



sasol

LIAL ALCHEM ISALCHEM

C_9-C_{15} alcohols

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.



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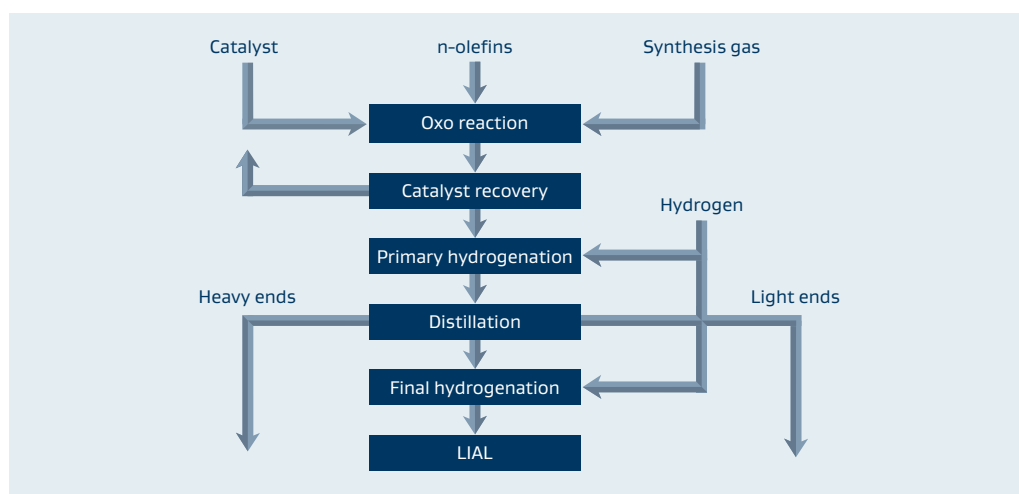
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1. Sasol Italy alcohol portfolio

LIAL	Mixture of linear and monobranched C ₉ –C ₁₅ alcohols, single cuts and blends
ALCHEM	Linear C ₉ –C ₁₅ alcohols, single cuts and blends
ISALCHEM	Monobranched C ₉ –C ₁₅ alcohols, single cuts and blends

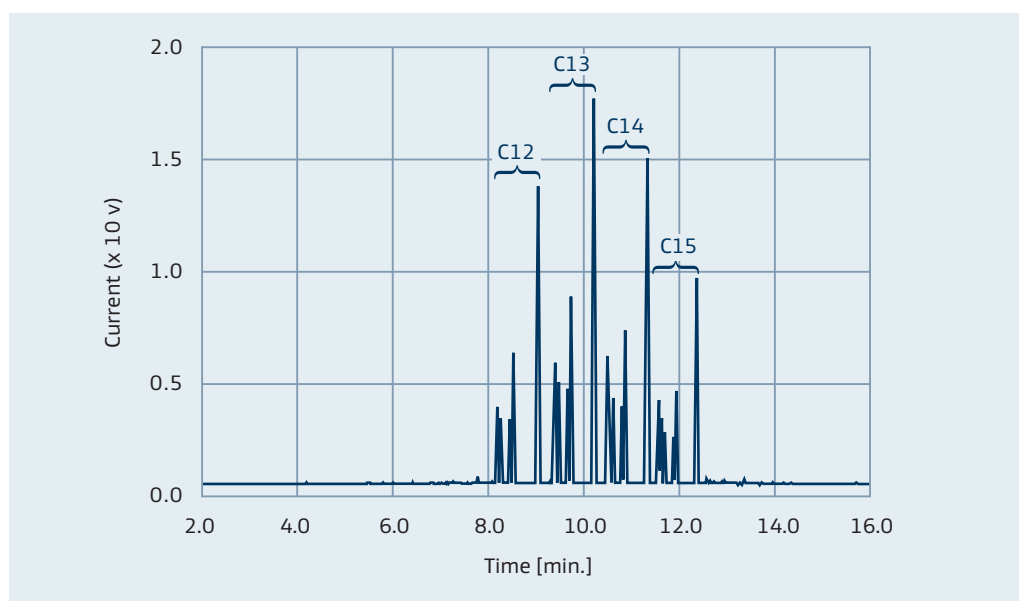
Sasol is a worldwide market leader of linear and branched alcohols, mixtures and derivatives. The alcohols produced by Sasol Italy at the plant located in Augusta (SR) are obtained by the hydroformylation and hydrogenation (OXO process) of petrochemical-derived n-olefins. Figure 1 shows a block diagram of the entire manufacturing process.

Figure 1:
Production flow chart of LIAL alcohols.

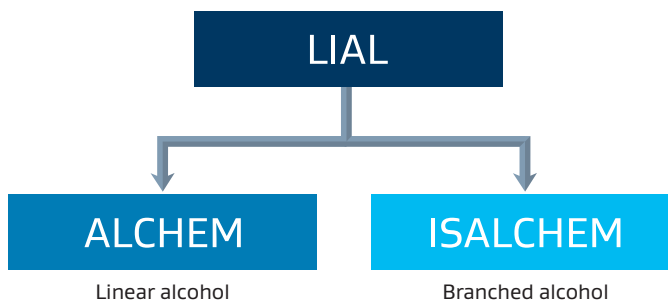


The product obtained is a mixture of linear and primary C₂-monobranched alcohols with a well-defined chemical structure, as clearly noticeable from the alcohol chromatogram reported in Figure 2. In Figure 3 the chemical structure of the C₁₂ isomers contained in LIAL alcohols is represented.

Figure 2:
Gas chromatogram of LIAL 125.



LIAL alcohols can be further processed in order to obtain ISALCHEM and ALCHEM alcohols that are the monobranched and linear fractions respectively. Moreover, additional blends can be prepared according to customer requests.



The different chemical structure of the LIAL (mixture of linear and branched alcohols), ALCHEM (linear alcohols) and ISALCHEM (branched alcohols) produces relevant differences in the physical-chemical properties both in the alcohols (as in the case of pour point, see Figure 4) and in the corresponding derivatives, allowing us to offer the product that best fits our customer requirements.

Figure 3:
Chemical structure of C₁₂ isomers
in LIAL alcohols.

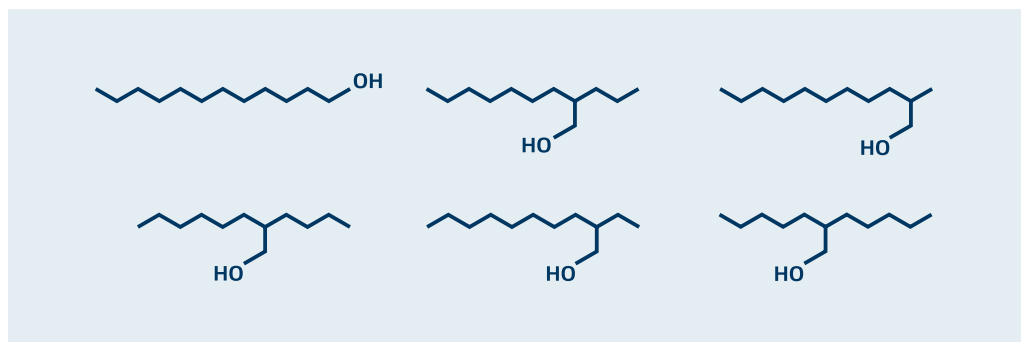
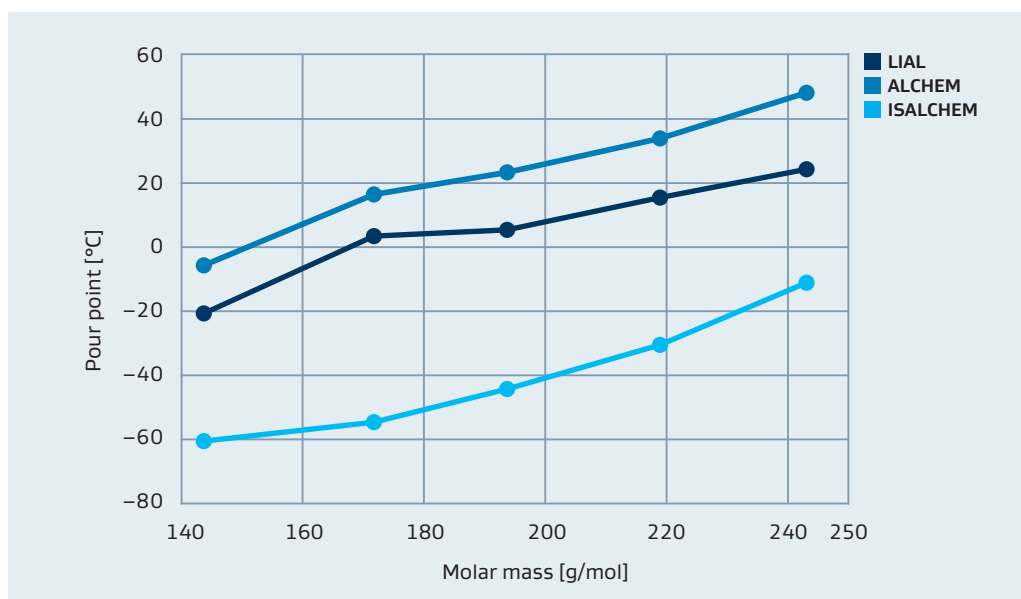


Figure 4:
Pour point of LIAL, ALCHEM
and ISALCHEM alcohols
vs. the molecular weight.



2. Applications

Due to the wide range of structures and properties, LIAL, ALCHEM and ISALCHEM alcohols can be used as they are or derivatised to be successfully used in several application fields.

Detergents and cleaners

- Washing powders
- Liquid detergents
- Detergent tablets
- All-purpose cleaners

Cosmetics and personal care

- Shampoos
- Bath foams
- Toothpastes
- Hair conditioners
- Creams and lotions
- Make-up products

Plastic additives

- Plasticisers
- Lubricants
- Stabilisers
- Polymerisation auxiliaries

Textile and leather

- Scouring agents
- Wetting agents
- Softeners
- Emulsifiers

Metal processing

- Coupling agents
- Aluminium rolling oils
- Metalworking fluids

Pulp and paper

- Deinking
- Floatation agents
- Foam depressants

Agrochemicals

Flavourings and fragrances

3. Other products and trademarks

Based on LIAL, ALCHEM and ISALCHEM, we produce the following derivatives:

LIALET	LIAL alcohol ethoxylates
BIODAC	Short-chain alcohol ethoxylates
MARLOX	LIAL alkoxyates
NONIDAC	Alcohol ethoxylates
DACLOR	LIAL ethoxysulphates
DACPON	Alcohol sulphates
ANIODAC	Alcohol ethoxysulphates
COSMACOL	Esters



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

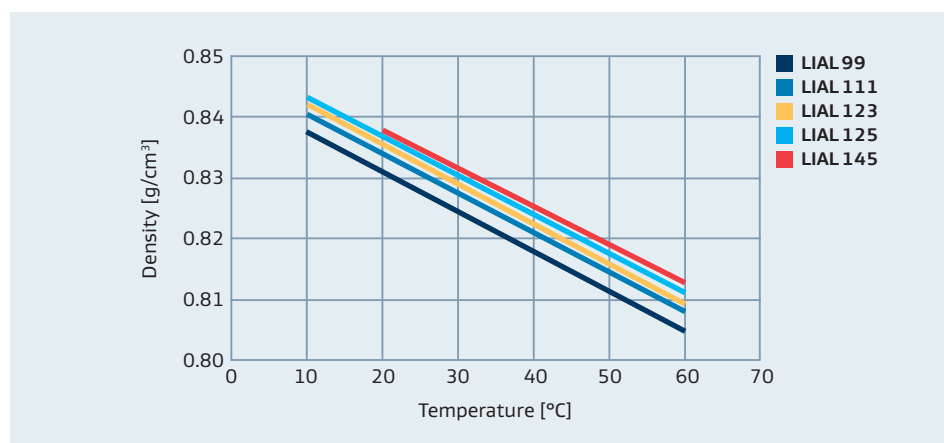
4. LIAL

Mixture of linear and monobranched C₉–C₁₅ alcohols (single cuts and blends)

		LIAL 99	LIAL 111
Sales specifications		C ₉ alcohols	C ₁₁ alcohols
Composition	[wt. %]	C ₈ and lighter: max. 1.0 C ₉ : min. 95.0 C ₁₀ and heavier: max. 4.0	C ₁₀ and lighter: max. 2.0 C ₁₁ : min. 94.0 C ₁₂ and heavier: max. 5.0
Av. molar mass	[g/mol]	142–148	170–175
Hydroxyl number	[mg KOH/g]	389*	320–330
Colour	[APHA]	max. 10	max. 10
Acid number	[mg KOH/g]	max. 0.50	max. 0.05
Carbonyl number	[mg KOH/g]	max. 0.30	max. 0.20
Bromine index	[mg Br/100g]	max. 50	max. 50
Water	[wt. %]	max. 0.50	max. 0.10
Hydrocarbons	[wt. %]	max. 0.20	max. 0.10
Diols	ppm	—	—
Flash point	[°C]	98*	min. 110
Additional properties typical values			
Branching degree	[wt. %]	35	50
Density @ 20 °C	[kg/l]	0.832	0.835
Viscosity @ 40 °C	[cSt]	7	10
Pour point	[°C]	–18 °C	0
Distillation	[°C]	–	i. b. p. 236 f. b. p. 243

*typical value

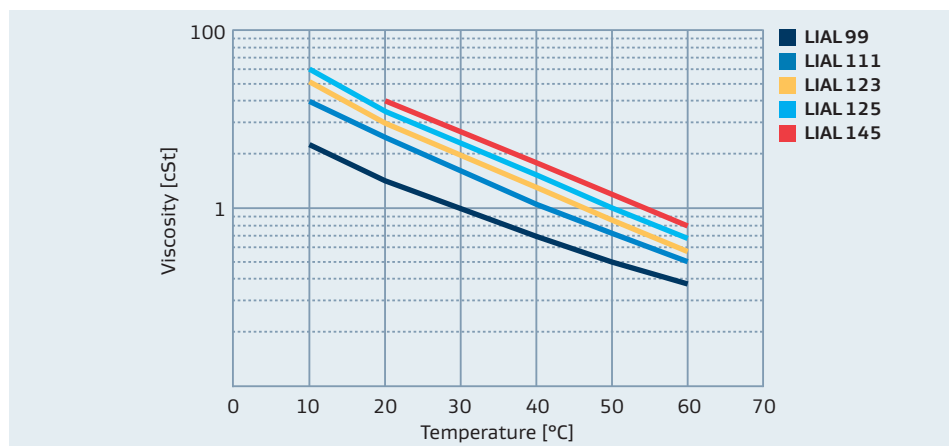
Figure 5:
LIAL alcohols density vs. temperature.



		LIAL 123	LIAL 125	LIAL 145
Sales specifications		C ₁₂ –C ₁₃ alcohols	C ₁₂ –C ₁₅ alcohols	C ₁₄ –C ₁₅ alcohols
Composition	[wt. %]	C ₁₁ and lighter: max. 1.0 C ₁₂ : 38–48 C ₁₃ : 52–62 C ₁₄ and heavier: max. 3.0	C ₁₁ and lighter: max. 0.5 C ₁₂ : 19–25 C ₁₃ : 28–34 C ₁₄ : 27–33 C ₁₅ : 15–21 C ₁₆ and heavier: max. 1.5	C ₁₃ and lighter: max. 2.5 C ₁₄ : 55–65 C ₁₅ : 35–45 C ₁₆ and heavier: max. 3.0
Av. molar mass	[g/mol]	192–196	204–209	217–222
Hydroxyl number	[mg KOH/g]	286–292	270–276	252–258
Colour	[APHA]	max. 10	max. 10	max. 10
Acid number	[mg KOH/g]	max. 0.10	max. 0.10	max. 0.08
Carbonyl number	[mg KOH/g]	max. 0.15	max. 0.25	max. 0.30
Bromine index	[mg Br/100g]	max. 50	max. 50	max. 50
Water	[wt. %]	max. 0.10	max. 0.10	max. 0.10
Hydrocarbons	[wt. %]	max. 0.10	max. 0.15	max. 0.15
Diols	ppm	max. 1,000	max. 1,000	max. 1,000
Flash point	[°C]	min. 125	min. 125	min. 125
Additional properties typical values				
Branching degree	[wt. %]	54	57	60
Density @ 20 °C	[kg/l]	0.836	0.836	0.837
Viscosity @ 40 °C	[cSt]	12	14	16
Pour point	[°C]	6	6	15
Distillation	[°C]	i. b. p. 253 f. b. p. 277	i. b. p. 261 f. b. p. 298	i. b. p. 274 f. b. p. 296

* typical value

Figure 6:
LIAL alcohols viscosity vs. temperature.



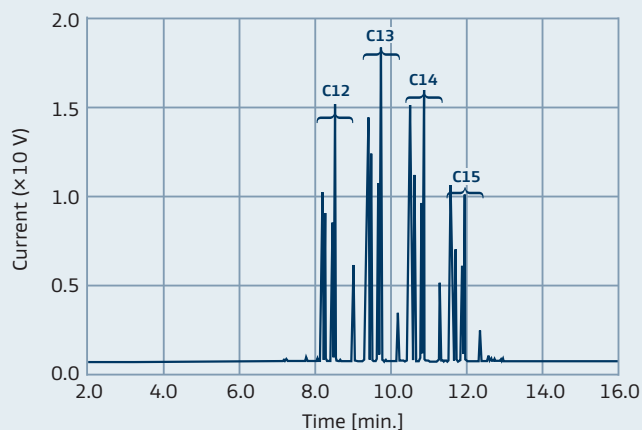
5. ISALCHEM

Monobranched C₉–C₁₅ alcohols (single cuts and blends)

		ISALCHEM 9	ISALCHEM 11
Sales specifications		C ₉ alcohols	C ₁₁ alcohols
Composition	[wt. %]	C ₈ and lighter: max. 2.0 C ₉ monobranched: min. 90.0 C ₉ linear and heavier: max. 10.0	C ₁₀ and lighter: max. 10.0 C ₁₁ monobranched: min. 90.0 C ₁₁ linear and heavier: max. 1.0
Branching degree	[wt. %]	92 *	92 *
Av. molar mass	[g/mol]	142–153	172 *
Hydroxyl number	[mg KOH/g]	389 *	326 *
Colour	[APHA]	5 *	max. 10
Acid number	[mg KOH/g]	max. 0.20	max. 0.10
Carbonyl number	[mg KOH/g]	max. 0.50	—
Bromine index	[mg Br/100g]	max. 50	max. 50
Water	[wt. %]	max. 0.10	max. 0.10
Hydrocarbons	[wt. %]	max. 0.50	max. 0.20
Flash point	[°C]	95 *	120 *
Additional properties: typical values			
Density @ 20 °C	[kg/l]	0.830	0.833
Viscosity @ 40 °C	[cSt]	7	10
Pour point	[°C]	–72	–55
Distillation	[°C]	i. b. p. 199 f. b. p. 218	i. b. p. 227 f. b. p. 235

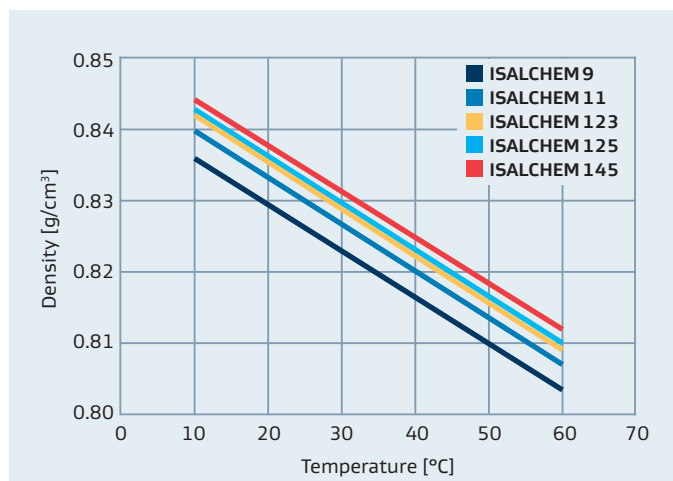
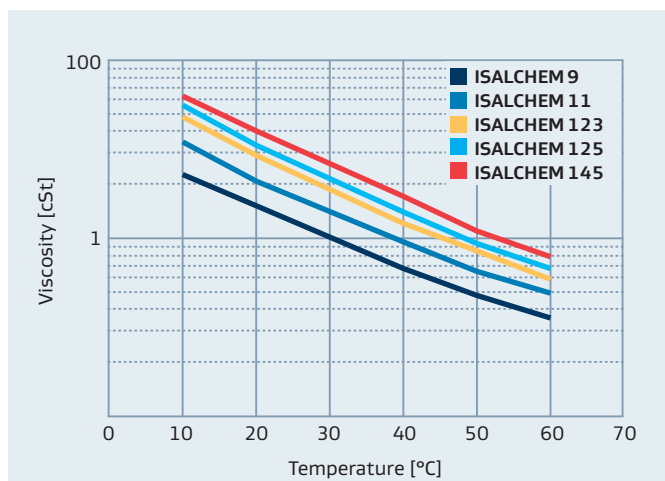
* typical value

Figure 7:
Gas chromatogram of ISALCHEM 125.



		ISALCHEM 123	ISALCHEM 125	ISALCHEM 145
Sales specifications		C ₁₂ –C ₁₃ alcohols	C ₁₂ –C ₁₅ alcohols	C ₁₄ –C ₁₅ alcohols
Composition	[wt. %]	C ₁₁ and lighter: max. 1.0 C ₁₂ : 37–48 C ₁₃ : 52–63 C ₁₄ and heavier: max. 4.0	C ₁₁ and lighter: max. 1.0 C ₁₂ : 18–25 C ₁₃ : 26–34 C ₁₄ : 27–36 C ₁₅ : 16–22 C ₁₆ and heavier: max. 2.0	C ₁₃ and lighter: max. 5.0 C ₁₄ : 54–68 C ₁₅ : 32–45 C ₁₆ and heavier: max. 3.0
Branching degree	[wt. %]	min. 92	94*	95*
Av. molar mass	[g/mol]	192–196	203–209	215–221
Hydroxyl number	[mg KOH/g]	286–293	268–276	253–261
Colour	[APHA]	max. 10	max. 10	max. 10
Acid number	[mg KOH/g]	max. 0.10	max. 0.10	max. 0.05
Carbonyl number	[mg KOH/g]	max. 0.25	max. 0.30	max. 0.30
Bromine index	[mg Br/100g]	max. 80	max. 90	max. 100
Water	[wt. %]	max. 0.10	max. 0.10	max. 0.10
Hydrocarbons	[wt. %]	max. 0.20	max. 0.25	max. 0.25
Flash point	[°C]	137*	min. 125	min. 125
Additional properties: typical values				
Density @ 20 °C	[kg/l]	0.835	0.836	0.837
Viscosity @ 40 °C	[cSt]	12	14	16
Pour point	[°C]	–45	–40	–31
Distillation	[°C]	i. b. p. 257 f. b. p. 287	i. b. p. 268 f. b. p. 305	i. b. p. 283 f. b. p. 308

* typical value

Figure 8: ISALCHEM alcohols density vs. temperature.**Figure 9:** ISALCHEM alcohols viscosity vs. temperature.

6. ALCHEM

Linear C₉–C₁₅ alcohols (single cuts and blends)

		ALCHEM 9–99	ALCHEM 11–99
Sales specifications		1-nonanol	1-undecanol
Composition	[wt. %]	C ₉ monobranched and lighter: max. 0.50 C ₉ linear: min. 99.0 C ₁₀ and heavier: max. 1.0	C ₁₁ monobranched and lighter: max. 0.50 C ₁₁ linear: min. 99.0 C ₁₂ and heavier: max. 1.0
Total linear alcohol	[wt. %]	min. 99	min. 99
Av. molar mass	[g/mol]	142–145	172*
Hydroxyl number	[mg KOH/g]	389*	326*
Colour	[APHA]	5*	max. 10
Acid number	[mg KOH/g]	max. 0.10	max. 0.20
Carbonyl number	[mg KOH/g]	max. 0.20	max. 0.35
Bromine index	[mg Br/100g]	max. 20	max. 50
Water	[wt. %]	max. 0.10	max. 0.10
Hydrocarbons	[wt. %]	max. 0.15	max. 0.10
Flash point	[°C]	102*	120*
Additional properties: typical values			
Pour point	[°C]	–6	18
Distillation	[°C]	i. b. p. 212 f. b. p. 229	i. b. p. 240 f. b. p. 245

* typical value



		ALCHEM 123	ALCHEM 125	ALCHEM 145
Sales specifications		C ₁₂ –C ₁₃ alcohols	C ₁₂ –C ₁₅ alcohols	C ₁₄ –C ₁₅ alcohols
Composition	[wt. %]	C ₁₁ and lighter: max. 1.0 C ₁₂ : 37–48 C ₁₃ : 52–63 C ₁₄ and heavier: max. 4.0	C ₁₁ and lighter: max. 0.5 C ₁₂ : 18–25 C ₁₃ : 26–34 C ₁₄ : 26–35 C ₁₅ : 15–21 C ₁₆ and heavier: max. 1.5	C ₁₃ and lighter: max. 4.0 C ₁₄ : 57–68 C ₁₅ : 31–42 C ₁₆ and heavier: max. 3.0
Total linear alcohol	[wt. %]	min. 92	min. 93	min. 93
Av. molar mass	[g/mol]	191–196	203–209	217–223
Hydroxyl number	[mg KOH/g]	287–293	268–276	252–258
Colour	[APHA]	max. 10	max. 10	max. 10
Acid number	[mg KOH/g]	max. 0.06	max. 0.10	max. 0.06
Carbonyl number	[mg KOH/g]	max. 0.10	max. 0.10	max. 0.10
Bromine index	[mg Br/100g]	max. 50	max. 50	max. 50
Water	[wt. %]	max. 0.10	max. 0.10	max. 0.10
Hydrocarbons	[wt. %]	max. 0.10	max. 0.10	max. 0.15
Flash point	[°C]	120*	124*	142*
Additional properties: typical values				
Pour point	[°C]	23	26	34
Distillation	[°C]	i. b. p. 267 f. b. p. 291	i. b. p. 275 f. b. p. 308	i. b. p. 291 f. b. p. 311

* typical value

Analytical methods

Parameter	Sasol Italy reference	Parameter	Sasol Italy reference
Composition	RCM 1101	Hydrocarbons	RCM 1101
Av. molar mass	RCM 1101	Flash point	ASTM D93
Hydroxyl number	RCM 1101	Diols	RCM 1402
Colour	EN 1557 + ASTM D5386	Branching degree	RCM 1101
Acid number	ASTM D664	Density @ 20 °C	ASTM D 4052
Carbonyl number	ISO 1279	Viscosity @ 40 °C	ASTM D 446
Bromine index	ASTM D1492	Pour point	ASTM D5950
Water	EN ISO 12937	Distillation	ASTM D86

RCM are SASOL Italy analytical methods developed internally.
Additional information is available upon request.

7. Sasol Chemicals alcohol portfolio

LIAL Mixture of linear and monobranched alcohols from C ₉ to C ₁₅	Sasol Italy S.p.A. Augusta
ALCHEM Linear alcohol monocuts and blends from C ₉ to C ₁₅	Sasol Italy S.p.A. Augusta
ISALCHEM Monobranched alcohol monocuts and blends from C ₉ to C ₁₅	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 Chemicals (USA) (USA) LLC 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



Our global footprint

● Sasol Chemicals' business locations, e.g. offices, production sites, JVs, laboratories, etc.



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At your service



Sasol Chemicals

Anckelmannsplatz 1, 20537 Hamburg, Germany
info@de.sasol.com Telephone +49 40 63684-1000

Italy

sasol.italy@it.sasol.com
Telephone +39 025 8453-1

Spain / Portugal

oliver.groegor@de.sasol.com
Telephone +34 934 676 902

United Kingdom

info.uk@sasol.com
Telephone +44 1564 78 3060

Benelux

henk.verschuuren@de.sasol.com
Telephone +31 74 278 28 73

France

mariealice.tessieres@fr.sasol.com
Telephone +33 1 44 01 05 30

Slovakia

sales@sk.sasol.com
Telephone +421 2 544 30 219

North America

info@us.sasol.com
Telephone +1 281 588 3870

South America

sasollatinamerica@us.sasol.com
Telephone +55 11 4612 8199

Middle East and India

abbas.haroon@sasol.com
Telephone +97 14 8086 300

Pacific Region

jackson.ding@cn.sasol.com
Telephone +852 3971 5988

P.R. China

liangbo.lu@cn.sasol.com
Telephone +86 21 221 80 500

Japan

yoshihiro.ito@jp.sasol.com
Telephone +81 3 6263 2061

www.sasol.com