

HAIR CARE CONDITIONING INGREDIENTS

IMPROVE HAIR APPEARANCE
MAKE HAIR SMOOTH AND SILKY
CONTROL FRIZZ AND FLY AWAY
ENSURE HEALTHY HAIR

YOUR PARTNER FOR
HAIR CONDITIONER
FORMULATIONS

PROVIDING SOLUTIONS WITH KAO TECHNOLOGY

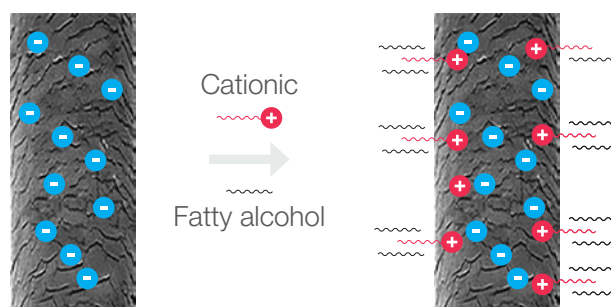


CONCEPT

Hair care is a growing market within the personal care industry. The most representative sectors of this market are hair conditioners, shampoos and hair dyes. Currently, there is a growing trend to formulate products that are safe for both humans and the environment, due to consumer perception and regulations.

Hair Conditioners are used to confer benefits on hair. They facilitate hair combing, enhance gloss and smoothness, provide antistatic properties and improve hair manageability.

Cationic surfactants are the main components of hair conditioners; they are effectively deposited on the hair surface and condition the hair thanks to the hydrophobic nature of the alkyl rest and to the cationic charge of the polar head group. The strong electrostatic forces between the positive charge of the molecule and the negatively charged hair surface prevent the elimination of these compounds through the rinsing process. In addition, there are hydrophobic interactions between the fatty alkyl chain and the hair's protein structures, which also help these compounds to remain on the hair surface throughout the rinsing process.



Additionally, the charge of the molecule helps the dissipation of the static charge generated by combing, preventing the fly-away phenomenon. Also, the reduction in combing forces by lubrication plays a role in eliminating fly away.

Quaternary ammonium salts have traditionally been used as key components in the formulation of Hair Conditioners, with Cetrimonium Chloride (CTAC) and Behentrimonium Chloride (BTAC) being the ones most often used.

Alkylamidoamines properly neutralised with an acid are a good alternative to monoalkyl quats in hair rinse formulations; they are more compatible with anionic surfactants and easier to work with. Furthermore, these molecules in the cationic form show a higher affinity for the hair surface and impart a much better antistatic effect.

Esterquats, which are quaternary compounds with an ester group in the long hydrophobic chains, fulfil current market trends. They are mild, non-irritant, non-sensitising, safe for the environment and naturally derived.

KEY INGREDIENTS

Kao Chemicals Europe offers a broad list of conditioning agents that enable formulators to produce high-performance hair care products according to the consumer's needs.

These materials can be used to formulate any type of hair conditioner, either rinse-off or leave-on, and in any kind of presentation (emulsion, gel, liquid, solid, etc.), as well as hair treatment products. They can also be included in shampoo formulations at low dosages.

TRADE NAME	INCI - CHEMICAL DESCRIPTION	TYPE	ACTIVE MATTER %	APPEARANCE (20°C)	SOLVENT
AMIDET® APA-22	Behenamidopropyl Dimethylamine	Amidoamine	≈ 100	Pellets	None
DANOX® HC-30	Behenamidopropyl Dimethylamine, Dipalmitoylethyl Hydroxyethylmonium Methosulfate, Cetyl Alcohol, Stearyl Alcohol, Lactic Acid	Amidoamine Ester Quat FA	≈ 100	Pellets	None
QUARTAMIN® 60W25 or 60W30	Cetrimonium Chloride	Monoalkyl Trimethyl Quaternary	≈ 25 or ≈ 30	Liquid	Water
QUARTAMIN® 60L	Cetrimonium Chloride	Monoalkyl Trimethyl Quaternary	≈ 50	Liquid	IPA
QUARTAMIN® AB	Behenrimonium Chloride	Monoalkyl Trimethyl Quaternary	≈ 85	Pellets	IPA
QUARTAMIN® BTC 131	Behenoyl PG-Trimonium Chloride	Monoester Quaternary	≈ 70	Waxy solid	HG & Water
QUARTAMIN® BTC 131 VC	Behenoyl PG-Trimonium Chloride, Cetyl Alcohol	Ester Quat FA	≈ 45	Waxy solid	HG & Water
TETRANYL® CO-40	Dioleoylethyl Hydroxyethylmonium Methosulfate	Ester Quat	≈ 80	Liquid	PG
TETRANYL® L6-30	Dipalmitoylethyl Hydroxyethylmonium Methosulfate, Cetearyl Alcohol	Ester Quat FA	≈ 100	Pellets	None

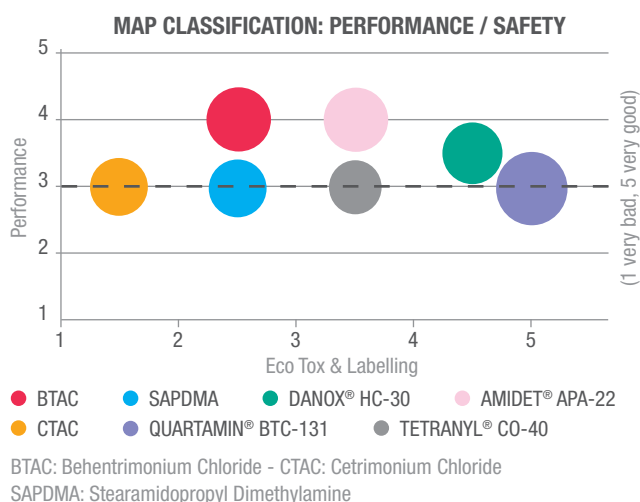
IPA: Isopropyl Alcohol | PG: Propylene Glycol | HG: Hexylene Glycol | FA: Fatty Alcohol

MAIN CHARACTERISTICS

Main functions are: to reduce combing force, improve hair feeling, fly away control, hair smoothness, shine and manageability.

	TRADE NAME	AMIDET® APA-22	DANOX® HC-30	QUARTAMIN® 60W25, 60W30, 60L	QUARTAMIN® AB	QUARTAMIN® BTC-131	QUARTAMIN® BTC-131 VC	TETRANYL® CO-40	TETRANYL® L6-30
PROCESS (HAIR CONDITIONERS)	Hot	●	●	●	●	●	●	●	●
	Medium (40-55°C)	●	●	●	●	●	●	●	●
	Room Temperature	●	●	●	●	●	●	●	●
	Stepwise water addition	●	●	●	●	●	●	●	●
SUGGESTION HAIR TYPE	Ethnic	●●	●	●	●●	●	●	●	●
	Caucasian	●	●	●	●	●	●	●	●
	Asian	●●	●	●	●●	●	●	●	●
	Natural	●	●	●	●	●	●	●	●
	Light damaged	●	●	●	●	●	●	●	●
	Damaged	●●	●	●	●●	●	●	●	●
	Fine	●	●	●	●	●●	●●	●●	●●
	Thick	●●	●	●	●●	●	●	●	●
Curly	●●	●	●	●●	●	●	●	●	
BENEFITS	Detangling	●●	●	●	●●	●	●	●	●
	Combing	●●	●	●	●●	●	●	●	●
	Rich feeling	●●	●	●	●●	●	●	●	●
	Fly away	●●	●●	●	●	●	●	●	●
	Volume maintain	●	●	●	●	●	●	●	●
	Silky	●●	●	●	●●	●	●	●	●
	Smooth	●●	●●	●	●●	●	●	●	●
	Protects cuticle Hair coloration	●							

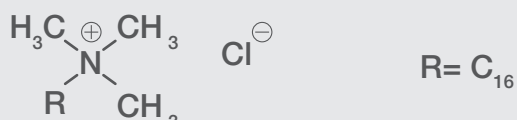
Another important aspect is the Eco toxicological profile (biodegradation and aquatic toxicity) of these surfactants. Monoalkyl quats, such as CTAC and BTAC and C18 amidoamines have a worse classification in terms of the environment. C22 amidoamines, esterquats and DANOX® HC-30 show better classification, with QUARTAMIN® BTC-131 being the one with best Eco-Tox profile.



●● Excellent | ● Very good | ● Good | ● Not recommended

QUARTAMIN® 60 Range

QUARTAMIN® 60 RANGE



HAIR RINSE: FORMULATION HINTS & PERFORMANCE

COLD PROCESS	●
ETHNIC HAIR	●
DAMAGED HAIR	●
CURLY HAIR	●
PERFORMANCE	●
ECO TOX & LABELLING	●

TRADE NAME	Appearance at 20°C	Cationic Active Matter (%)	Solvent
QUARTAMIN® 60W25	Liquid	≈25	Water
QUARTAMIN® 60W30	Liquid	≈30	Water
QUARTAMIN® 60L	Liquid	≈50	Water / IPA

MAIN FEATURES

- Suitable for fine hair types
- Medium performance
- Cold & Hot processable

Today, monoalkylquats continue to be the most commonly-used cationic surfactants in hair rinses, although it is also known that these products present limitations with regard to their ecotoxicity properties.

In addition, the short-medium alkyl chain quats type is in liquid form at room temperature, which makes them easy to handle and cold processable.

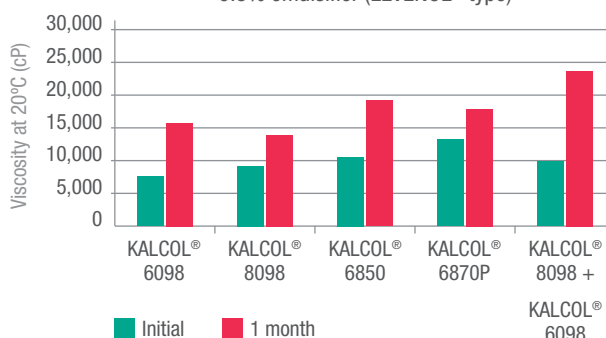
*Additives: Fragrance, preservatives, dyes, etc.

Kao Chemicals Europe manufacturers Cetrimonium Chloride and markets it under the trade name **QUARTAMIN® 60**.

The **QUARTAMIN® 60** range acts as a medium-performing conditioner but is very good for the fine, Caucasian and natural hair type. Even though the final viscosity increases over time, the types of fatty alcohol used and the addition of an emulsifier play a predominant role in viscosity. With pure fatty alcohols, the viscosity obtained is lower than with Cetearyl Alcohol.

VISCOSITY STABILITY

1.5% a.m. cationic, 3% FA, 2% PG, 0.5% emulsifier (LEVENOL® type)



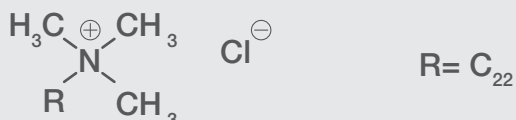
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HAIR RINSE FOR NORMAL HAIR

	%
KALCOL® 6850 Cetearyl Alcohol	3.5
QUARTAMIN® 60W25 Cetrimonium Chloride	6.0
LEVENOL® H&B Glycereth-2 Cocoate	0.5
Propylenglycol	2.0
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	White viscous emulsion
Viscosity Brookfield 20°C (cP)	5,000
pH (as it is)	3.0 - 4.0

QUARTAMIN® AB

QUARTAMIN® AB



HAIR RINSE: FORMULATION HINTS & PERFORMANCE

COLD PROCESS	●
ETHNIC HAIR	● ●
DAMAGED HAIR	● ●
CURLY HAIR	● ●
PERFORMANCE	● ●
ECO TOX & LABELLING	●

TECHNICAL DATA

Appearance (20°C)	White solid pellets
Dry active matter (%)	Approx. 80
Type of solvent (%)	Isopropanol (< 20)

MAIN FEATURES

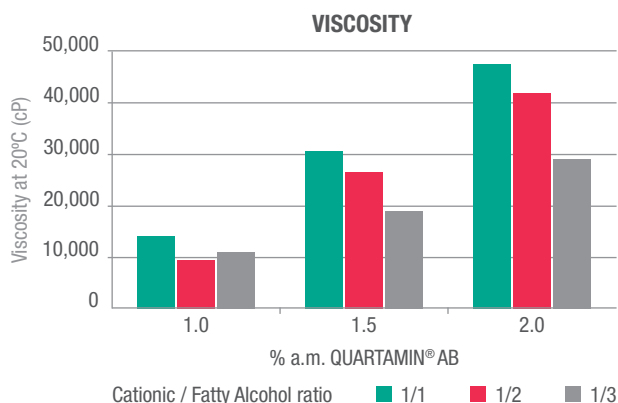
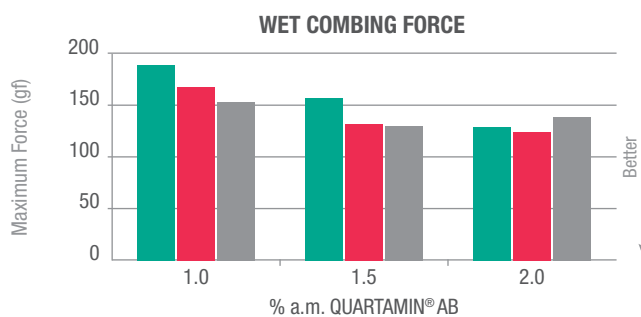
- Suitable for all hair types
- High performance
- Hot processable

QUARTAMIN® AB is Behentrimonium Chloride supplied in pellet form at a concentration of 80%. The fatty alcohol used in a basic hair conditioner formulation has a positive impact, not only on the viscosity of final product, but also on combing in wet conditions, as can be seen from the results shown in the graphs, where the cationic range was 1-2% a.m. and fatty alcohol range, 1-6% a.m., with the 1/1-1/3 (cationic/fatty alcohol) ratio being the best. The lowest wet combing forces are obtained with 1.5% a.m. QUARTAMIN® AB and 3% KALCOL® 6850, with the viscosity being 25,000 cP, which matches market requirements.

● Excellent | ● Very good | ● Good | ● Not recommended

INFLUENCE OF FATTY ALCOHOL

1-2% a.m. QUARTAMIN® AB, 1-6% KALCOL® 6850



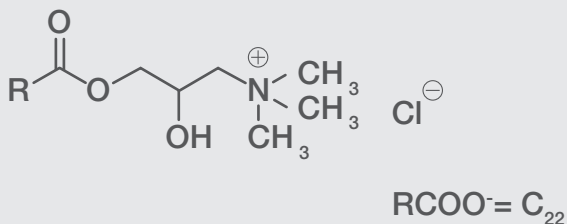
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HAIR RINSE FOR NORMAL HAIR

	%
KALCOL® 6870P Cetearyl Alcohol	3.0
QUARTAMIN® AB Behentrimonium Chloride	1.86
LEVENOL® H&B Glycereth-2 Cococate	0.5
Propylenglycol	2.0
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	White viscous emulsion
Viscosity Brookfield 20°C (cP)	8,600
pH (as it is)	4.0 - 5.0

QUARTAMIN® BTC-131

QUARTAMIN® BTC-131



HAIR RINSE: FORMULATION HINTS & PERFORMANCE

COLD PROCESS	●
ETHNIC HAIR	●
DAMAGED HAIR	●
CURLY HAIR	●
PERFORMANCE	●
ECO TOX & LABELLING	● ●

TECHNICAL DATA

Appearance (20°C)	White to yellowish, waxy solid
Dry active matter (%)	≈ 60
Type of solvent	Hexylene Glycol and Water

MAIN FEATURES

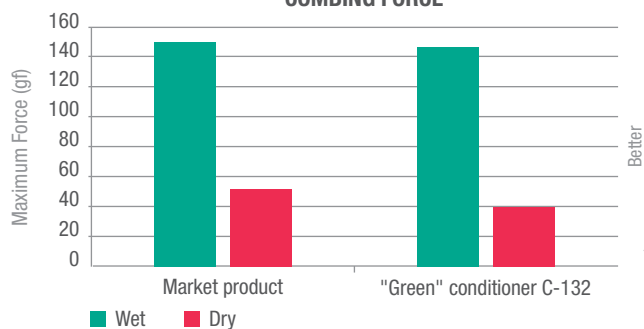
- Suitable for fine hair
- Medium performance
- Low temperature process (40°C)
- Excellent Eco-tox and non-labelled product

QUARTAMIN® BTC-131 is Behenoyl PG-Trimonium Chloride supplied in a waxy solid form at a concentration of 60%. QUARTAMIN® BTC-131 acts as a medium-performing conditioning agent and adds volume to the hair.

QUARTAMIN® BTC-131 and TETRANYL® CO-40 can be combined in formulations to obtain extraordinary synergistic effects in terms of performance. These "green" cream rinse formulations are better in terms of combing forces than existing high-performance market products.

*Additives: Fragrance, preservatives, dyes, etc.

COMBING FORCE



Ref.: C-132

HAIR CONDITIONER GREEN FORMULATION

	%
KALCOL® 6850 Cetearyl Alcohol	2.5
QUARTAMIN® BTC-131 Behenoyl PG-Trimonium Chloride	2.5
TETRANYL® CO-40 Dioleylethyl Hydroxyethylmonium Methosulfate	1.25
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	White viscous emulsion
Viscosity Brookfield 20°C (cP)	2,000
pH (as it is)	3.0 - 4.0

QUARTAMIN® BTC-131 VC

QUARTAMIN® BTC-131 VC is a combination of a cationic fatty ester and a fatty alcohol developed for easy preparation of hair conditioners that enables the formulator to prepare cream rinses and masks at low temperatures. Suitable for eco-certified green hair rinse formulations.

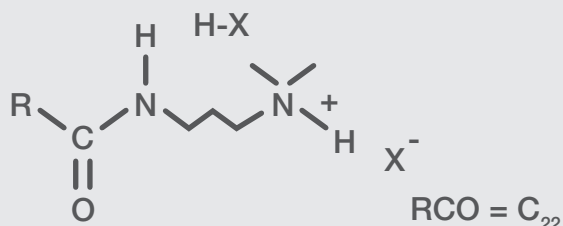
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HAIR CONDITIONER LOW T PROCESS

	%
QUARTAMIN® BTC-131 VC	6.5
LEVENOL® H&B Glycereth-2 Cocoate	0.5
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	White viscous emulsion
Viscosity Brookfield 20°C (cP)	10,000
pH (as it is)	3.5 - 4.5

AMIDET® APA-22

AMIDET® APA-22



HAIR RINSE: FORMULATION HINTS & PERFORMANCE

COLD PROCESS	●
ETHNIC HAIR	● ●
DAMAGED HAIR	● ●
CURLY HAIR	● ●
PERFORMANCE	● ●
ECO TOX & LABELLING	●

TECHNICAL DATA

Appearance (20°C)	Yellowish white pellets
Dry active matter (%)	100
Melting Point (°C)	Approx. 80

MAIN FEATURES

- Suitable for all hair types
- High performance
- Hot processable
- Eco-friendly product

Behenamidopropyl Dimethylamine is a highly effective cationic surfactant for conditioners when properly neutralised with an acid. It does not contain any solvents (100% active matter).

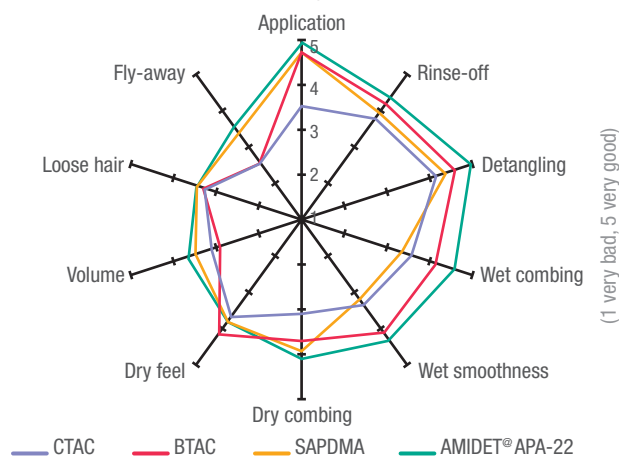
AMIDET® APA-22 meets the EU Ecolabel & Nordic Ecolabel criteria.

A better sensory profile is observed for AMIDET® APA-22 on comparing its conditioning performance to the monoalkyl quats most commonly used in Hair Conditioners.

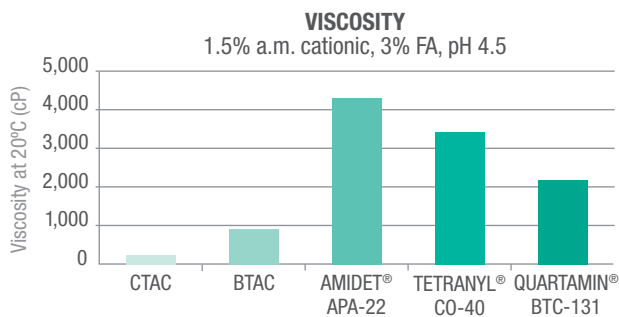
● Excellent | ● Very good | ● Good | ● Not recommended

SENSORY EVALUATION

1.5% cationic + 3% cetearyl alcohol



The viscosity of hair conditioners is an important parameter that facilitates handling of the product and spreading on the hair. AMIDET® APA-22 gives a much higher viscosity than CTAC, BTAC, cationic fatty esters or oleic ester quats.



Ref. C-140

HAIR MASK

	%
KALCOL® 6850 Cetearyl Alcohol	7.0
AMIDET® APA-22 Behenamidopropyl Dimethylamine	3.2
Amodimethicone	1.0
Panthenol (50% solution)	0.5
Guar Hydroxypropyl Trimonium Chloride	0.5
Tocopheryl Acetate	0.3
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	White viscous emulsion
Viscosity Brookfield 20°C (cP)	Approx. 30,000
pH (as it is)	4.2 - 4.6

DANOX® HC-30

HAIR RINSE: FORMULATION HINTS & PERFORMANCE

COLD PROCESS	●
ETHNIC HAIR	●
DAMAGED HAIR	●
CURLY HAIR	●
PERFORMANCE	●
ECO TOX & LABELLING	● ●

TECHNICAL DATA

Appearance (20°C)	Yellowish white pellets
Cationic active matter (%)	Approx. 33
Fatty Alcohol content (%)	Approx. 67
Recommended dosage (%)	2.5-12

MAIN FEATURES

- Suitable for all hair types
- Optimal performance
- Hot processable
- Eco-friendly and non-labelled product

DANOX® HC-30 is a ready-to-use conditioning agent based on a synergistic combination of cationic surfactants and fatty alcohol that allows a single-step formulation process. The formulation viscosity is remarkable and remains stable over time.

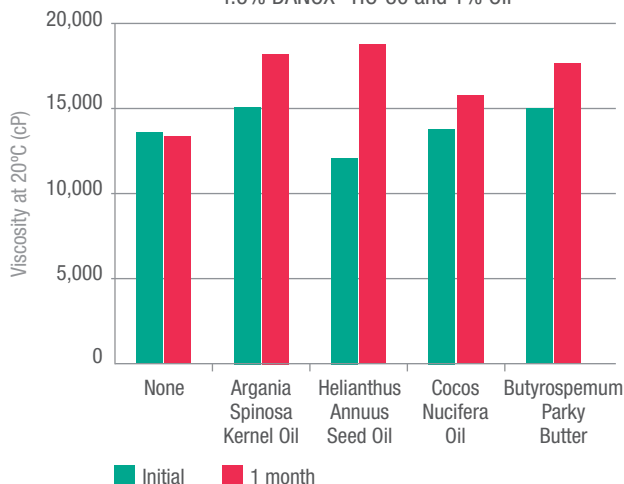
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HAIR MASK	%
DANOX® HC-30	10.0
Amodimethicone	2.5
Argan Oil	1.5
Tocopheryl Acetate	0.5
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	White viscous emulsion
Viscosity Brookfield 20°C (cP)	>20,000
pH (as it is)	3.5 - 4.0

*Additives: Fragrance, preservatives, dyes, etc.

Aside from the good performance of DANOX® HC-30 on hair, it also allows formulators to achieve homogenous consistent products when combined with conditioning additives such as oils, silicones and polymers, without having to add emulsifiers.

VISCOSITY STABILITY
4.5% DANOX® HC-30 and 1% Oil

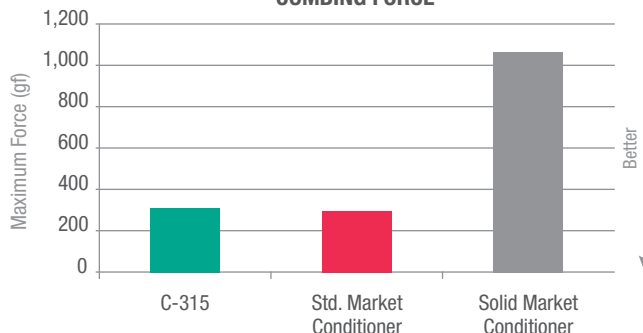


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SMOOTH SOLID CONDITIONER

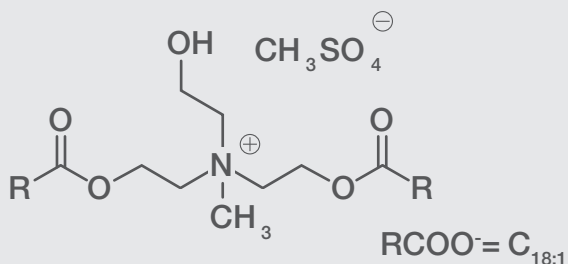
	%
DANOX® HC-30	60.5
KALCOL® 6850 Cetearyl Alcohol	15.0
LEVENOL® H&B Glycereth-2 Cococate	8.0
KAO SOFCARE® GP-1 PPG-3 Caprylyl Ether	5.0
Shea Butter	10.0
Parfum SHINRIN-YOKU	1.5

COMBING FORCE



TETRANYL® Range

TETRANYL® CO-40



HAIR RINSE: FORMULATION HINTS & PERFORMANCE

COLD PROCESS	●
ETHNIC HAIR	●
DAMAGED HAIR	●
CURLY HAIR	●
PERFORMANCE	●
ECO TOX & LABELLING	●

TECHNICAL DATA

Appearance (≥20°C)	Transparent liquid
Dry active matter (%)	Approx. 80
Type of solvent (%)	Propylene Glycol (≈ 20)

MAIN FEATURES

- Suitable for fine hair
- Medium performance
- Cold & hot processable
- Good eco-toxicological profile

● Excellent | ● Very good | ● Good | ● Not recommended

TETRANYL® CO-40 is an oleic acid-derived esterquat, which gives a very smooth feel to hair due to its two alkyl chains.

It is especially suitable for formulations that require controlled fly-away, good manageability and low volume effects. These requirements are suitable for anti-frizz conditioners.

Ref. C-131

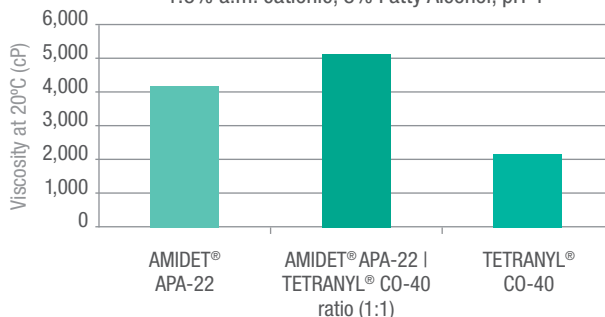
HAIR CONDITIONER GREEN FORMULATION

	%
KALCOL® 6850 Cetearyl Alcohol	3.0
TETRANYL® CO-40 Dioleylethyl Hydroxyethylmonium Methosulfate	1.62
AMIDET® APA-22 Behenamidopropyl Dimethylamine	0.64
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	White viscous emulsion
Viscosity Brookfield 20°C (cP)	Approx. 5,000
pH (as it is)	Around 4.0

In combination with AMIDET® APA-22, adds better and more stable viscosity to the hair conditioner.

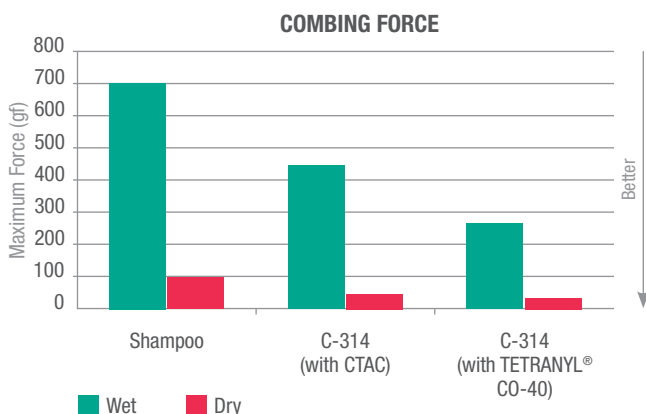
VISCOSITY ENHANCEMENT

1.5% a.m. cationic, 3% Fatty Alcohol, pH 4



Thanks to its liquid properties, TETRANYL® CO-40 is easy to handle and can be incorporated at room temperature if no other components with high melting point are present in the formula.

Formula C-314, a micellar leave-on conditioner, has a clear appearance and a better performance than CTAC.



Ref. C-314

MICELLAR LEAVE-ON CONDITIONER

	%
OXIDET® DMCLD Lauramine Oxide	6.0
TETRANYL® CO-40 Dioleylethyl Hydroxyethylmonium Methosulfate	1.9
Ethanol	4.0
Polyquaternium 10	0.15
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	Clear colourless liquid
pH (as it is)	3.5 - 4.0

*Additives: Fragrance, preservatives, dyes, etc.

TETRANYL® L6-30

HAIR RINSE: FORMULATION HINTS & PERFORMANCE

COLD PROCESS	●
ETHNIC HAIR	●
DAMAGED HAIR	●
CURLY HAIR	●
PERFORMANCE	●
ECO TOX & LABELLING	●

TECHNICAL DATA

Appearance (20°C)	Yellowish white pellets
Cationic active matter (%)	Approx. 30
Fatty alcohol content (%)	Approx. 70

TETRANYL® L6-30 is a combination of a cationic surfactant of a palmitic acid-derived esterquat and a fatty alcohol. It is specially designed for the easy preparation of economical rinse-off conditioners by simply dispersing the pellets in water previously heated to 70°C.

Its performance is quite similar to that of CTAC, the most commonly-used cationic surfactant in hair rinses.

Ref. C-265

HAIR CONDITIONER FOR NORMAL HAIR

	%
TETRANYL® L6-30	5.0
Additives*	q.s.
Deionised Water	Up to 100
Appearance (20°C)	White viscous emulsion
Viscosity Brookfield 20°C (cP)	Approx. 18,000
pH (as it is)	3.5 - 4.5



KAO CHEMICALS EUROPE

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Enriching lives,
in harmony with nature.

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