sasol
reaching new frontiers

Sasol Olefins & Surfactants

ISOFOL® C_{12}-C_{32}
Defined Branched Guerbet Alcohols

ISOFOL® C_{12}-C_{32}

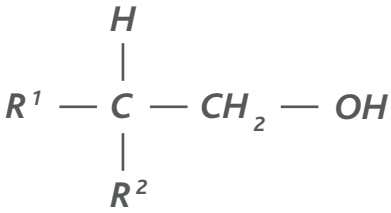
Contents

1

Foreword

ISOFOL® – Defined Branched Guerbet Alcohols

***ISOFOL®** is the registered trademark of Sasol Olefins & Surfactants GmbH for saturated primary alcohols with defined branching of the carbon chain.*



Such alcohols are chemically described as 2-alkyl-1-alkanols and are well known as Guerbet alcohols.

*The **ISOFOL®** alcohols C_{12} - C_{24} are liquid at ambient temperature whereas corresponding saturated alcohols are solid. While unsaturated alcohols start to solidify at approx. 10°C, **ISOFOL®** alcohols C_{12} to C_{18} remain liquid even below 0°C.*

*Because of the saturation characteristic **ISOFOL®** alcohols are completely saturated they show excellent oxidation and colour stability. Unlike unsaturated alcohols **ISOFOL®** alcohols do not become rancid. Polarity and viscosity are both influenced by the specific structure of the products giving an advantageous solubility and solvent potential.*

*The combination of the properties described above recommends the use of **ISOFOL®** alcohols whenever saturated alcohols are insufficiently liquid, unsaturated alcohols, however, lack oxidative stability and short chain alcohols are too volatile.*

*In contrast to dimer alcohols derived from oxo-alcohols, **ISOFOL®** alcohols possess two 100% linear alkyl chains resulting in low viscosity and better biodegradability.*

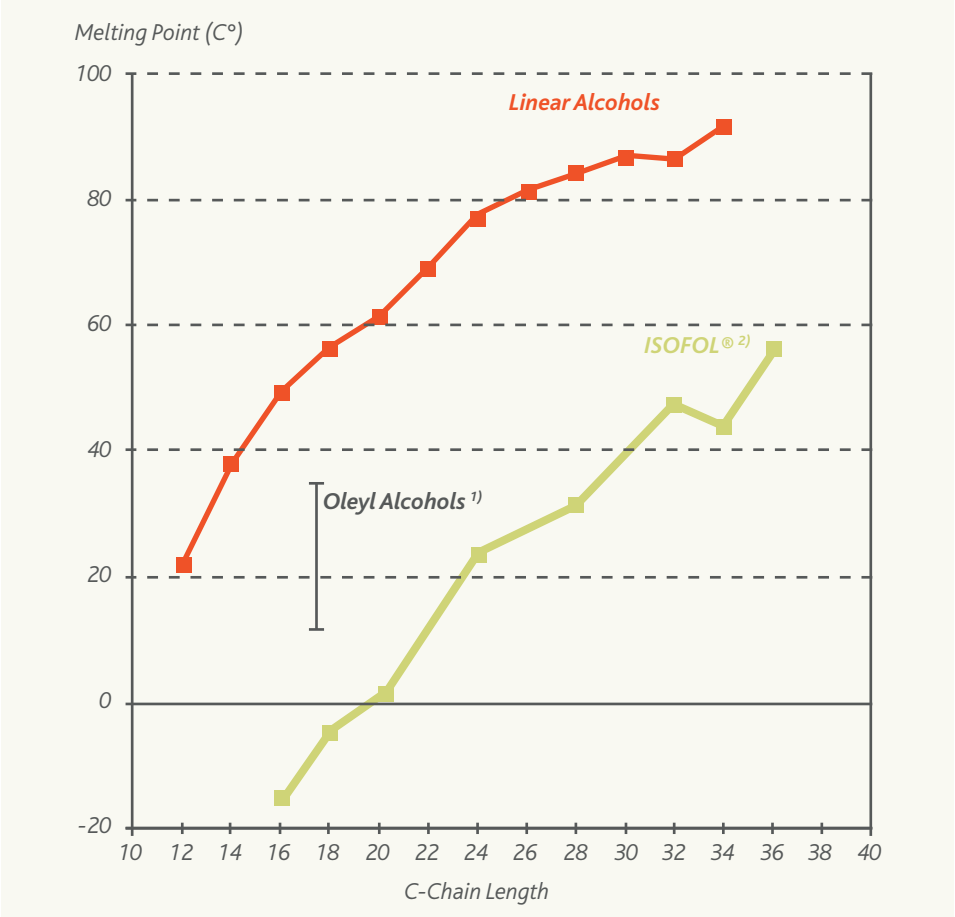
*As the advantageous properties are also retained in the various reaction products, **ISOFOL®** alcohols are valuable raw materials for the production of derivatives.*

*Some of the products derived from **ISOFOL®** alcohols are listed below: Acid esters, alkylphosphates, alkylhalogenides, alkylpolyglycolethers, acrylates, aldehydes, alkylsulfates, methacrylates, carboxylic acids, alkylethersulfates, amines, mercaptans, sulfosuccinates, etheramines.*

*Derivatives of **ISOFOL®** alcohols are principally obtained by reactions which were originally developed for the conversion of linear alcohols.*

Melting Points

The advantageous melting ranges of ISOFOL® alcohols in comparison to linear saturated and unsaturated alcohols are shown in this graph.



1) End of melting range, Iodine number 45-96 mg 1/100mg

2) End of melting range

2

Applications

Cosmetics

- *Guerbet alcohols as oily components with good solvent properties for active ingredients*
- *Ester as oily components and emulsifiers*
- *Polyglycolethers as emulsifiers*
- *Guerbet alcohols as superfattening agents with exellent spreading properties*

Textile Industry

- *Esters as lubricants in spin finishes*
- *Alkylsulfates, alkylethersulfates, alkylpolyglycolethers as wetting agents and emulsifiers*
- *Phosphates of alcohols and ethoxylates as antistatics in spin finishes*

Metal Processing

- *Guerbet alcohols as components of cooling and cutting fluids*
- *Guerbet alcohols as lubricating components of stamping and rolling oils*
- *Acids (ISOCARB®) as odourless anticorrosive agents in metal coolants*

Lubricants

- *Esters as components of synlubes*

Surfactants

- *Alkylpolyglycolethers for cleansing of hard surfaces*
- *Ethoxysulfates as surfactants which show advantageous combination of wetting and foaming properties*
- *Alkylsulfates as low foaming and good wetting surfactants*

Further Technical Applications

- *Guerbet alcohols as components of defoamers (detergents, paper production, textile auxiliaries)*
- *Guerbet alcohols as solubilizers for printing inks and other special inks*
- *Acrylates and methacrylates as odourless speciality monomers for co-polymerisation (e.g. resin concrete or paints)*

3

Other Products and Trademarks

We market our linear alcohols worldwide under the following trademarks:

- ***NACOL®*** *– Single fractions of linear alcohols* $C_4 - C_{22}$
- ***NAFOL®*** *– Blends of linear alcohols* $C_8 - C_{28}$
- ***LINCOL®*** *– Blends of linear alcohols* $C_6 - C_{12}$
- ***ALFOL®*** *– Blends and single fractions of linear alcohols* C_6 - C_{22+}

Based on our linear alcohols we are producing the following specialities:

- ***LINPLAST®*** *– Plasticizers made from alcohols.*
- ***ISOCARB®*** *– Defined branched Guerbet acids*
- ***GALENOL®*** *– Self emulsifying blends of linear alcohols*

Detailed product data are contained in our brochures NACOL®, NAFOL®, LINCOL®, LINPLAST®, ISOCARB® and GALENOL®.

4

Sales Specification & Additional Properties

Defined Branched Guerbet Alcohols

		ISOFOL® 12	ISOFOL® 14 T	ISOFOL® 16
Sales Specification				
Alcohol Composition	[%]:			
2-Butyloctanol		97.0 min.	10.0 – 20.0	–
2-Butyldecanol		–	} 45.0 – 55.0	–
2-Hexyloctanol		–		–
2-Hexyldecanol		–	25.0 – 35.0	97.0 min.
Spec. Alcohol Content	[%]	97.0 min.	95.0 min.	97.0 min.
Ester Number	[mg KOH/g]	0.3 max.	0.5 max.	0.3 max.
Acid Number	[mg KOH/g]	0.05 max.	0.05 max.	0.05 max.
Iodine Number	[mg I/100 mg]	0.5 max.	1.0 max.	0.5 max.
Water Content	[Weight %]	0.1 max.	0.1 max.	0.1 max.
Colour APHA	[Hazen]	20 max.	20 max.	20 max.
Additional Properties				
Molecular Weight	[g/mol]	approx. 186	212 – 223	approx. 242
Hydroxyl Number	[mg KOH/g]	286 – 305	252 – 265	225 – 235
Carbonyl Number	[mg KOH/g]	0.3 max.	0.3 max.	0.3 max.
Refractive Index	[n_D]	approx. 1.443 (20 °C)	approx. 1.447 (20 °C)	approx. 1.450 (20 °C)
Density	[g/ml]	approx. 0.833 (20 °C)	approx. 0.835 (20 °C)	approx. 0.836 (20 °C)
Viscosity	[mPa·s]	approx. 23 (20 °C)	approx. 32 (20 °C)	approx. 38 (20 °C)
Melting Range	[°C]	< – 30	< – 25	– 21 to – 15
Boiling Range	[°C]	145 – 149 (33 mbar)	160 – 195 (33 mbar)	193 – 197 (33 mbar)
Flash Point	[°C]	approx. 120	approx. 139	approx. 156
Surface Tension	[mN/m]	approx. 28	approx. 30	approx. 30

		ISOFOL® 18T	ISOFOL® 18E	ISOFOL® 20	ISOFOL® 24
Sales Specification					
Alcohol Composition	[%]:				
2-Hexyldecanol		15.0 – 20.0	3.0 – 6.0	–	–
2-Octyldecanol		}46.0 – 54.0	}85.0 – 90.0	–	–
2-Hexyldodecanol				–	–
2-Octyldodecanol		27.0 – 33.0	3.0 – 6.0	97.0 min.	–
2-Decyltetradecanol		–	–	–	97.0 min.
Spec. Alcohol Content	[%]	95.0 min.	95.0 min.	97.0 min.	97.0 min.
Ester Number	[mg KOH/g]	0.5 max.	0.5 max.	0.5 max.	0.5 max.
Acid Number	[mg KOH/g]	0.05 max.	0.05 max.	0.05 max.	0.05 max.
Iodine Number	[mg I/100 mg]	0.5 max.	0.5 max.	0.5 max.	0.5 max.
Water Content	[Gew. %]	0.1 max.	0.1 max.	0.1 max.	0.1 max.
Colour APHA	[Hazen]	20 max.	20 max.	20 max.	20 max.
Additional Properties					
Molecular Weight	[g/mol]	267 – 285	269 – 279	approx. 298	approx. 354
Hydroxyl Number	[mg KOH/g]	197 – 210	196 – 206	184 – 190	154 – 160
Carbonyl Number	[mg KOH/g]	0.3 max.	0.3 max.	0.3 max.	0.3 max.
Refractive Index	[n_D]	approx. 1.452 (20 °C)	approx. 1.452 (20 °C)	approx. 1.455 (20 °C)	approx. 1.457 (20 °C)
Density	[g/ml]	approx. 0.837 (20 °C)	approx. 0.837 (20 °C)	approx. 0.838 (20 °C)	approx. 0.842 (20 °C)
Viscosity	[mPa·s]	approx. 50 (20 °C)	approx. 50 (20 °C)	approx. 60 (20 °C)	approx. 86 (20 °C)
Melting Range	[°C]	– 10 to – 6	– 10 to – 6	– 1 to + 1	+ 17 to + 20
Boiling Range	[°C]	207 – 236 (33 mbar)	211 – 218 (33 mbar)	234 – 238 (33 mbar)	271 – 275 (33 mbar)
Flash Point	[°C]	approx. 170	approx. 170	approx. 180	approx. 230
Surface Tension	[mN/m]	approx. 30	approx. 30	approx. 31	approx. 32

Defined Branched Guerbet Alcohols

		ISOFOL® 28	ISOFOL® 32
Sales Specification			
Alcohol Composition	[%]:		
2-Dodecylhexadecanol		90.0 min.	–
2-Tetradecyloctadecanol		–	80.0 min.
Spec. Alcohol Content	[%]	90.0 min.	80.0 min.
Ester Number	[mg KOH/g]	0.5 max.	1.0 max.
Acid Number	[mg KOH/g]	0.05 max.	0.1 max.
Iodine Number	[mg I/100 mg]	0.50 max.	1.0 max.
Water Content	[Weight %]	0.1 max.	0.1 max.
Colour APHA	[Hazen]	40 max.	80 max.
Additional Properties			
Molecular Weight	[g/mol]	approx. 410	approx. 470
Hydroxyl Number	[mg KOH/g]	125 – 140	95 – 120
Carbonyl Number	[mg KOH/g]	0.30 max.	1.0 max.
Refractive Index	[n_D]	approx. 1.455 (40 °C)	approx. 1.447 (60 °C)
Density	[g/ml]	approx. 0.830 (40 °C)	approx. 0.820 (60 °C)
Viscosity	[mPa·s]	approx. 40 (40 °C)	approx. 23 (60 °C)
Melting Range*	[°C]	+ 32 to + 39	+ 44 to + 48
Flash Point	[°C]	approx. 240	approx. 266

** The data refer to the high melting modification which is formed during some 4 weeks of storage from the low melting modification.*

5

Analytical Methods

Analytical Methods	Sasol Method	with Reference to
Alcohol Composition	600 – 12	–
Alcohol Content	600 – 12	–
Colour	600 – 40	DIN 53 409
Density	600 – 23	DIN 51 757
Melting Range	600 – 27	ISO 3016
Boiling Range	600 – 21	DIN 51 751/DIN 53 171
Flash Point [Cleveland]	600 – 26 C	ISO 2592
Hydroxyl Number	600 – 30	DIN 53 240
Ester Number	600 – 33	DIN 53 401
Acid Number	600 – 31	DIN 53 402
Iodine Number	600 – 39	DIN 53 241
Viscosity [Ubbelohde]	600 – 25	DIN 51 562
Water Content	600 – 37	DIN 51 777
Refractive Index	600 – 24	DIN 51 423
Carbonyl Number	600 – 34	ASTM E 411
Surface Tension	–	DIN 53 993

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