



**SASOL**

# PARAFOL

Your natural alternative  
to synthetic oils

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Sasol Chemicals



## About us

We at Sasol Chemicals innovate for a better world and deliver long-term value to our customers, communities and society.

Our broad portfolio of high-value products plays an integral role in the creation of numerous solutions that benefit the lives of millions of people.

Thousands of companies around the world leverage our technology, world-class facilities, expertise and collaborative approach to tackle their challenges.

Surfactants, surfactant intermediates, fatty alcohols, linear alkyl benzene (LAB), short-chain linear alpha olefins, mineral oil-based and synthetic paraffin waxes, high-purity and ultra-high-purity alumina as well as high-quality carbon solutions form the basis of our key product range.

As individual as the industrial applications they serve, the tailor-made solutions offered by our products create real business value for customers. Ongoing research activities result in a continuous stream of innovative product concepts that help our customers position themselves successfully in future markets.

Our products are used in countless applications in our daily lives to add value, security and comfort. Typical examples include detergents, cleaning agents, personal care, construction, paints, inks and coatings, metalworking and lubricants, hot-melt adhesives, bitumen modification and catalyst support for automotive catalysts and refineries as well as other specialty applications including oil and gas recovery, agriculture, plastic stabilisation, and polymer production. Every day, our researchers explore ways to improve our products and develop innovations that improve the quality of people's lives.

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# 1. PARAFOL – Your natural alternative to synthetic oils

## 1.1 Description

Sasol is a producer of ingredients for cosmetics and personal care products. Our global manufacturing network along with highly skilled marketing, R&D teams is dedicated to helping you achieve your performance and formulation requirements. We strive to enable our customers to develop innovative, **cost-effective**, high-performance personal care solutions from **natural resources**. Our unique technology allows us to create products which have similar performance to synthetic emollients but are produced from **plant-based & renewable** raw materials. As Sasol is committed to sustainable palm production and trade, the palm-derived products that we offer are Roundtable on Sustainable Palm Oil (**RSPO**) Mass Balance (**MB**) grade.

**PARAFOL** paraffins are high-purity, biodegradable, linear single-cut hydrocarbons which are manufactured from natural sources.

This product line features three high-performing emollients:

- **PARAFOL 12 RSPO-MB** is a very light and highly spreading emollient that is a perfect replacement for Cyclomethicone (D5).
- **PARAFOL 14 RSPO-MB** is a light and highly spreading emollient that can perfectly substitute for Isohexadecane.
- **PARAFOL 22 - 95** is a non-volatile alternative to Dimethicones with a high molecular weight.

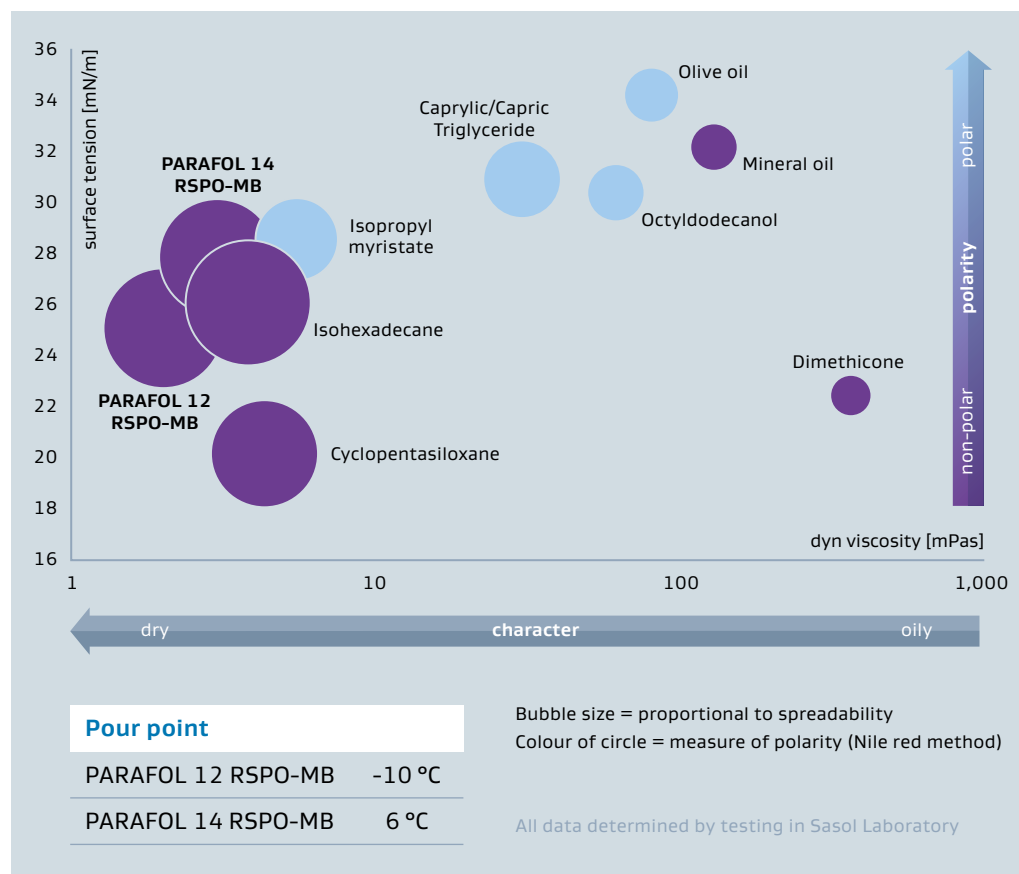


## 1.2 Features

- **PARAFOL** products are clear, colourless and odourless non-polar emollients. The low viscosity of liquid PARAFOL products makes them fast and highly spreading emollients.
- **PARAFOL** products demonstrate excellent oxidation and pH stability, making them ideal to formulate at extreme pH conditions.
- **PARAFOL** products are able to solubilise silicones, lipophilic cosmetic ingredients and UV filters.

## 1.3 Sasol emollient properties at a glance

Figure 1: PARAFOL – emollient properties at a glance



## 2. Why PARAFOL?

### Value add of PARAFOL products



100 % Bio-based & renewable



Biodegradable non-toxic to fish, daphnia, and algae



Superior performance



High stability



Cost effective

### Super properties of light PARAFOLS



Fast and high spreadability



Solubilises lipophilic cosmetic ingredients & organic liquid UV filters



High volatility at body temperature

### Sasol's promise

Sasol is a producer of ingredients for cosmetics and personal care products. Our global manufacturing network along with highly skilled marketing, research and development teams is dedicated to helping you achieve your performance and formulation requirements. Take advantage of Sasol's experience in product development.

QUALITY ASSURANCE

RELIABILITY OF SUPPLY

TECHNICAL SUPPORT

BEST PERFORMANCE-BASED PRICE

## 2.1 PARAFOL product range

Main features of **PARAFOL** products are listed below.

	<b>PARAFOL 12 RSPO-MB</b>	<b>PARAFOL 14 RSPO-MB</b>	<b>PARAFOL 22 – 95</b>
<b>Raw material</b>	Natural (RSPO-MB) Palm Kernel Oil	Natural (RSPO-MB) Palm Kernel Oil	Natural Rape Seed
<b>Biodegradability</b>	Readily Biodegradable	Readily Biodegradable	Inherently Biodegradable
<b>Feel</b>	Very light & highly spreading	Light & highly spreading	–
<b>Volatility @ body temperature</b>	High Volatility (> Cyclomethicone D5)	Medium Volatility	–
<b>Stability</b>	Highly stable against oxidation and in extreme pH environment	Highly stable against oxidation and in extreme pH environment	Highly stable against oxidation and in extreme pH environment
<b>Solubility</b>	Solubilises lipophilic cosmetic ingredients & organic liquid UV filters	Solubilises lipophilic cosmetic ingredients & organic liquid UV filters	–
<b>Approved labels</b>	COSMOS RSPO	COSMOS RSPO	COSMOS
<b>Applications</b>	<ul style="list-style-type: none"> <li>• Cyclomethicone D5 replacement</li> <li>• Skin care</li> <li>• Sun care</li> <li>• Hair care</li> <li>• Deodorants</li> </ul>	<ul style="list-style-type: none"> <li>• Isohexadecane replacement</li> <li>• Skin care</li> <li>• Sun care</li> <li>• Hair care</li> <li>• Colour cosmetics</li> </ul>	<ul style="list-style-type: none"> <li>• Dimethicone replacement</li> <li>• Hair care</li> </ul>



All **PARAFOL** products are verified by ECOCERT GREENLIFE, conform to the COSMOS Standard.

**COSMOS  
APPROVED**

## 2.2 Physical properties

Typical physical properties of **PARAFOL** products are listed below.

	<b>PARAFOL 12 RSPO-MB</b>	<b>PARAFOL 14 RSPO-MB</b>	<b>PARAFOL 22 – 95</b>
<b>INCI name</b>	Dodecane	Tetradecane	Docosane
<b>CAS reg. no.</b>	112-40-3	629-59-4	629-97-0
<b>Appearance @ 20 °C</b>	Clear, colourless liquid	Clear, colourless liquid	Colourless solid
<b>Purity</b>	99.0 % min.	97.0 % min.	95.0 % min.
<b>Viscosity mPas</b>	1.5 [@ 20 °C]	2.3 [@ 20 °C]	3.4 [@ 60 °C]
<b>Surface tension @ 20 °C</b>	25.1 mN/m	28.0 mN/m	–
<b>Refractive index @ 20 °C</b>	1.4216 nD	1.4289 nD	–
<b>Pour point</b>	-10 °C	6 °C	43 °C <sup>(1)</sup>
<b>Flash point</b>	84 °C	115 °C	184 °C
<b>Colour [Hazen]</b>	20 max.	20 max.	20 max.
<b>Density [g/ml]</b>	0.749 [@ 20 °C]	0.763 [@ 20 °C]	0.768 [@ 60 °C]

<sup>(1)</sup> Melting point



### Packaging

155 kg coated steel drums

### Packaging compatibility

Compatible with materials like HDPE coated with EVOH or PA

### Storage

Protect from moisture and sunlight; keep between 5 and 20 °C

### Shelf life

48 months from the date of manufacturing when properly stored and handled

### Certificates (Sasol Germany GmbH)

- ISO 14001; ISO 9001; ISO 45001; EMAS
- Approved by COSMOS and ECOCERT
- Kosher and Halal products can be provided upon request

For further information, please refer to the Technical Data Sheet (TDS), the Material Safety Data Sheet (MSDS) and the Regulatory Information Sheet (RIS).



## 2.2.1 Solubility

PARAFOL products are miscible with **silicones** and **lipophilic cosmetic oils & solvents**.

Solubility in	PARAFOL 12 RSPO-MB	PARAFOL 14 RSPO-MB
Water	○	○
Glycerine	○	○
Propylene Glycol	○	○
Ethanol	○	○
Caprylic / Capric Triglyceride	×	×
Olive Oil	×	×
Isopropyl Myristate	×	×
Octyldodecanol	×	×
Mineral Oil (150 cSt)	×	×
Cyclopentasiloxane	×	×
Dimethicone (350 cSt)	×	×

Solubility at R.T.: ○ = insoluble; × = soluble in any ratio; P = partially soluble

PARAFOL products are effective solubilisers of **crystalline & liquid UV filters**

INCI	USAN*	Filter type	PARAFOL 12 RSPO-MB	PARAFOL 14 RSPO-MB	Cyclo-pentasiloxane	Iso-hexadecane
<b>Liquid UV filters</b>						
Ethylhexyl Salicylate	Octisalate	UVB	×	×	×	×
Octocrylene	Octocrylene	UVB / shorter UVA	×	P (~ 80 %)	○	×
Homosalate	Homosalate	UVB	×	×	×	×
Ethylhexyl Methoxycinnamate	Octinoxate	UVB	×	×	×	×
<b>Crystalline UV filters</b>						
Ethylhexyl Triazone	–	UVB	P (~ 2.0 %)	P (~ 1.0 %)	P (~ 0.2 %)	P (~ 0.1 %)
Diethylamino Hydroxybenzoyl Hexyl Benzoate	–	UVA long-wave	P (~ 0.7 %)	P (~ 0.6 %)	P (~ 0.1 %)	P (~ 0.4 %)
Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine	Bemotrizinol	UVA/ UVB	P (~ 0.4 %)	P (~ 1.0 %)	P (~ 0.5 %)	P (~ 0.4 %)
Benzophenone-3	Oxybenzone	UVA / shorter UVB	P (~ 1.0 %)	P (~ 3.0 %)	P (~ 0.9 %)	P (~ 2.0 %)
Butylmethoxydibenzoyl-methane	Avobenzene	UVA	P (~ 1.3 %)	P (~ 1.3 %)	P (~ 0.7 %)	P (~ 0.5 %)

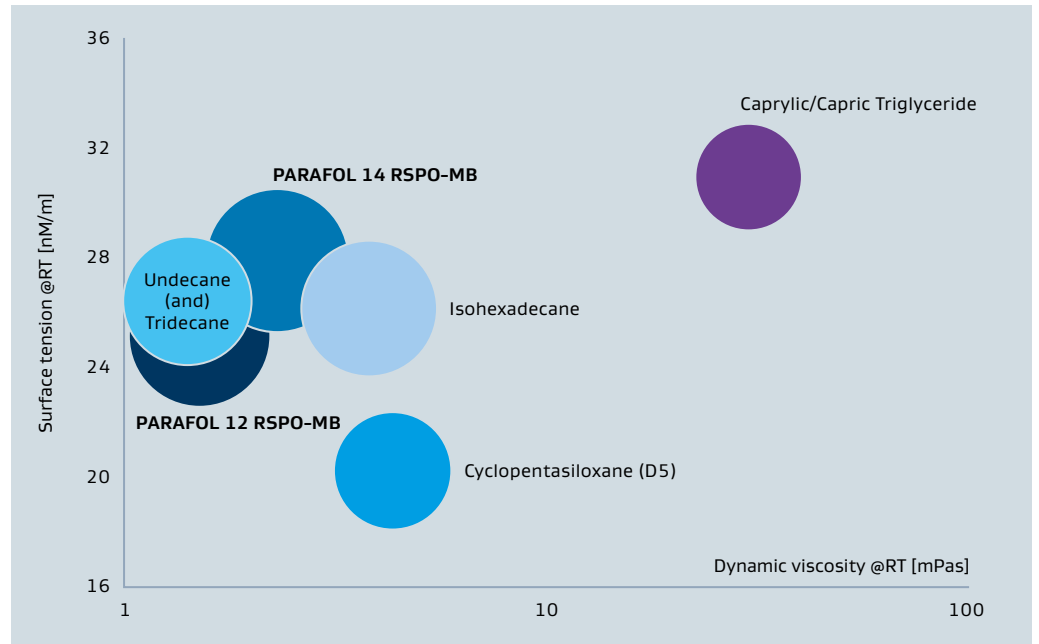
Solubility at R.T.: ○ = insoluble; × = soluble in any ratio; P = partially soluble

\* USAN: United States adopted names  
All data determined by testing in Sasol laboratory

### 2.2.2 Spreadability

**PARAFOL 12 RSPO-MB** and **PARAFOL 14 RSPO-MB** exhibit the ideal combination of low surface tension, low viscosity and high spreadability to mimic Cyclomethicone D5 or petrochemical oils.

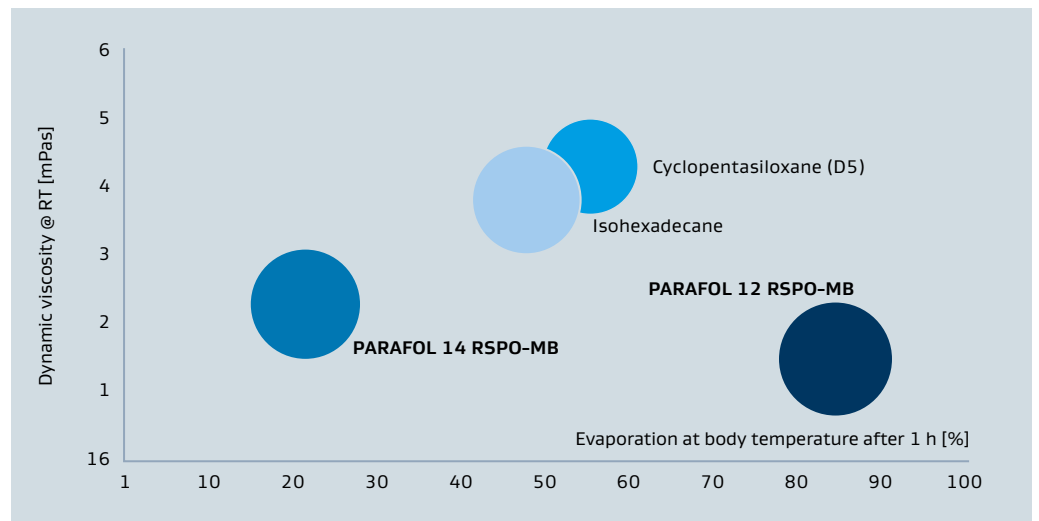
Figure 2: Spreadability of PARAFOLS vs. other emollients



### 2.2.3 Volatility

The combination of low viscosity, high spreadability and volatility of **PARAFOL 12 RSPO-MB** helps sun care formulations form an even film on the skin’s surface to improve UV protection or to improve pigment distribution in colour cosmetics.

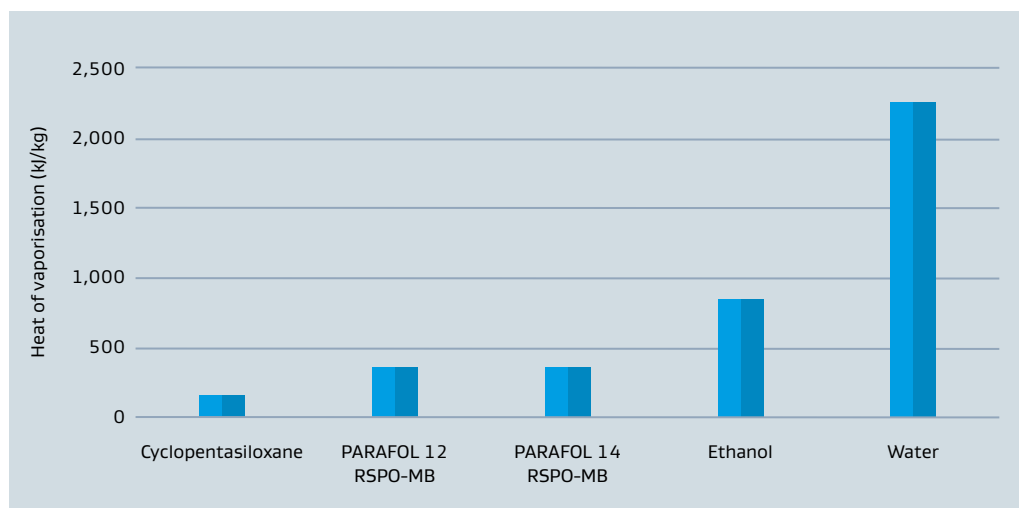
Figure 3: Volatility of PARAFOLS vs. other emollients



## 2.2.4 Heat of vaporisation

Similar to volatile silicones, **PARAFOL 12 RSPO-MB** and **PARAFOL 14 RSPO-MB** are highly volatile and have low heat of vaporisation. Therefore, they are able to evaporate from sun-warmed skin without the undesirable cooling effect when used in AP/DEO or sun spray applications.

Figure 4: Heat of vaporisation at 25 °C



## 2.3 Registration

	PARAFOL 12 RSPO-MB	PARAFOL 14 RSPO-MB	PARAFOL 22 – 95
<b>CAS reg. no.</b>	112-40-3	629-59-4	629-97-0
<b>EINECS</b>	203-967-9	211-096-0	211-121-5
<b>TSCA</b>	Yes	Yes	Yes
<b>Japan ENCS</b>	(02)-10	(02)-10	(02)-10
<b>KECI</b>	KE-12826	KE-33334	KE-12773
<b>AICS</b>	Yes	Yes	Yes
<b>DSL</b>	Yes	Yes	Yes
<b>China IECSC</b>	Yes	Yes	Yes
<b>Japan ISHL</b>	(02)-10	(02)-10	(02)-10
<b>New Zealand NZIoC</b>	Yes, HSNO approved	Yes, HSNO approved	Yes
<b>Philippines PICCS</b>	Yes	Yes	Yes

For further information, please refer to the corresponding Regulatory Information Sheet (RIS).

### 3. Applications

PARAFOL products can be used in a wide range of cosmetic & personal care formulations.

	Recommended use level
• Skin care	1 – 10 %
• Sun care	1 – 3 %
• Hair care	1 – 10 %
• Colour cosmetics	1 – 10 %

#### 3.1 Skin and sun care

PARAFOL products exhibit the same feel and performance of silicone oils. The lighter products **PARAFOL 12 RSPO-MB** and **PARAFOL 14 RSPO-MB** are characterised by their high spreadability and nonoily touch. The heavier product **PARAFOL 22** helps increase spreading times, resulting in a long-lasting effect.

**PARAFOL 12-RSPO-MB** and **PARAFOL 14 RSPO-MB** combine high spreadability and volatility with low viscosity to closely mimic the feel of Cyclopentasiloxane (D5) and Isohexadecane in AP/DEO applications.

**PARAFOL** products are an excellent silicone oil replacement in sun care formulations. In addition to their fast-spreading and soft finish, they are effective solubilisers of several crystalline & liquid UV filters.



## 3.2 Hair care

Typical rinse-off as well as leave-on hair conditioners contain quaternary compounds and silicone oils as actives, which have the primary function of providing a protective layer to the skin to keep it moisturised. Silicone oils in hair conditioners are often blends of cyclopentasiloxane and Dimethicones.

Sasol's **PARAFOL** products are plant-based, renewable and biodegradable alternatives to these oils and can be used as a drop-in substitute in hair care formulations. **PARAFOL** products enhance dry hair properties, significantly improve conditioner distribution in hair, and result in a longer-lasting conditioning effect.

### Natural silicone-free-rinse-off conditioner formulation

Phase	Ingredient	*	INCI name	wt%
A	GALENOL 1618 AE	1	Cetearyl Alcohol (and) Ceteareth-20	3.0
	NAFOL 1618 H	1	Cetearyl Alcohol	1.0
	<b>PARAFOL 12 RSPO-MB</b>	<b>1</b>	<b>Dodecane</b>	<b>1.0</b>
	<b>PARAFOL 22-95</b>	<b>1</b>	<b>Docosane</b>	<b>1.0</b>
	Genamin BTLF	4	Behentrimonium Chloride	1.0
B	Demin. Water		Aqua	Add to 100
	Genamin CTAC 50		Cetrimonium Chloride	2.0
C	Perfume "Commage"		Parfum (EU) / Fragrance (US)	q.s.
	Citric acid		Citric Acid	q.s.
D	Preservative			q.s.

#### Preparation:

1. Heat phase (A) and (B) separately to 70 °C.
2. Add phase (B) to (A) and homogenise.
3. Cool to 35 °C and add phase (C) to (AB) and homogenise.
4. Add phase (D) to (ABC) and homogenise.
5. Adjust the pH value.

**Appearance:** Viscous

Viscosity (Haake, Rheostress 1, 1 s<sup>-1</sup>): ~ 3800 mPas at 25 °C

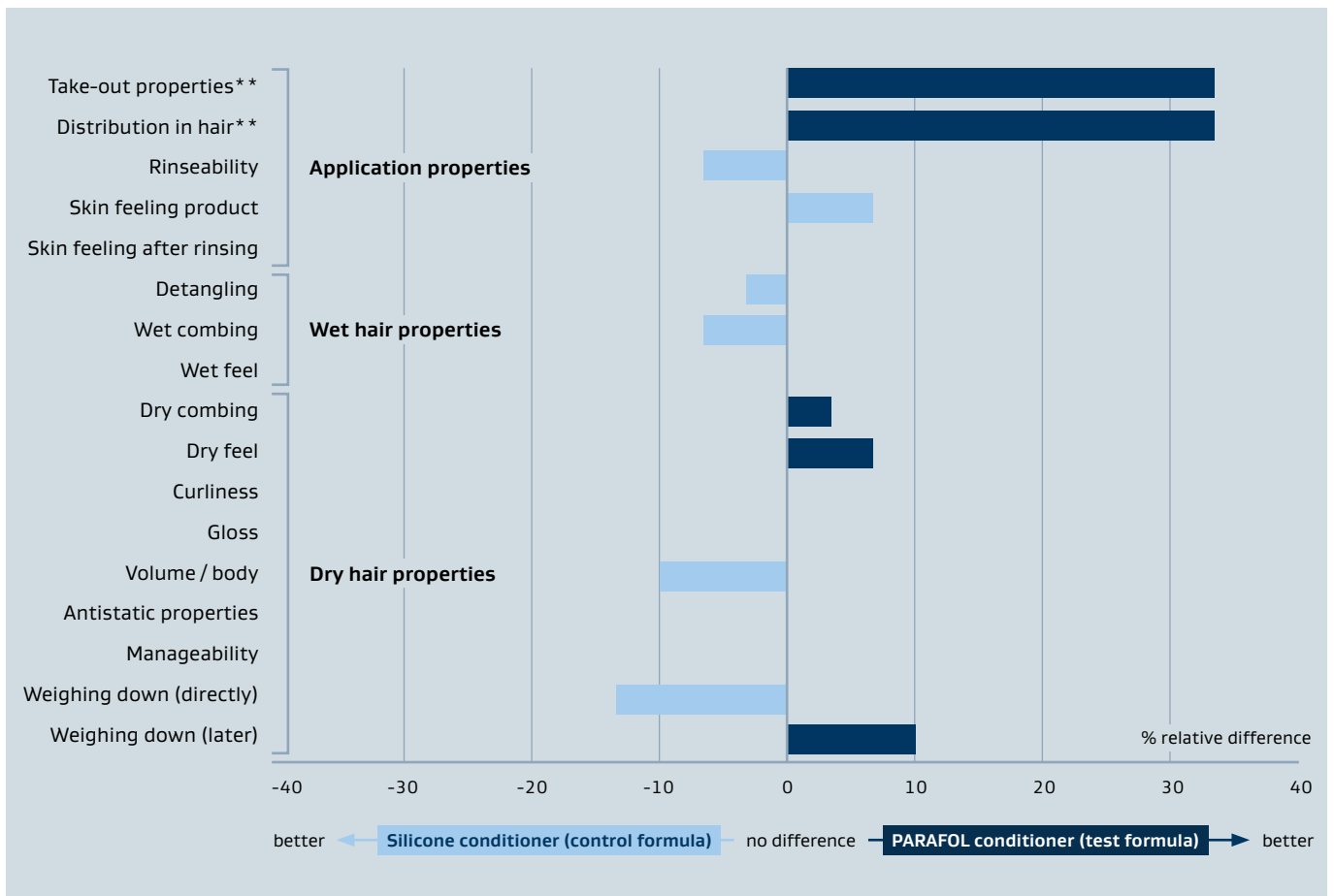
Storage stability in terms of appearance: stable at room temperature 40 °C and 50 °C for at least 3 months.

#### \* Suppliers:

(1) Sasol Germany GmbH, (4) Clariant International Ltd., (6) drom fragrances GmbH & Co. KG

In a half-head test, a rinse-off conditioner with a combination of **PARAFOL 12 RSPO-MB** and **PARAFOL 22 – 95** showed comparable efficiency and performance to a reference silicone conditioner containing Dimethicone and a D5/D6 Cyclomethicone blend.

Figure 5: Half-head test results\*



\* Carried out by an independent test institute  
 \*\* Significant difference

**PARAFOL 12 RSPO-MB** helps attain impressive results with silky, shiny, healthy hair with improved manageability. **PARAFOL 22 – 95** imparts a luxurious nourishing conditioning effect to dry hair leaving a silky soft feeling.

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**Need more details?**

If you are interested in further information on formulations, please refer to the Cosmetics formulary brochure or contact the local sales office.



**Source reference**

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