Chemicals / Petrochemical (Ver6)

GROUP-1

(LAB)

Linear alkyl benzene

Linear alkyl benzene is widely used in detergent industries due to its good biodegradability in the environment. Linear alkyl benzene is converted to alkyl benzene acid sulfonate (LABSA) in lower hand units after sulfonation and is used as a major cleaning liquid in liquid detergents and hand and washing machine powders.

PROPERTY	TEST METHOD	SPECIFICATION	TYPICAL VALUE
Linear Alkyl Benzene , wt%	UOP 698	92 min	92.98
Carbon Distribution , wt%	UOP 698		
< LAB 10		1 max	0.35
LAB 10		15 max	8.49
LAB 10 + LAB 11		33-51	37.50
LAB 12		26-40	32.08
LAB 13 + LAB 14		15-28	23.40
LAB 14		1 max	0.11
> LAB 14		0.5 max	0.30
2-Phenyl Alkanes , wt%	UOP 698	20 max	15.36
Total Normal Paraffin , wt%	UOP 698	0.5 max	0.42
Average Molecular Weight	UOP 698	238-244	242.0
Density at 15.6°C , gr/cm^3	ASTM D-4052	0.8575-0.8700	0.8598
Bromine Index , mg Br/100gr of Sample	UOP 304	15 max	4
Moisture , ppm	UOP 481	200 max	5
Saybolt Color	ASTM D-156	+29 min	>+30
Tetralins , wt%	ECOSOL , UOP-929	1 max	<0.5
Sulfonatability , wt%	UOP 429	98 min	98.7
Doctor Test	ASTM D-4952	Negative	Negative
Acid Wash Color , T%	EM 07203	15 min	69.8
Refractive Index at 20°C	ASTM D-1218	1.480-1.490	1.480
Flash Point °C	ASTM D-93	140 min	144

(LABSA)
Linear alkyl benzene sulfonic acid

Linear alkyl benzene sulfonic acid (LABSA) is prepared commercially by sulfonating linear alkylbenzene (LAB). Linear alkyl benzene sulfonate (LAS), the world's largest-volume synthetic surfactant, which includes the various salts of sulfonated alkylbenzenes, is widely used in household detergents as well as in numerous industrial applications. The LABSA market is driven by the markets for LAS, primarily household detergents. Linear alkylbenzene sulfonate was developed as a biodegradable replacement for nonlinear (branched) alkylbenzene sulfonate (BAS) and has largely replaced BAS in household detergents throughout the world. The pattern of LAS consumption demonstrates the overwhelming preference by consumers for liquid laundry detergents in North America, whereas powders continue to be the dominant products in Western Europe, mainland China, and Northeast Asia (Japan, South Korea, and Taiwan). Comparable and reliable data in other regions of the world are generally unavailable, but in these less-developed world areas, LAS is essentially used only in laundry powders (particularly in India and Indonesia) and hand dish-washing liquids. The latter are often used as general-purpose cleaners.

Property	Test Method	Specification	Result
Appearance	Visual	Vis Liquid	Vis Liquid
Color (Klet Method)	ISIRI 3513	70 Max (Brown Clear Liquid)	9
Active Matter (%wt)	ISIRI 3513	96 Min	96.5
Acid Value (mgkoh/g)	USP	180-190	186.9
Free Oil (%wt)	ISIRI 3513	2 Max	1.31
Free Sulfuric Acid (%wt)	ISIRI 3513	1.8 Max	1.18
Water (%wt)	ISIRI 3513	1.0 Max	0.3

(NaOH)

Castic Soda-Sodium hydroxide

Sodium hydroxide is sometimes called caustic soda or lye. It is a common ingredient in cleaners and soaps. At room temperature, sodium hydroxide is a white, odorless solid. Liquid sodium hydroxide is colorless and has no odor. It can react violently with strong acids and water. Sodium hydroxide is corrosive. NaOH can react with moisture from the air and may generate heat as it dissolves. This heat can be enough to cause a fire if it is near flammable materials. Sodium hydroxide is useful for its ability to alter fats. It is used to make soap and as a main ingredient in household products such as liquid drain cleaners. Sodium hydroxide is usually sold in pure form as white pellets or as a solution in water.

Composition	Unit	Specification	Typical Value
NaOH	%w/w	Min 98	Min 98
Na_2CO_3	%w/w	Max 1.0	Max 0.5
NaCl	%w/w	Max 0.06	Max 0.01
Fe	ppm	Max 30	Max 7
Hg	ppm	Max 0.2	Nil
Heavy metals	ppm	Max 20	Max 2

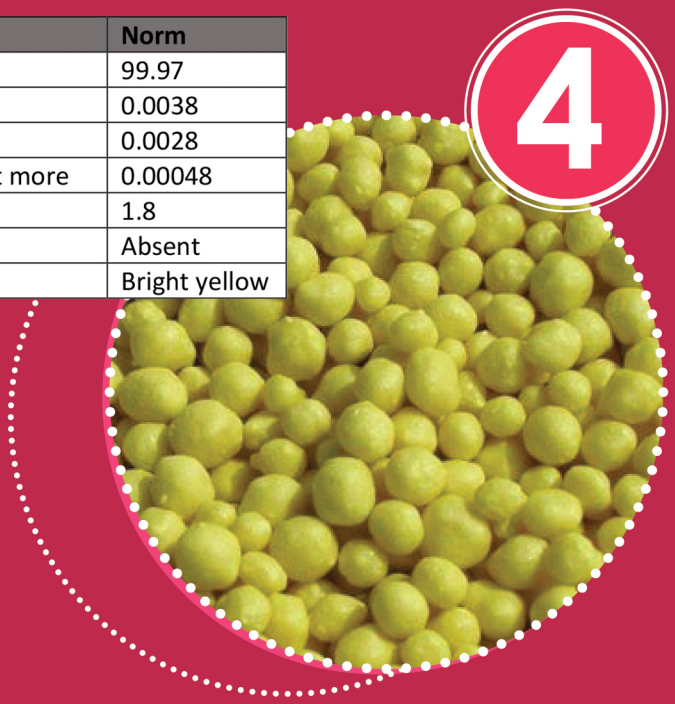
Sulfur

Sulfur (or sulphur in British English) is a chemical element with the symbol S and atomic number 16. It is abundant, multivalent and nonmetallic. Under normal conditions, sulfur atoms form cyclic octatomic molecules with a chemical formula S8. Elemental sulfur is a bright yellow, crystalline solid at room temperature.

Sulfur is the tenth most abundant element by mass in the universe and the fifth most on Earth. Though sometimes found in pure, native form, sulfur on Earth usually occurs as sulfide and sulfate minerals. Being abundant in native form, sulfur was known in ancient times, being mentioned for its uses in ancient India, ancient Greece, China, and ancient Egypt. Historically and in literature sulfur is also called brimstone,[5] which means «burning stone».[6] Today, almost all elemental sulfur is produced as a byproduct of removing sulfur-containing contaminants from natural gas and petroleum.[8][7] The greatest commercial use of the element is the production of sulfuric acid for sulfate and phosphate fertilizers, and other chemical processes. Sulfur is used in matches, insecticides, and fungicides. Many sulfur compounds are odoriferous, and the smells of odorized natural gas, skunk scent, grapefruit, and garlic are due to organosulfur compounds. Hydrogen sulfide gives the characteristic odor to rotting eggs and other biological processes.

Sulfur is an essential element for all life, but almost always in the form of organosulfur compounds or metal sulfides. Three amino acids (cysteine, cystine, and methionine) and two vitamins (biotin and thiamine) are organosulfur compounds. Many cofactors also contain sulfur, including glutathione, thioredoxin, and iron–sulfur proteins. Disulfides, S–S bonds, confer mechanical strength and insolubility of the protein keratin, found in outer skin, hair, and feathers. Sulfur is one of the core chemical elements needed for biochemical functioning and is an elemental macronutrient for all living organisms.

№	Parameters name	Norm
1	Mass fraction of sulfur, %, not less	99.97
2	Mass fraction of ash, %, not more	0.0038
3	Mass fraction of organically substances, %, not more	0.0028
4	Mass fraction of acids in recalculation on sulfuric acid, %, not more	0.00048
5	*Mass fraction of moisture, %, not more	1.8
6	Mechanical inputs	Absent
7	Color	Bright yellow



(NP) Normal paraffin

Normal paraffin with carbon range of C10 - C13 is widely used in the production of linear alkyl benzene. Normal paraffin is also used in the production of fatty alcohols which is applicable in surfactants and solvents used in the paint and resin industries.

PROPERTY	TEST METHOD	SPECIFICATION	TYPICAL VALUE
Total Normal Paraffin , wt%	UOP 915	98 min	98.66
Carbon Distribution , wt%	UOP 915		
≤ N- C_9		0.2 max	0.02
N- C_{10}		7-12	8.60
N- C_{11}		20-35	29.61
N- C_{12}		30-42	33.74
N- C_{13}		20-30	26.45
N- C_{14}		0.7 max	0.24
Average Molecular Weight	UOP 915	163-169	166.4
Aromatics , wt%	UOP 495	0.5 max	0.40
Density at 15.6°C , gr/cm^3	ASTM D-4052	0.7490-0.7530	0.7506
Moisture , ppm	UOP 481	100 max	6
Bromine-Index , mg Br/100gr of Sample	ASTM D-1492	20 max	2
Nitrogen , ppm	ASTM D-6366	1 max	< 0.5
Sulfur , ppm	ASTM D-5453	2 max	< 1
Peroxide Number	ASTM E-299	2 max	< 0.1
Chloride , ppm	UOP 395	1 max	< 0.1
Saybolt Color	ASTM D-156	+29 min	>+30
Flash Point °C	ASTM D-93	65 min	76

(HAB)
Heavy Alkylates

Heavy alkylate is a by-product of the linear alkyl benzene production process and is a combination of diphenyl-alkanes and dialkyl-benzene. Due to its dielectric properties and high oxidation stability as well as low pour point, this compound has wide applications in the industries of transformer oils, industrial lubricants, diesel fuel additives and hot oils for heat transfer and is also used in industrial detergents.

PROPERTY	TEST METHOD	SPECIFICATION	TYPICAL VALUE
Viscosity at 37.8 °C , cSt	ASTM D-445	15 - 50	30.5
Density at 20 °C , gr/cm^3	ASTM D-4052	Less Than 0.895	0.8786
Distillation Range °C	ASTM D-1160	310-550	352- 485
Flash Point , °C	ASTM D-93	170 min	194
ASTM Color	ASTM D-1500	Less Than 2	L –1.0
Moisture , ppm	UOP 481	Less Than 200	5
Doctor Test	ASTM D-4952	Negative	Negative
Refractive Index at 20°C	ASTM D-1218	1.485- 1.500	1.490

GROUP-2

Stearic Acid

In normal temperature, stearic acid is white or yellowish flaky, bead-like or lumpy solid. It is made up of C16 & C18 saturated fatty acid. The stearic acid is widely used as the heat-stable medicinal preparation, the lubricant, the remover, the plasticizer in the plastics industry; the curing active ingredient, the softener, the dispersing agent in the rubber industry; raw materials of lever wax, tea wax, cup wax and craft candle; the softening cream, cold cream in the cosmetics greasy raw materials, and also serves as the emulsifier, the super fatting agent, the softening agent, the polish and so on; the emulsifier, the dispersing agent, the quality modifier in food profession; AKD, the softening agent in the paper industry; wax pencil's raw material in the culture and education tools, pencil's lead and the solid glue water thickener; assistant agent in the medicine, the surface active agent and antibiotics and so on; raw material of solidified alcohol in the fuel industry and the soap base in the lubricant industry and so on.

Name	Index				
Grade	1865	1842	1838	P401820	R401860
Appearance	Bead	Bead	Bead	Bead	Bead
Iodine value (gI2/100g) ≤	0.5	0.5	0.5	0.5	8.0
Saponification value (mgKOH/g)	203-209	206-211	211-213	213-219	193-220
Acid value (mgKOH/g)	202-208	205-210	210-212	212-218	192-218
Color (Hazen) ≤	50	60	80	100	200-400
Moisture % ≤	0.2	0.2	0.2	0.2	0.3

Fatty Acid

Fatty acids are the building blocks of the fat in our bodies and in the food we eat. During digestion, the body breaks down fats into fatty acids, which can then be absorbed into the blood. Fatty acid molecules are usually joined together in groups of three, forming a molecule called a triglyceride.

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	Saturated	Monounsaturated	Polyunsaturated	Cholesterol	Vitamin E
	g/100g	g/100g	g/100g	mg/100g	mg/100g
Animal fats					
Duck fat[38]	33.2	49.3	12.9	100	2.70
Lard[38]	40.8	43.8	9.6	93	0.60
Tallow[38]	49.8	41.8	4.0	109	2.70
Butter	54.0	19.8	2.6	230	2.00
Vegetable fats					
Coconut oil	85.2	6.6	1.7	0	.66
Cocoa butter	60.0	32.9	3.0	0	1.8
Palm kernel oil	81.5	11.4	1.6	0	3.80
Palm oil	45.3	41.6	8.3	0	33.12
Cottonseed oil	25.5	21.3	48.1	0	42.77
Wheat germ oil	18.8	15.9	60.7	0	136.65
Soybean oil	14.5	23.2	56.5	0	16.29
Olive oil	14.0	69.7	11.2	0	5.10
Corn oil	12.7	24.7	57.8	0	17.24
Sunflower oil	11.9	20.2	63.0	0	49.00
Safflower oil	10.2	12.6	72.1	0	40.68
Hemp oil	10	15	75	0	12.34
Canola/Rapeseed oil	5.3	64.3	24.8	0	22.21

Fatty Alcohol

Fatty alcohols (or long-chain alcohols) are usually high-molecular-weight, straight-chain primary alcohols, but can also range from as few as 6–4 carbons to as many as 26–22, derived from natural fats and oils. The precise chain length varies with the source.

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Name	Carbon atoms	Branches/saturation	Formula
tert-Butyl alcohol	4 carbon atoms	branched	$C_4H_{10}O$
tert-Amyl alcohol	5 carbon atoms	branched	$C_5H_{12}O$
3-Methyl-3-pentanol	6 carbon atoms	branched	$C_6H_{14}O$
1-Heptanol (enanthic alcohol)	7 carbon atoms		$C_7H_{16}O$
1-Octanol (capryl alcohol)	8 carbon atoms		$C_8H_{18}O$
Pelargonic alcohol (1-nonanol)	9 carbon atoms		$C_9H_{20}O$
1-Decanol (decyl alcohol, capric alcohol)	10 carbon atoms		$C_{10}H_{22}O$
Undecyl alcohol (1-undecanol, undecanol, Hendecanol)	11 carbon atoms		$C_{11}H_{24}O$
Lauryl alcohol (dodecanol, 1-dodecanol)	12 carbon atoms		$C_{12}H_{26}O$
Tridecyl alcohol (1-tridecanol, tridecanol, isotridecanol)	13 carbon atoms		$C_{13}H_{28}O$
Myristyl alcohol (1-tetradecanol)	14 carbon atoms		$C_{14}H_{30}O$
Pentadecyl alcohol (1-pentadecanol, pentadecanol)	15 carbon atoms		$C_{15}H_{32}O$
Cetyl alcohol (1-hexadecanol)	16 carbon atoms		$C_{16}H_{34}O$
Palmitoleyl alcohol (cis-9-hexadecen-1-ol)	16 carbon atoms	unsaturated	$C_{16}H_{32}O$
Heptadecyl alcohol (1-n-heptadecanol, heptadecanol)	17 carbon atoms		$C_{17}H_{36}O$
Stearyl alcohol (1-octadecanol)	18 carbon atoms		$C_{18}H_{38}O$
Oleyl alcohol (1-octadecenol)	18 carbon atoms	unsaturated	$C_{18}H_{36}O$
Nonadecyl alcohol (1-nonadecanol)	19 carbon atoms		$C_{19}H_{40}O$
Arachidyl alcohol (1-eicosanol)	20 carbon atoms		$C_{20}H_{42}O$
Heneicosyl alcohol (1-heneicosanol)	21 carbon atoms		$C_{21}H_{44}O$
Behenyl alcohol (1-docosanol)	22 carbon atoms		$C_{22}H_{46}O$
Erucyl alcohol (cis-13-docosen-1-ol)	22 carbon atoms	unsaturated	$C_{22}H_{44}O$
Lignoceryl alcohol (1-tetracosanol)	24 carbon atoms		$C_{24}H_{50}O$
Ceryl alcohol (1-hexacosanol)	26 carbon atoms		$C_{26}H_{54}O$
1-Heptacosanol	27 carbon atoms		$C_{27}H_{56}O$
Montanyl alcohol, cluytyl alcohol, or 1-octacosanol	28 carbon atoms		$C_{28}H_{58}O$
1-Nonacosanol	29 carbon atoms		$C_{29}H_{60}O$
Myricyl alcohol, melissyl alcohol, or 1-triacontanol	30 carbon atoms		$C_{30}H_{62}O$
1-Dotriacontanol (Lacceryl alcohol)	32 carbon atoms		$C_{32}H_{66}O$
Geddyl alcohol (1-tetratriacontanol)	34 carbon atoms		$C_{34}H_{70}O$

Glycerin

Glycerol,also called glycerine in British English and glycerin in American English, is a simple polyol compound. It is a colorless, odorless, viscous liquid that is sweet-tasting and non-toxic. The glycerol backbone is found in lipids known as glycerides. Due to having antimicrobial and antiviral properties it is widely used in FDA approved wound and burn treatments. Conversely, it is also used as a bacterial culture medium.It can be used as an effective marker to measure liver disease. It is also widely used as a sweetener in the food industry and as a humectant in pharmaceutical formulations. Owing to the presence of three hydroxyl groups, glycerol is miscible with water and is hygroscopic in nature.

CHARACTERISTICS	GL-99.7 USP FOOD GRADE	GL-99.7 USP KOSHER FOOD GRADE	GL-99.7 USP KOSHER FOR PASSOVER FOOD GRADE	GL-96.0 USP KOSHER FOOD GRADE
Glycerine Content	99.7% Minimum	99.7% Minimum	99.7% Minimum	96.0% Minimum
Specific Gravity Density meter: 25°/25°C	1.2613 Minimum	1.2613 Minimum	1.2613 Minimum	1.2517-1.2531
Assay, % Glycerine on anhydrous basis	99.0-101.0	99.0-101.0	99.0-101.0	99.0-101.0
Moisture Value %	0.3 Max	0.3 Max	0.3 Max	4.0 Max
Color APHA Pt-Co (Hazen) Scale	20 Maximum	20 Maximum	20 Maximum	20 Maximum
Residues on Ignition	0.01% or 100 ppm Max	0.01% or 100 ppm Max	0.01% or 100 ppm Max	0.01% or 100 ppm Max
Chlorides (as Chlorine)	0.001% or 10 ppm Max	0.001% or 10 ppm Max	0.001% or 10 ppm Max	0.001% or 10 ppm Max
Sulfates	0.002% or 20 ppm Max	0.002% or 20 ppm Max	0.002% or 20 ppm Max	0.002% or 20 ppm Max
Heavy Metals (as Pb)	0.0005% or 5 ppm Max	0.0005% or 5 ppm Max	0.0005% or 5 ppm Max	0.0005% or 5 ppm Max
Chlorinated Compounds (as Cl)	0.003% or 30 ppm Max	0.003% or 30 ppm Max	0.003% or 30 ppm Max	0.003% or 30 ppm Max
Fatty Acids & Esters	1.0 ml Max	1.0 ml Max	1.0 ml Max	1.0 ml Max
Identification B by GC: Diethylene Glycol (DEG) & Ethylene Glycol	DEG Impurity ≤ 0.1% EG Impurity ≤ 0.1%	DEG Impurity ≤ 0.1% EG Impurity ≤ 0.1%	DEG Impurity ≤ 0.1% EG Impurity ≤ 0.1%	DEG Impurity ≤ 0.1% EG Impurity ≤ 0.1%
Identification C by GC	Passes test as glycerine	Passes test as glycerine	Passes test as glycerine	Passes test as glycerine
Identification A by IR	Passes test as glycerine	Passes test as glycerine	Passes test as glycerine	Passes test as glycerine
Related Compounds	Individual Impurity ≤ 0.1% Sum of all impurities ≤ 1.0%	Individual Impurity ≤ 0.1% Sum of all impurities ≤ 1.0%	Individual Impurity ≤ 0.1% Sum of all impurities ≤ 1.0%	Individual Impurity ≤ 0.1% Sum of all impurities ≤ 1.0%
Residual Solvents	Compliant with USP 467	Compliant with USP 467	Compliant with USP 467	Compliant with USP 467
CAS Number	56-81-5	56-81-5	56-81-5	56-81-5