CHT-BeauSil™ RE-AMO 919 EM

THE 1st RECYCLED SUGAR MODIFIED SILICONE

Future Trends

Neo-Ecology Megatrend

- Resource-efficient, sustainable economy.
- Purchase decisions based on characteristics with added value and longevity.

Circular Economy and Sustainable Development Goals (SDGs) of the United Nations

- Goal 12 – responsible consumption and production – sets out demands for more environmentally compatible handling of chemicals and waste as well as a significant reduction of waste volumes through reuse and recycling
- Goal 13 – taking urgent action to combat climate change and its impacts – issues a challenge to politics and industry to incorporate appropriate climate protection measures in their strategies

CHT
SMART CHEMISTRY WITH CHARACTER.

Recycling End-of-Life Silicone Products

- Silicone is a versatile material in a wide range of applications.
  - i.e. Cosmetics, Detergents, Paints, Molds and Consumer Goods.

- Silicone production is energy intensive. To fully exploit the value of this resource, end-of-life silicone products are recycled.

- As a result, today’s silicone waste can be used to produce an important sustainable raw material for tomorrow.

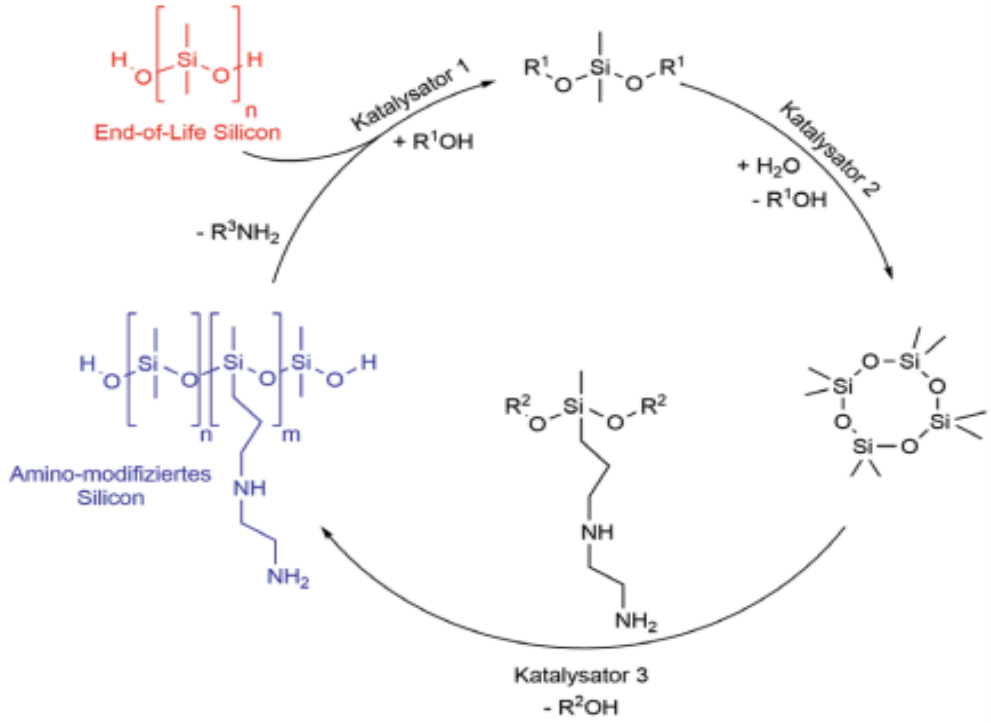
- This approach to silicone recycling follows the **waste-to-value process.**

CHT
SMART CHEMISTRY WITH CHARACTER.

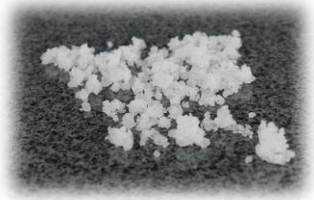
The Waste-to-Value Concept in Detail

The end-of-life polymers are catalytically split into silicone monomers, modified, and then finally polymerized into a new modified silicone in virgin quality, which can be used for Personal and Home Care products

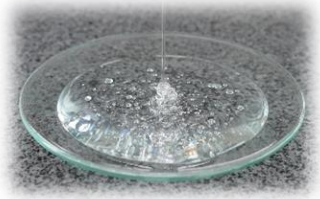
Fig. 2: Waste-to-value – from end-of-life silicone to new, amino-modified silicone.



e.g Silicone molds or other silicone products, mechanically processed



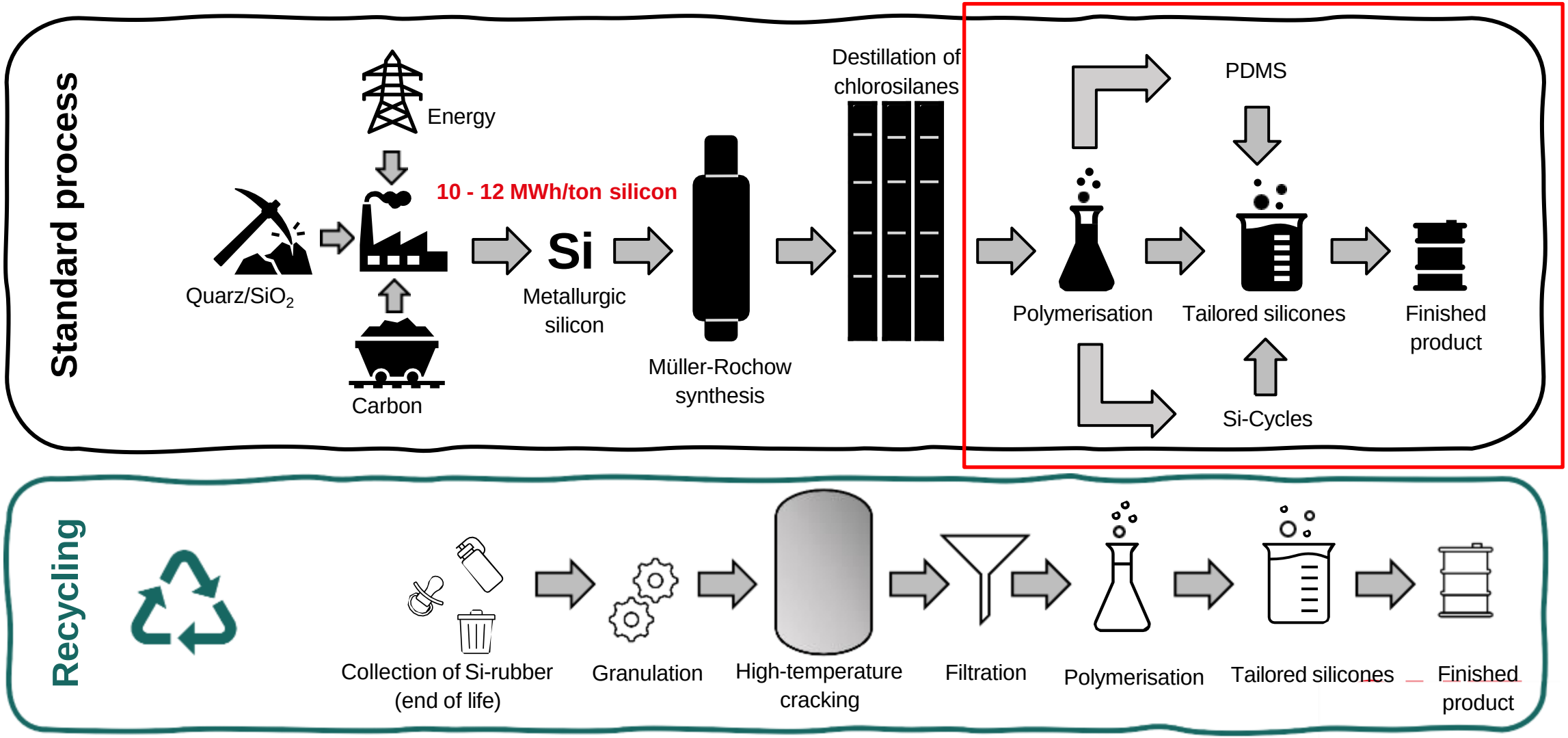
Catalytically split into monomers



Modified e.g. with aminogroups and emulsified

CHT
SMART CHEMISTRY WITH CHARACTER.

Process in Detail



What happens to silicone in the environment? (simplified)

SiO_2 Quartz Sand

Silicone Polymer

e.g. Shampoo with Silicone

Controlled release
(primary usage)

Silicones end up in
the wastewater plant
(28 days)

Sewage
sludge,
applied on
fields

Soil (6 months)

Degradation into
CO_2, SiO_2 and H_2O

Burning of sewage sludge
for generating heat
(instaneous degradation)

Journal of Polymers and the Environment, Vol. 11, No. 4, October 2003 (© 2003) 129 1566-2543/03/1000-0129/0 © 2003 Plenum Publishing Corporation A Review of the Fate and Effects of Silicones in the Environment

CHT
SMART CHEMISTRY
WITH CHARACTER.

Biodegradability vs Degradability

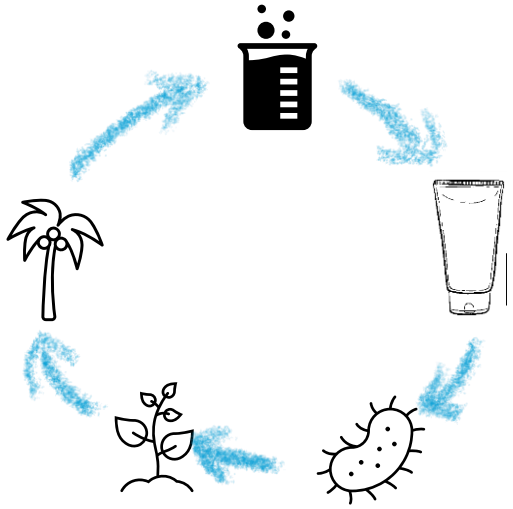
Biodegradability:
Polymer or substance will be decomposed by the action of a microorganism.

Degradability:
Polymer or substance will break into simpler / smaller compounds in stages. In most cases the simpler and smaller compounds will degrade further by microorganisms.

Reference video from the Institute of Personal Care Science – Australia.
https://www.youtube.com/watch?v=Z_1cXdIT0VE

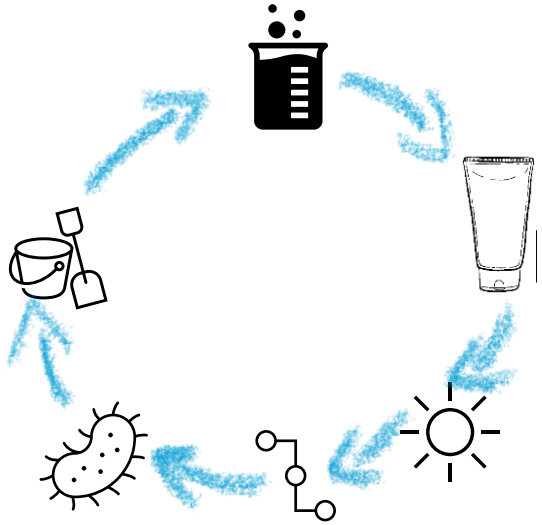
CHT
SMART CHEMISTRY
WITH CHARACTER.

Circular vs Non-Circular Degradation Pathways



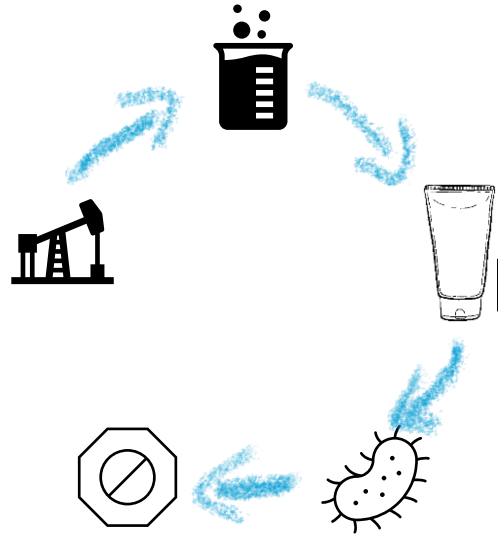
Silicone Alternatives made from a Natural Source

Polymer based on Carbon chemistry which is food for microorganisms. Polymers will degrade by microorganisms back to Carbon,CO_2, and water which will go back to natural circulation.



Silicones e.g. Dimethicone, Sugar modified Amodimethicone

Polymer based on Silicon (Si) which is not food for microorganisms. The silicone polymer will degrade first by UV exposure or by the activity in the soil to smaller silicone molecules which will further degrade by microorganisms back to Quartz, CO_2, and water. Silicone degrades back to the raw material sand.



Silicone Alternatives made from Petrol Chemistry (biodegradable)

Polymer based on Carbon chemistry which is food for microorganisms. Polymers will degrade by microorganisms back to Carbon, CO_2, and water. However, it will not turn back into the raw material oil.

CHT-BeauSil™ Re-AMO 919

Sugar modified and recycled

Detailed product application:

INCI Name: Gluconamido Amodimethicone (and) Coco glucoside

Applications
Shampoo transparent and milky
Shampoo for normal and dry hair
Leave-on products and treatments

Processing notes / application pro tips:

< 0.1% D4, D5, D6
Free of MIT/BIT and Paraben

Natural origin content: 85%

Recommended to be added into the water phase.
Recommended use levels 0.5%-5.0%

Non-volatile content: 25 – 30%
pH: 5.0 – 6.5

CHT-BeauSil RE-AMO 919 EM | Sugar-modified and recycled silicone for hair care - YouTube

Additional information:

Markets: Europa, Americas, Africa, India, Indonesia, Vietnam

“Excellent and natural softness on hair with good conditioning properties created by the unqiue sugar modification of an amodimethicone“

Most important product features:

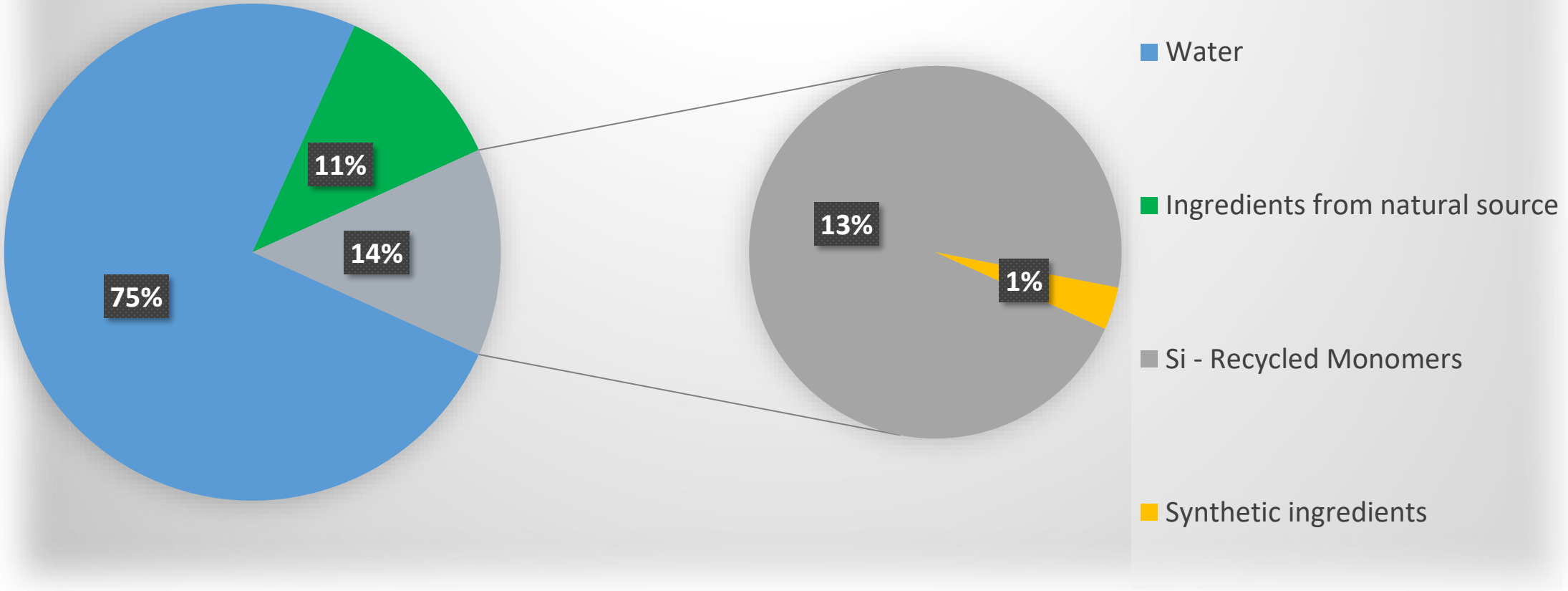
- Improves combing on wet hair
- No heavy feel on dry hair
- Natural softness
- Silky shine on hair
- Moisturized skin feel
- Sugar technology

Offset products & competition:

Unique

Application expert: Kyle Ryder

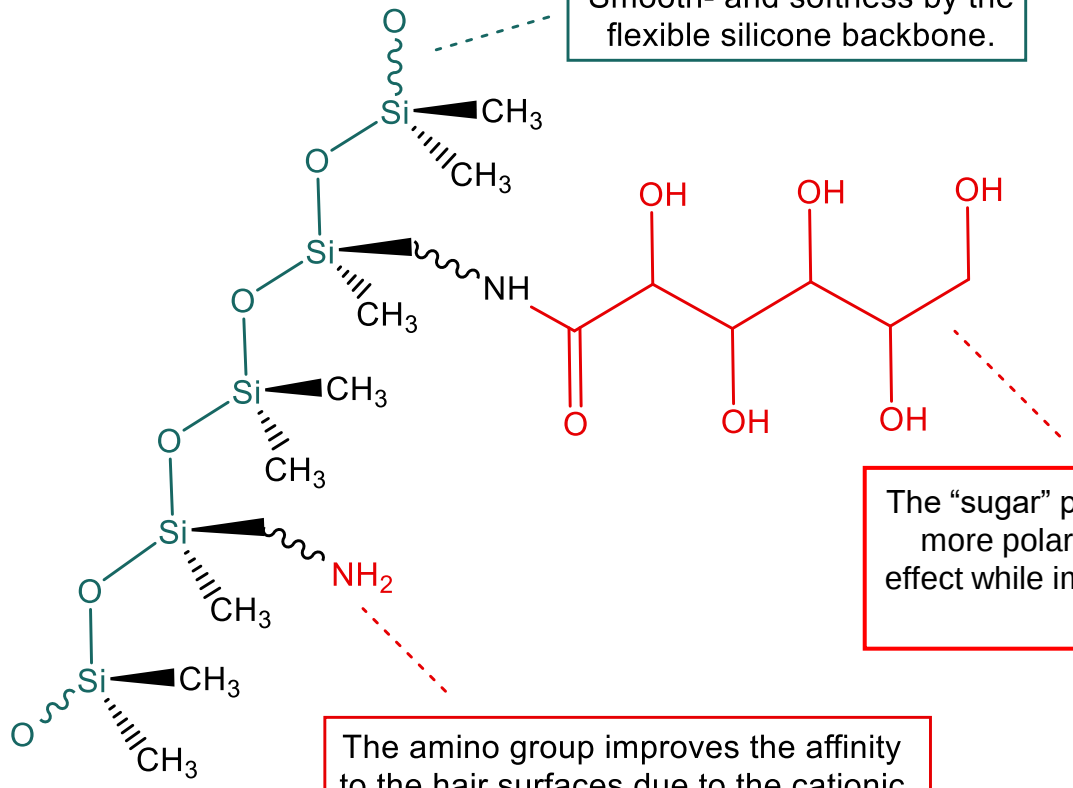
CHT-BeauSil™ RE-AMO 919 EM



CHT
SMART CHEMISTRY WITH CHARACTER.

Chemical structure CHT-BeauSil™ RE-AMO 919 EM – Triple Functionality in One Polymer

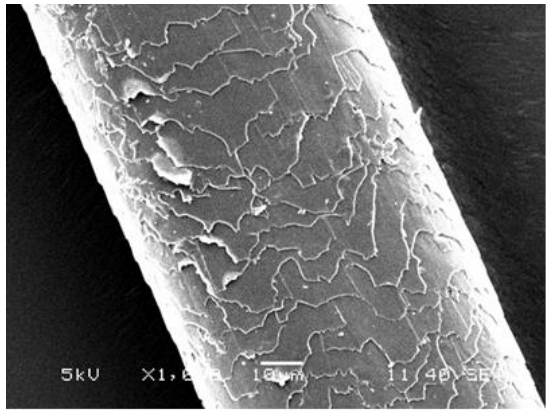
- This new generation of recycled silicone polymer is modified with amino and sugar groups which provides a unique effect.
- The chemistry has the same conditioning effect as a classic amodimethicone without weighing the hair down.



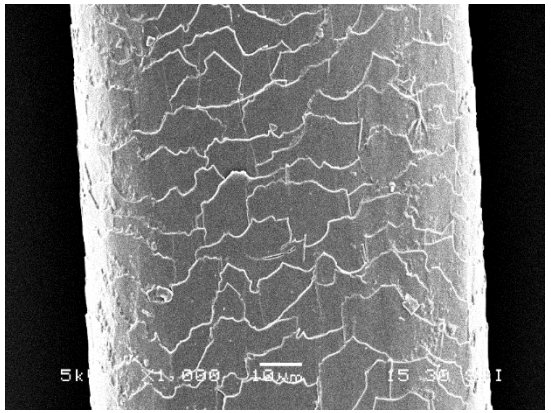
CHT
SMART CHEMISTRY WITH CHARACTER.

CHT-BeauSil™ RE-AMO 919 EM the natural look and softness

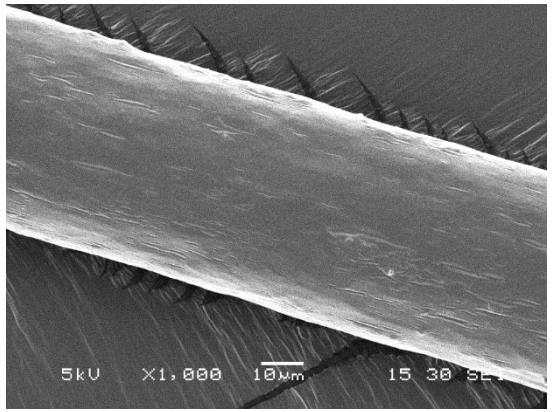
SEM Magnification at 1000x before and after treatment with a shampoo containing the material compared to a shampoo with dimethiconol.



The hair fiber before treatment shows a scaly uneven structure. This structure can cause difficult combing as well as less shine.



The hair fiber after treatment shows an even and shiny structure. The **CHT-BeauSil™ RE-AMO 919 EM** repairs the natural structure without weighing down the hair. The result is a **natural look**.



The large **dimethiconol** polymer coats the surface of the hair. A strong build-up effect which hides the natural hair structure and weighs it down after multiple uses

CHT
SMART CHEMISTRY WITH CHARACTER.

Performance Assessment

The CHT-BeauSil™ RE-AMO 919 EM was assessed in different formulations in the application lab to ensure key performance properties. The selection of the formulations covers a wide spectrum of final use products; a transparent shampoo, a sulphate free shampoo, and a hair treatment.

Mild Shampoo for Daily Use [H-1012-22]

Extra mild shampoo for the daily use. The unique polymer technology of the CHT-BeauSil™ RE-AMO 919 EM ensures vibrant healthy hair.

Phase	Tradename	Supplier	INCI / Chemical	w/w %
A	Water		Water	To 100.00
	Sodium EDTA		Disodium EDTA	0.10
B	Jaguar HP 105	Solvay	Hydroxypropyl Guar	1.20
	Glycerin	Merck	Glycerin	3.00
C	Plantapon SF	BASF	Sodium Cocoamphoacetat (and) Glycerin (and) Lauryl Glucoside (and) Sodium Cocoyl Glutamate (and) Sodium Lauryl Glucose Carboxylate	15.00
	CHT-BeauSil™ RE-AMO 919 EM	**CHT**	**Glucoamido amodimethicone (and) Coco-glucoside**	**2.50**
D	Fragrance			q.s.
	Preservative*			q.s.
E	pH-control		Citric acid 10%	q.s.
				100.00

(*e.g. 0.5% Euxyl K700, Schülke)

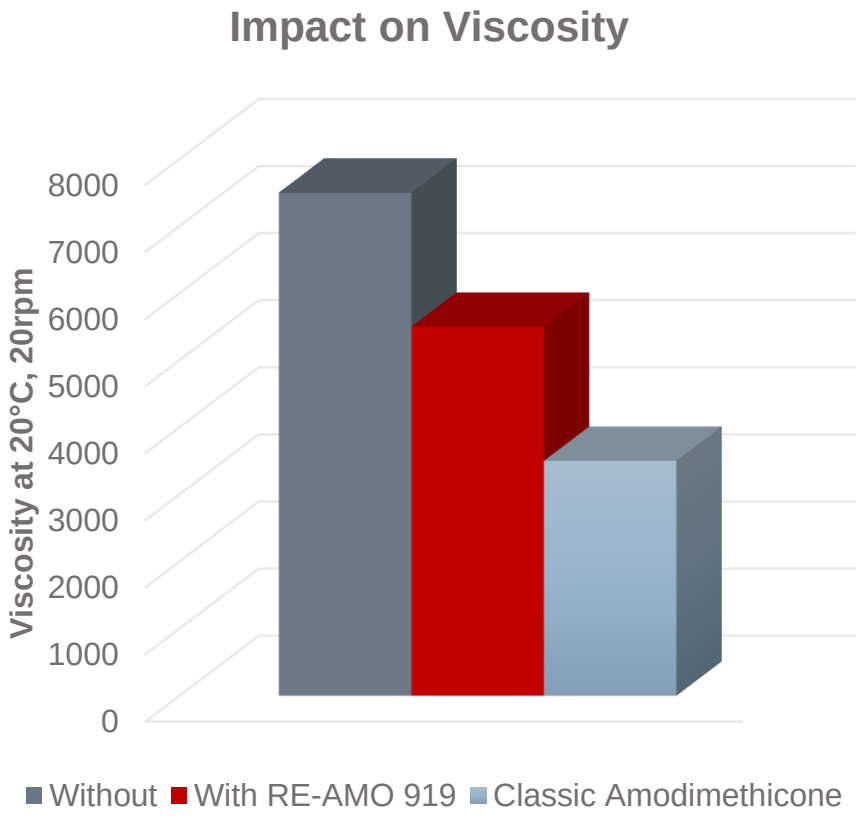
Procedure

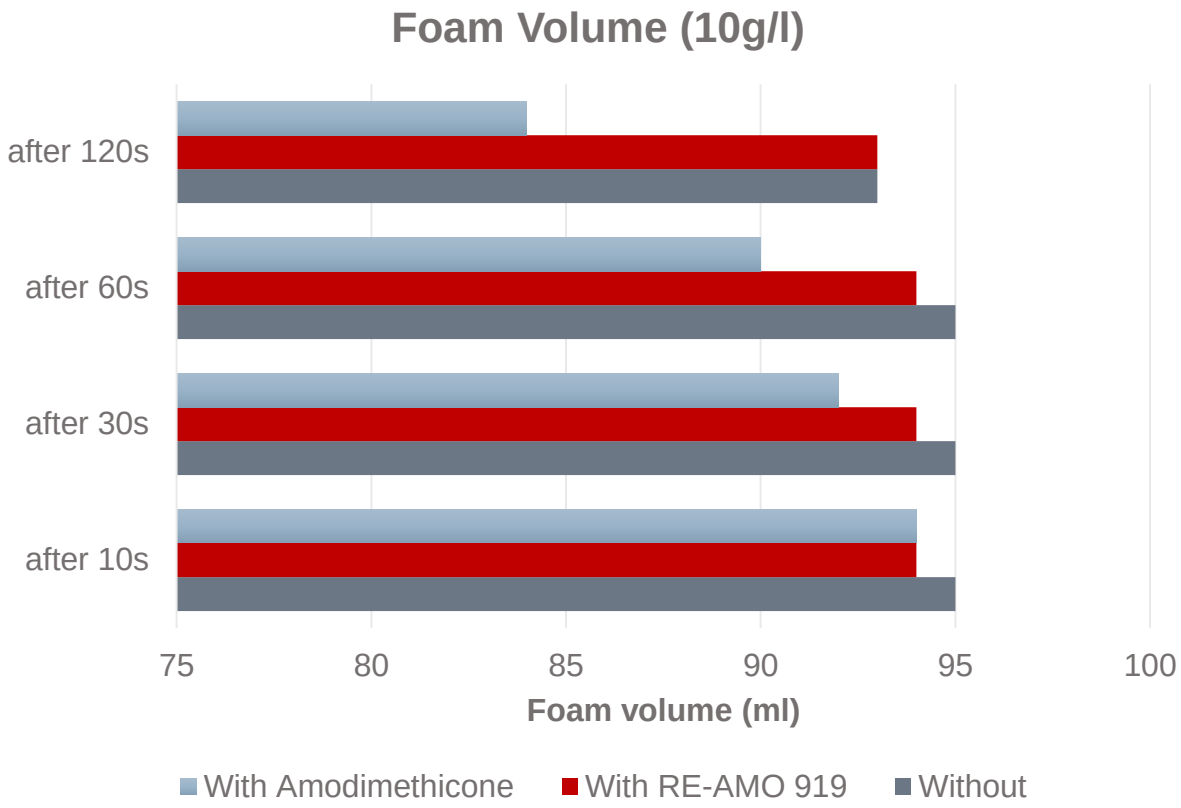
- Mix ingredients of phase A
- Blend ingredients of phase B and add to phase A
- Stir till the thickener is complete hydrated
- Add ingredients of phase C and blend
- Add phase D and stir till it is homogeneous
- Adjust pH to 5.5 with phase E

Technical data	
Appearance	Clear liquid
pH-value	5.5
Viscosity	5.000 – 7.000 mPas
Stability	3 months at RT, 45°C, 7°C

CHT
SMART CHEMISTRY WITH CHARACTER.

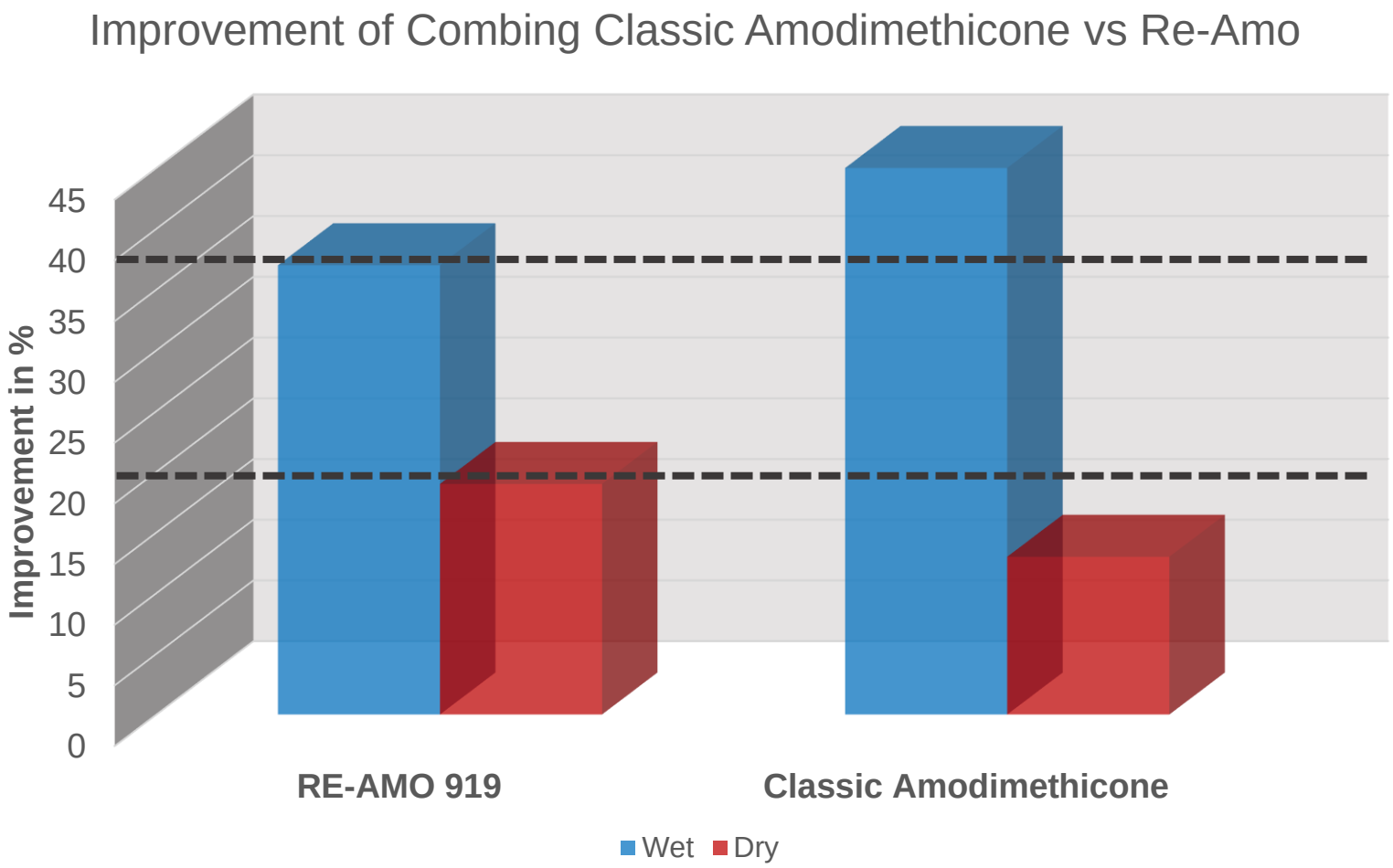
Impact on Viscosity and Foam Volume





CHT
SMART CHEMISTRY
WITH CHARACTER.

Combing Improvement on Indian Hair - Chemical damage



- CHT-BeauSil™ RE-AMO 919 EM is a bit weaker in the wet combing versus the classic Amodimethicone, however still a good level.
- CHT-BeauSil™ RE-AMO 919 EM has better dry combing improvement versus the classic Amodimethicone.

CHT
SMART CHEMISTRY WITH CHARACTER.

Further Formulations Ideas Utilizing CHT-BeauSil RE-AMO 919 EM

- Hair Treament (Leave – In)
- Classic Transparent Shampoo with SLES
- Conditioner – Rinse-Off
- Hair Styling Cream

Hair Strengthen Spray H-3013-22

CHT-BeauSil™ RE-AMO 919 EM improves the softness and reduces frizz with no build-up effect. CHT-BeauSil™ PEG 205 leaves a light hair feeling and nourishes the hair

Phase	Tradename	Supplier	INCI / Chemical	w/w %
A	Water	-	Aqua	To 100.00
B	Glycerin	-	Glycerin	0.50
	Butylen glycole	-	Butylen glycole	0.50
	Jaguar C-162	Solvay	Hydroxypropyl Guar (and) Hydroxypropyltrimonium Chloride	0.20
C	Dehyquart A-CA	BASF	Cetrimonium Chloride	0.20
	CHT-BeauSil™ RE-AMO 919 EM	**CHT**	**Glucoamido amodimethicone (and) Coco-glucoside**	**5.00**
D	Gluadin W 40Bp	BASF	Hydrolyzed Wheat Protein	0.15
E	Fragrance	-		q.s.
	CHT-BeauSil™ PEG 205	**CHT**	**PEG-12 Dimethicone**	**0.30**
	Preservative*	-		q.s.
F	Citric acid	-	Citric acid	q.s.
				100.00

(*e.g. 0.5% Euxyl K900, Schülke)

Procedure

- Heat phase A to 60°C
- Combine phase B and add to phase A, further heating is not required
- Add ingredients of phase C to phase AB
- Add phase D
- Combine ingredients of phase E and add to phase ABCD
- Adjust pH to 5 with phase F

Technical data	
Appearance	Transparent liquid
pH-value	~ 5.0
Viscosity	<20 mPas (20rpm, 20°C)
Stability	4 weeks at RT, 45°C

CHT SMART CHEMISTRY WITH CHARACTER.

Classic Shampoo with SLES H-1018-23-US

CHT-BeauSil™ RE-AMO 919 EM creates a smooth and soft hair feeling with no build-up effect.

Phase	Tradename	Supplier	INCI / Chemical	w/w %
A	Water	-	Water	To 100.00
B	Glycerin	-	Glycerin	0.40
	Celquat SC-240	Akzo Nobel	Polyquaternium-10	0.20
C	Genapol LRO Liq	Clariant	Sodium laureth sulfate	35.00
	CHT-BeauSil™ RE-AMO 919 EM	**CHT**	**Glucoamido amodimethicone (and) Coco-glucoside**	**4.00**
	Genagen CAB 818	Clariant	Cocamidopropyl betaine	7.50
D	Sodium chloride	-	Sodium chloride	1.00
E	Arlypon TT	BASF	PEG/PPG-120/10 trimethylolpropane trioleate (and) laureth-2	1.00
F	Sodium chloride	-	Sodium chloride	q.s.
	Euxyl K900	Schülke	Preservative agent	0.50
G	Citric acid	-	Citric acid	To pH 5.5
				100.00

Procedure

- Combine phase B and add to phase A
- Add phase C, D and E to AB
- Adjust viscosity with phase F
- Add phase G

Technical data	
Appearance	Transparent liquid
pH-value	~ 5.0
Viscosity	~ 6.000 mPas (20rpm, 20°C)
Stability	4 weeks at RT, 45°C

CHT
SMART CHEMISTRY WITH CHARACTER.

Sweet Touch Conditioner H-2008-23-US

CHT-BeauSil™ RE-AMO 919 EM provides softness, improved combing, and protects the hair from damage.

Phase	Tradename	Supplier	INCI / Chemical	w/w %
A	Water	-	Water	To 100.00
	Jaguar C-162	Rhodia	Hydroxypropyl guar (and) Hydroxypropyltrimonium chloride	0.20
	Lactic acid 80	Merck	Lactic acid	0.10
	Behenyl TMC-85	Croda	Behentrimonium chloride	0.50
B	Crodacol 1618	Croda	Cetearyl alcohol	4.00
	Tego Amid S18	Evonik	Stearamidopropyl dimethylamine	0.20
	Dimethicone 350cst	-	Dimethicone	1.00
	Eumulgin B2 G2	BASF	Ceteareth-20	0.20
C	Panthenol	-	Panthenol	0.10
	CHT-BeauSil™ RE-AMO 919 EM	**CHT**	**Glucoamido amodimethicone (and) Coco-glucoside**	**4.50**
	Hydrolyzed Keratin	-	Hydrolyzed Keratin	0.20
D	Preservative	-		q.s.
	Lactic acid 80	-		To pH 4.5
	Fragrance	-		q.s.
				100.00

Procedure

- Mix ingredients of phase A and heat to 80°C
- Blend ingredients of phase B at 80°C
- Add phase B to phase A
- Cool down to 40°C and add phase C
- Cool further and add phase D

Technical data	
Appearance	White cream
pH-value	4 – 5
Viscosity	n/a
Stability	2 weeks at 45°C

CHT
SMART CHEMISTRY WITH CHARACTER.

Hair Styling Cream

H-9003-23-US

CHT-BeauSi™ RE-AMO 919 EM supports a non-sticky flexible hold and conditioning effect for the hair to keep it healthy.

Phase	Tradename	Supplier	INCI / Chemical	w/w %
A	Water	-	Aqua	To 100.00
	EDTA	-	Disodium EDTA	0.05
	Propylene glycol	-	Propylene glycol	2.00
B	Carbopol EDTD 2020	Lubrizol	Acrylates/C10-30 Alkyl Acrylate	0.60
C	NaOH, 10%	-	Sodium hydroxide	To pH 6.0-6.5
D	**CHT-BeauSil™ RE-AMO 919 EM**	**CHT**	**Glucoamido amodimethicone (and) Coco-glucoside**	**3.00**
E	Fragrance	-		q.s.
	Preservative agent*	-		q.s.
F	Water	-		10.00
	Luviskol K 30 Powder	BASF	Polyvinylpyrrolidon	3.00
	NaOH 10%	-	Sodium hydroxide	q.s.
				100.00

Procedure

- Blend ingredients of phase A
- Disperse phase B
- Adjust pH with phase C
- Add ingredients of phase D, E
- Premix ingredients of phase F and adjust pH to 6.0-6.5
- Add phase F to the formulation

Technical data	
Appearance	Opaque Gel
pH-value	~6.5
Viscosity	38.000 mPas
Stability	4 weeks at 50°C

SMART CHEMISTRY WITH CHARACTER.

NO.

Ineffective Silicone Alternatives

YES.

Safe Effective Sustainable Recycled Silicone Solutions