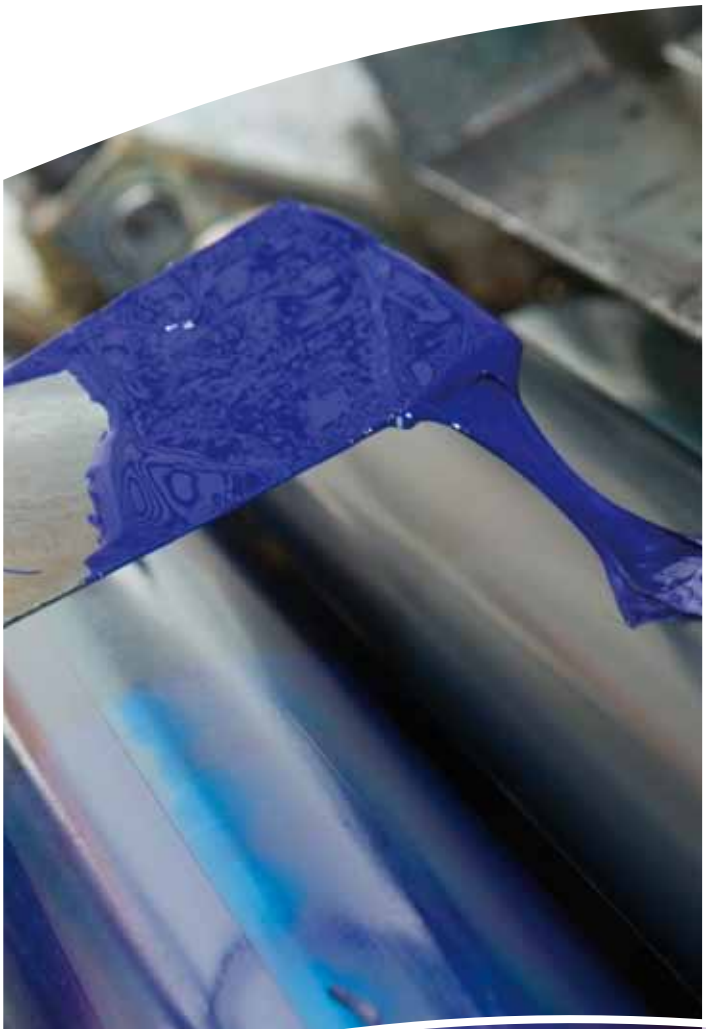
sasol
reaching new frontiers



NACOL® Ether

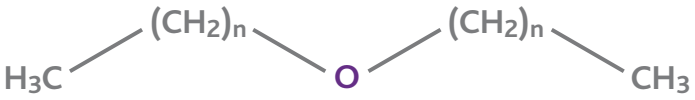
Di-n-alkyl-ethers for technical applications

Contents

1. General information

NACOL® Ethers are prepared in a catalyzed dehydration process using NACOL® alcohols as starting material. The ethers are purified in a further distillation step and are free of catalyst traces.

NACOL® Ethers are available with chain lengths between C_{12} and C_{36}.



n = 5, 7, 9, 11, 13, 15 , 17

Liquid NACOL® Ether

- Ethers based on linear alcohols (C_6 to C_{10})
- High purity (> 96%)
- Excellent flow and low viscosity properties
- Fast spreading agents
- Higher polarity than paraffins
- Alternative to many silicon additives
- Good pigment wetting properties
- Excellent solubility, low VOC solvents
- pH stable

Solid NACOL® Ether

- Ethers based on linear alcohols (C_{12} to C_{18})
- Sharp melting profile
- High latent heat
- Hydrophobation
- Higher polarity than paraffins
- Tunable hardness
- Good pigment compatibility
- pH stable

2. Applications

- Paints and coatings
- Printing inks
- Cleaners (i. e. I & I and hard surface)
- Textile
- Agrochemicals
- Latent heat storage units
- Ski waxes
- Defoamer

3. Other products and trademarks

Sasol Germany GmbH markets the linear alcohols worldwide under the following trademarks:

NACOL®	Pure cuts of linear alcohols C_6 to C_{22}
NAFOL®	Blends of linear alcohols C_8 to C_{28}

Based on the linear alcohols Sasol Germany GmbH is producing the following specialities:

GALENOL®	Self emulsifying blends of linear alcohols
ISOCARB®	Defined branched Guerbet acids C_{12} to C_{32}
ISOFOL®	Defined branched Guerbet alcohols C_{12} to C_{32}
LINPLAST®	Plasticizers made from alcohols
PARAFOL®	High purity normal paraffin cuts C_{12} to C_{22}

Product specific brochures are available with detailed information for NACOL® alcohols, NAFOL® alcohols, ISOFOL® alcohols, ISOCARB® acids and PARAFOL® pure cut paraffins.

Additional information on GALENOL® and LINPLAST® can be requested by contacting the local sales office listed on the back of the brochure.

4. NACOL® Ether

		NACOL® Ether 6	NACOL® Ether 8	NACOL® Ether 10
Chemical name		di-n-hexyl ether	di-n-octyl ether	di-n-decyl ether
Appearance at ambient temperature		clear, colourless liquid	clear, colourless liquid	clear, colourless liquid
Sales specification				
Purity	[wt. %]	96 min.	96 min.	96 min.
Water content	[wt. %]	0.1 max	0.1 max	0.1 max
Hydroxyl number	[mg KOH/g]	1.0 max.	1.0 max.	1.0 max.
Acid number	[mg KOH/g]	0.1 max.	0.1 max.	0.1 max.
Saponification number	[mg KOH/g]	2.0 max.	2.0 max.	2.0 max.
Additional properties				
Boiling point*	[° C]	228	286	—
Melting point*	[° C]	—	—	approx. 15
Pour point*	[° C]	-42	-7	17
Flash point*	[° C]	97	141	180
Refraction index*	[nD | 20]	1.4206	1.4306	1.4404
Molecular weight*	[g/mol]	186	240	298

		NACOL® Ether 12	NACOL® Ether 14
Chemical name		di-n-lauryl ether	di-n-myristyl ether
Appearance at ambient temperature		white, solid	white, solid
Sales specification			
Purity	[wt. %]	85 min.	85 min.
Water content	[wt. %]	0.1 max	0.1 max
Ester number	[mg KOH/g]	5.0 max.	5.0 max.
Acid number	[mg KOH/g]	1.0 max.	1.0 max.
Additional properties			
Melting point*	[° C]	32	44
Flash point*	[° C]	194	208
Refraction index*	[nD, 60° C]	1.4291	1.4333
Molecular weight*	[g/mol]	354	411

* approx. data
Products stabilised with alpha-tocophenol

4. NACOL® Ether

		NACOL® Ether 16	NACOL® Ether 18
Chemical name		di-n-cetyl ether	di-n-stearyl ether
Appearance at ambient temperature		white, solid	white, solid
Sales specification			
Purity	[wt. %]	85 min.	85 min.
Water content	[wt. %]	0.1 max	0.1 max
Ester number	[mg KOH/g]	5.0 max.	5.0 max.
Acid number	[mg KOH/g]	1.0 max.	1.0 max.
Additional properties			
Melting point*	[° C]	54	62
Flash point*	[° C]	233	259
Molecular weight*	[g/mol]	466	522

* approx. data
Products stabilised with alpha-tocophenol

5. Viscosity

Viscosity is a measure of a fluid's ability to resist flow under gravity. The kinematic viscosity of a fluid is defined as the ratio of absolute or dynamic viscosity to its density. The viscosity of a fluid is highly temperature dependant. For a liquid the kinematic viscosity will decrease with higher temperature, for a gas the kinematic viscosity will increase with higher temperature.

The temperature dependant kinematic viscosity of NACOL® Ethers is shown in Figure 1.

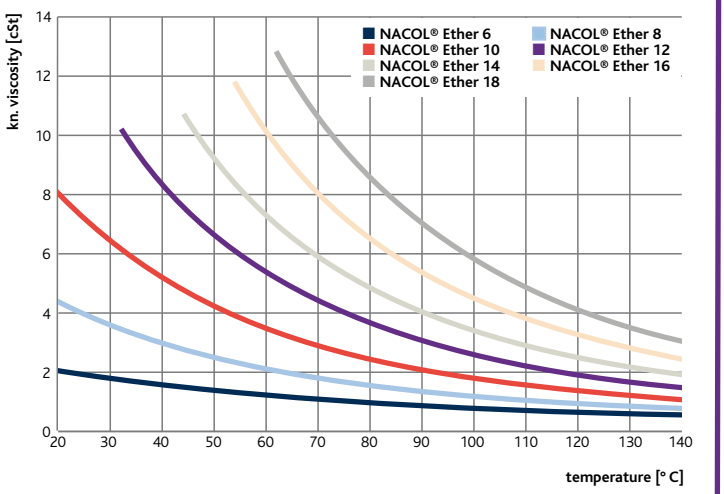


Figure 1
NACOL® Ether viscosity vs temperature

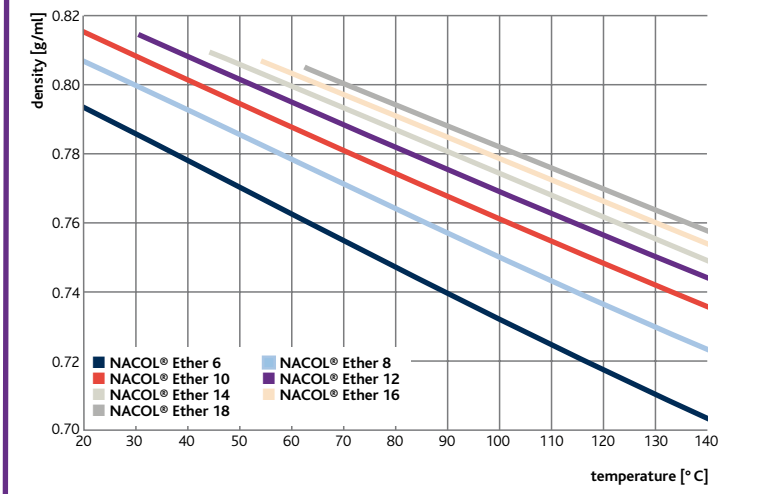


Figure 2
NACOL® Ether density vs temperature

6. Density

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 dependant density of NACOL® Ethers is shown in Figure 2.

7. Analytical methods

			Sasol method	with reference to
Acid number			600-31	DIN EN 14 104
Boiling point			600-21	DIN 51 751
Density			600-23	DIN EN ISO 12 185
Ester number			600-33	
Flash point	Pensky-Martens	65° C–165° C	600-26 b	EN ISO 2719
	Cleveland	> 165° C	600-26 c	ISO 2592
Hydroxyl number			600-30	DIN 53 240
Melting point			600-22 c	Ph. Eur. 2.2.14
Molecular weight			600-19	
Pour point			600-20	DIN ISO 3016
Purity			600-80	Gas chromatographic method
Refraction index			600-24	DIN 51 423
Saponification number			600-32	DIN 51 559
Viscosity			600-25	ASTM D 7042
Water content			600-37	DIN 51 777

8. *Packaging and delivery*

Bulk loading

All products can be delivered in bulk

- Road
  - 27 t per delivery for intermodal transportation
  - 24 t per delivery for conventional road tank vehicles
- Rail
  - 25 t per delivery for two-axle tank wagons
  - 55 t per delivery for four-axle tank wagons

Pastillated products

- Delivery of alcohols with a chain length of C14+
- Disposable packaging
- Please protect against direct sunlight and environmental influence

In polyethylene bags

- Suitable for foodstuffs
- Filling quantity: 20 kg/bag
- Pallet capacity: 24 bags per CP5 pallet (8 layers of 3 bags each), pallet covered by stretch hood
- Special packaging upon request

8. Packaging and delivery

Filled products

- Delivery of NACOL® ethers with chain lengths of C_{12} to C_{36}
- Special packaging upon request
- Disposable packaging
- Please protect against direct sunlight and environmental influence.

1. In steel drums

- Filling quantity: 160 to 180 kg/drum (depending on product)
- Pallet capacity: 4 drums (screw-cap drums) on a CP3 pallet covered by stretch hood
- Closed under a nitrogen blanket

2. In Intermediate Bulk Containers (IBCs)

- Capacity of approximately 800 kg
- Pallet capacity: 1 container securely mounted onto a CP1 pallet

3. As a special size (Hobbock)

- Filling quantity: 22 kg, plastic container
- Pallet capacity: 32 Hobbocks per Euro pallet, covered by stretch hood

9. Handling and storage

Storage temperature of all goods shipped in barrels or drums

5 < T < 30° C

41 < T < 86° F

- Plant components that come into contact with the product,e.g. pumps, pipes, tank containers etc. should be made of stainless steel where possible; aluminium plant components are unsuitable; petrol resistant hose connections can be used and should be rinsed thoroughly after use
- In the case of tank storage, inert gas blanketing is required
- Tank heating is required in the case of alcohols exceeding C_{12}; tank temperature shall not exceed 25° C above the setting point of the product; wall temperature of the heating coils shall not exceed 100° C
- In order to prevent overheating of the product at the heating coils, the use of a stirring device in the tank is compulsory

10. Registration

For registration status, please refer to the material safety data sheet or contact Sasol Olefins & Surfactants GmbH, info@de.sasol.com, Telephone +49 40 63684-1000

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