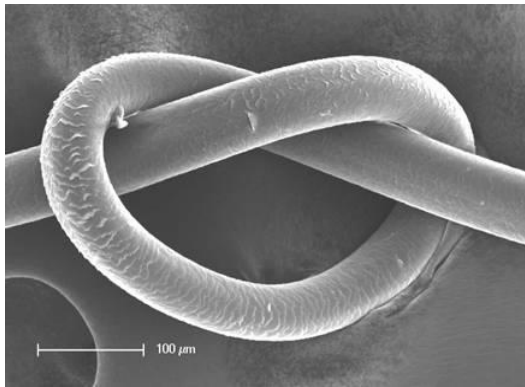
Shampoo	wt-%	Conditioner	wt-%	Color cream	wt-%
Sodium laureth sulfate	16	Cetearyl alcohol	5	Cetearyl alcohol	10
Cocamidopropyl betaine	15	Cetyl trimonium chloride, Isopropyl alcohol	1	Glyceryl stearate SE	2.5
Disodium cocoamphodiacetate	5%			Ceteareth-25	2.0
Preservative	0.7			Ethanolamine	0.5
				INCI : CI 26100	0.015
Sodium chloride	0.65			Glycol distearate	0.5
Citric acid	0.35	Citric acid	0.25	Disodium EDTA	0.05
TILAMAR® Quat 640	1%, 3%	TILAMAR® Quat 640	1%, 3%	TILAMAR® Quat 640	1%, 3%
Water	ad. 100	Water	ad. 100	Water	ad. 100
pH	5.2–5.7	pH	2.4–2.5	pH	11.0

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Performance

Weightless feel as easy to be removed without build-up

- 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 640, 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 640 and respectively 1% of the benchmark polymer for 10 minutes. Then the switches were pulled and washed with warm water for 90s.

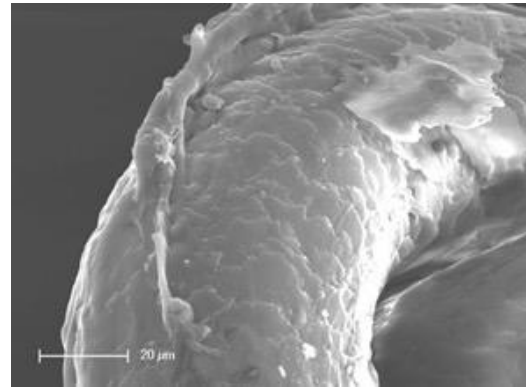
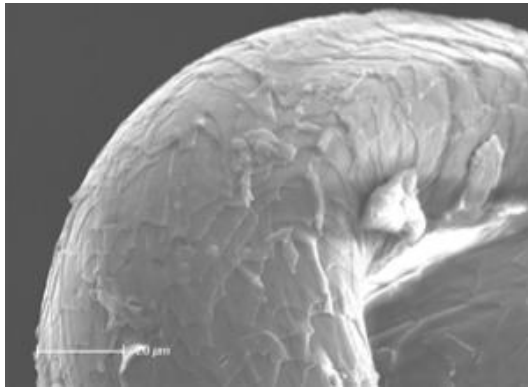
SEM pictures: left: TILAMAR® Quat 640; right: benchmark

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Performance

Weightless feel by lower deposition on the hair comparing TILAMAR® Quat 640 and used benchmark

- SEM pictures showed a lower deposition on the hair comparing TILAMAR® Quat 640 and used benchmark.
- Sensory assessment for wet and dry feel, wet and dry combability and dry tips feel was excellent and equal to benchmark.



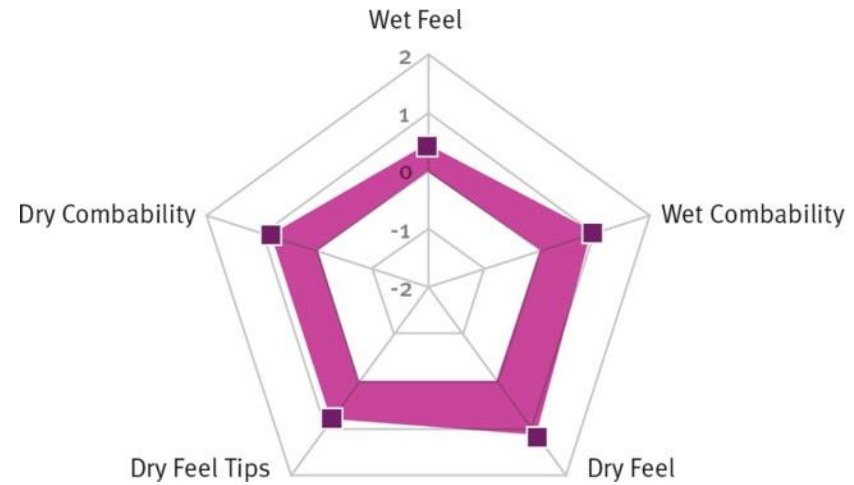
Procedure: hair switches were dipped into a water solution of 1% TILAMAR® Quat 640 and respectively 1% of the benchmark polymer for 10 minutes. SEM pictures: left: TILAMAR® Quat 640; right: benchmark

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Performance

Ultimate conditioning based on superior combability and sensorial attributes

- Excellent wet and dry combability in sensory assessment.
- Ahead of benchmark in dry feel including tips.



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 0.35% TILAMAR® Quat 640 and 0.4% benchmark.

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Stability

Ultimate conditioning based on superior combability and sensorial attributes

- ✓ Solubility (in formulation)
- ✓ Very broad pH compatibility from about 1 to 14
- ✓ No discoloration at standard formulations
- ✓ No odor development
- ✓ Viscosity remains stable
- ✓ Compatibility with other ingredients

TILAMAR® Quat 640 is stable at all tested criteria and at least as good as 'best in class' benchmarks.

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

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Stability

Special case formulation with amphoteric surfactant in mild shampoos



Benchmark 1 TILAMAR® Quat 640 Benchmark 2 Initial

TILAMAR® Quat 640 shows a slight discoloration at high storage temperature. TILAMAR® Quat 640 is better than benchmark 2 and comparable to benchmark 1.

Procedure: Stability data are assessed after 3 month at 43°C with 1% of respective polymer. Standard shampoo formulation was used with a color challenge due to the presence of amphoteric surfactant. For comparison 'best in class' benchmarks were used.

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Recommendations

Formulation features and recommendations:

- TILAMAR® Quat 640 is a water-soluble polymer which can easily be formulated.
It is recommended to add the product to the water phase of your system.
- TILAMAR® Quat 640 is
 - effective over a wide pH range of 2 – 14
 - suitable for hot and cold processes
 - compatible with cationic and nonionic co-ingredients.
- Partly incompatible with anionic surfactants due to high cationic charge (up to 5% anionic surfactant possible in case of changed ingredient order).
- For shampoo formulations, it is recommended to use an amphoteric or nonionic surfactant such as Disodium Cocoamphodiacetate, Cocamidopropyl Betaine/Coco Betaine or Alkyl Polyglucosides (APG) as primary surfactant.
- In liquid cleansing products, first dilute TILAMAR® Quat 640 in parts of the water phase before adding to the surfactants.

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Applications

Application and Benefits for Hair Care Products

Shampoos, conditioners, hair treatments, colorants and styling products

- Provides advantages in wet and dry feel
- Confers excellent wet and dry combability
- Contributes to gloss and a silky feel
- Delivers extraordinary detangling
- Imparts excellent lubricity and dry feel of tips
- Suggested concentrations: 1% in shampoo and conditioner and 3% in hair treatments

Application and Benefits for Skin Care Products

Bar soaps, shower products, face and body care products

- Contributes excellent moisturizing properties
- Imparts a smooth and tenderize feel
- Provides lubricity and could improve easier application of skin care products
- Enhances stability and foam formation when added to liquid cleansing products
- Suggested starting concentrations: 1%



TILAMAR® *Quat* 640

is strongly recommended when extra caring and moisturizing properties are needed, for example for chemically treated hair, and for leave-in detangling products.

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