A technical insight into our building blocks for Phase Change Materials (PCM)

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.

Within our Technical Formulations we offer customers and formulators in industrial markets technical support via an extensive range of high-performance functional additives, components and unique solutions that enable technical processes and facilitate the production of industrial goods. Customers use our products as emulsifiers, foamers, defoamers, inhibitors, dispersants, solvents, carriers, cleaning agents, spacer fluids, wetting agents, viscosity modifiers and pour point depressants.

Our customer-centric approach promotes close collaboration with customers in the development of high-performing solutions, resulting in products tailored to specific applications. Given our global presence and our commitment to sustainability, these solutions include responsibly sourced, sustainable raw materials such as synthetic, palm-free, natural renewable and/or low carbon footprint.

Content

Paraffins for Phase Change Materials (PCM)

We produce the building blocks for **Phase Change Materials (PCMs)**.

Our products are globally accessible, mainly based on renewable raw materials, high purity, biodegradable, single-cut linear paraffins – which are used in a variety of applications. From cool wicking textiles to temperature-controlled packaging, we have the perfect solution for your PCM applications.
We offer a broad range of paraffins with distinct melting points to meet the necessary temperature requirements from low temperatures to high temperatures.

Why our Paraffins are the best choice

PARAFOLs are high purity, linear paraffins mainly available from renewable resources.

PARAFOL single cut paraffins are an excellent choice when looking for a phase change material for latent heat storage applications including cold chain logistics, functional textiles and construction.

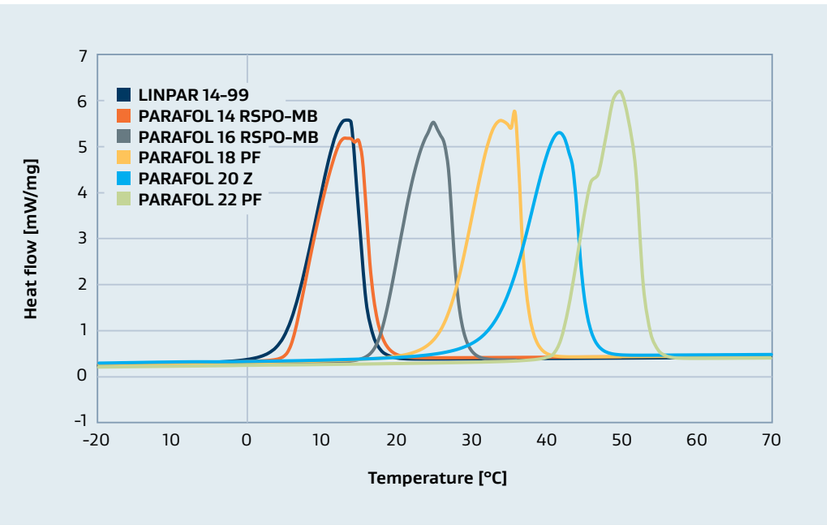
PARAFOL single cut paraffins are an alternative option when searching for high-purity non-polar solvents, oils, or wax additives. PARAFOLs are available from natural-based feedstock.

The performance profile of **PARAFOL** single cut paraffins is characterised by:

- sharp melting profiles as shown in Figure 1
- adjustable melting points by chain length in the desired temperature range
- high latent heat of fusion as shown in Figure 2
- non-tendency to segregation
- chemical inertness
- non-corrosiveness to conventional storage and construction material
- non-degradation throughout melt/freeze cycles
- non-tendency to supercooling

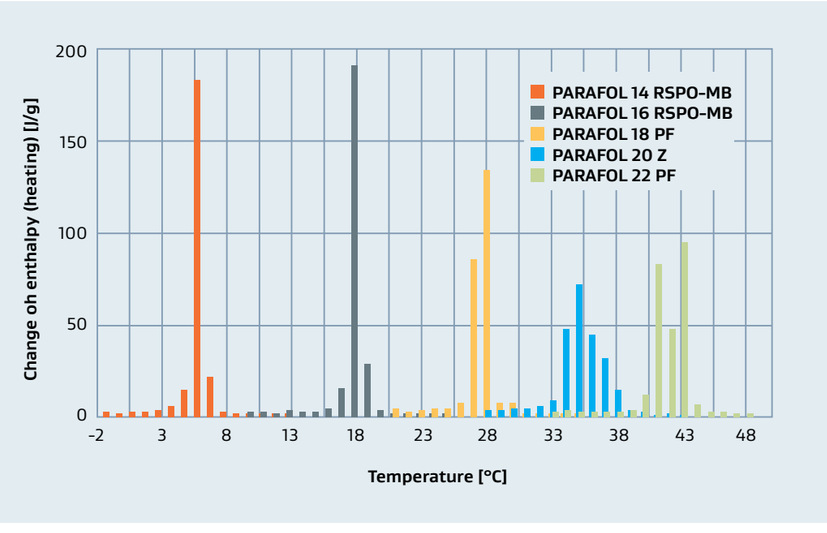
Sharp melting profile

Figure 1:
DSC thermogram – melting profile



High latent heat of fusion

Figure 2:
Detailed latent heat measurement in intervals of 1 °C



Applications

Discover the applications where our products deliver outstanding performance.

The wide landscape of PCM products is dynamic and we are proud to offer innovative solutions for the following applications:

Latent heat storage

Logistics and transportation

Construction

Automotive

Functional textile

Bedding

Cooling

Our **PARAFOL** products are also utilized in various other applications such as cosmetics, inks, paints, coatings, and more.

Please reach out to us for our PARAFOL brochure.

A technical insight into our building blocks for PCM Applications

Applications

Our products are used in countless applications in our daily lives to add value, security and comfort.

PARAFOL and LINPAR products

Trade name		PARAFOL 14 RSPO-MB	LINPAR 14	PARAFOL 16 RSPO-MB	PARAFOL 18 PF	PARAFOL 20 Z	PARAFOL 22 PF
Chemical name		n-tetradecane	n-tetradecane	n-hexadecane	n-octadecane	n-eicosane	n-docosane
Feedstock		oleochemical	synthetic	oleochemical	oleochemical	synthetic	oleochemical
Appearance at ambient temperature		clear, colourless liquid	clear, colourless	clear, colourless liquid	colourless, solid	colourless, solid	colourless, solid
Sales specification							
Purity	[wt. %]	min. 97	min. 99	min. 97	min. 97	min. 90	min. 95
Onset temperature	[°C]	approx. 4.5	approx. 4.5	approx. 16.5	approx. 27.5	approx. 32.5	approx. 41.5
Latent heat	[J/g]	min. 210	min. 210	min. 220	min. 220	min. 200	min. 220
Additional properties							
Molecular weight	[g/mol]	approx. 198	approx. 198	approx. 226	approx. 254	approx. 282	approx. 310
Colour	[Hazen]	max. 20	max. 30	max. 20	max. 20	max. 20	max. 20
Boiling point	[°C]	approx. 253	235-246	approx. 287	—	—	—
Flash point	[°C]	approx. 115	102	approx. 135	approx. 165	approx. 176	approx. 184
Kauri butanol value		approx. 12	—	approx. 8	—	—	—

Viscosity and density

The kinematic viscosity is the resistance to flow of a fluid under gravity. It is determined by measuring the time for a volume of liquid to flow under gravity through a calibrated glass capillary viscometer.

The temperature dependant kinematic viscosity **PARAFOL** is shown in Figure 3.

Density is a measure of how much mass is contained in a given unit volume. The formal definition of density is mass per unit volume. Usually, the density is expressed in grams per mL. In general, density can be changed by changing either the pressure or the temperature. Increasing the pressure will always increase the density of a material. Increasing the temperature generally decreases the density, but there are notable exceptions to this generalisation.

The temperature dependent density of **PARAFOL** is shown in Figure 4.

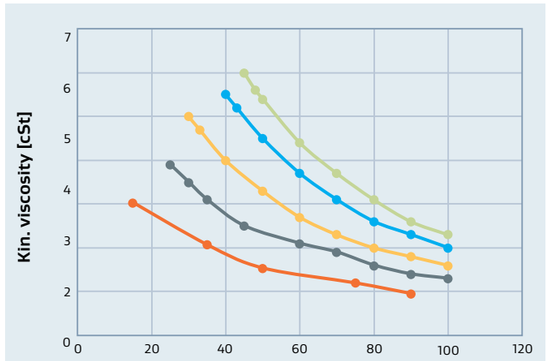


Figure 5: Kin. viscosity

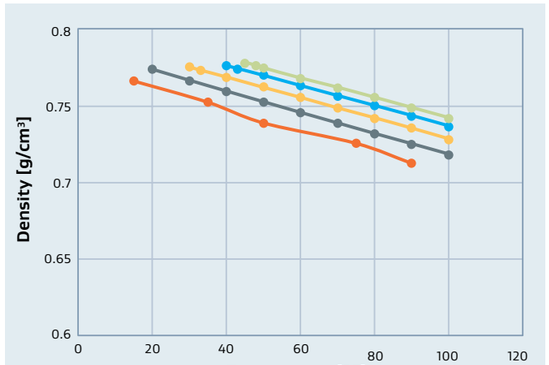


Figure 6: Density

Analytical methods

		Sasol method with reference to
Boiling point		DIN 51 751
Colour		EN ISO 6271 -2
Density		DIN EN ISO 12 185
Flash point	Pensky-Martens (65° C to 165° C)	EN ISO 2719
	Cleveland (> 165° C)	ISO 2592
Kauri butanol value		ASTM D 1133
Latent heat		DIN 53 765
Molecular weight		
Onset temperature		DIN 53 765
Purity		Gas chromatographic method
Viscosity		ASTM D 7042

Packaging and delivery

Filled products

1. In steel drums
- Filling quantity: 155 kg/drum
- Pallet capacity: 4 drums (screw-cap) on a CP3 pallet covered by stretch hood
- Inside coating using epoxyphenolic lacquer

2. In intermediate bulk containers (IBCs)
- Capacity of approximately 1 kg or 1 m^3
- Pallet capacity: 1 container securely mounted onto a CP1 pallet
- EVOH Barrier for guaranteed permeation protection

Handling and storage

Storage temperature of all goods shipped in barrels or drums

5 < T < 30 °C
41 < T < 86 °F

Sasol Chemicals alcohol portfolio

Sasol Chemicals is one of the world's largest suppliers of C6+ alcohols and offers one of the broadest portfolios of specialty and commodity alcohols based on different production technologies. Sasol Chemical's C_6 to C_{20+} alcohols serve a huge number of different industries along the chemical value chain.

Want to explore our comprehensive alcohol brochure? Don't hesitate to get in touch with us for details!

LIAL	Mixture of linear and mono-branched alcohols from C_9 to C_{17}	Sasol Italy S.p.A., Augusta
ALCHEM	Linear alcohol mono-cuts and blends from C_9 to C_{17}	Sasol Italy S.p.A., Augusta
ISALCHEM	Mono-branched alcohol mono-cuts and blends from C_9 to C_{17}	Sasol Italy S.p.A., Augusta
NACOL	Pure cuts of linear alcohols C_6 to C_{22}	Sasol Germany GmbH, Brunsbüttel
NAFOL	Blends of linear alcohols C_8 to C_{28}	Sasol Germany GmbH, Brunsbüttel
ISOFOL	Defined branched Guerbet alcohols C_{12} to C_{32}	Sasol Germany GmbH, Brunsbüttel
SAFOL	Mixture of linear and branched alcohols C_{12} to C_{13}	Sasol Ltd, Secunda
ALFOL	Pure cuts and blends of linear Ziegler alcohols C_6 to C_{22}	Sasol Chemicals (USA) LLC, Lake Charles

Registration

For registration status, please refer to the material safety data sheet or contact us at:

Sasol Chemicals | https://chemicals.sasol.com/contactus

Our global footprint

Sasol Chemicals

Technical Formulations – Phase Change Materials

www.chemicals.sasol.com

A technical insight into our building blocks for Phase Change Materials (PCM) 07/25