

ALUMINUM s-BUTOXIDE, 99+%

Safety Data Sheet AKA020.1

Date of issue: 19/02/2015 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Product form	: Substance
Physical state	: Liquid
Substance name	: ALUMINUM s-BUTOXIDE, 99+%
Product code	: AKA020.1
Formula	: C ₁₂ H ₂₇ AlO ₃
Synonyms	: ALUMINUM TRI-sec-BUTOXIDE
Chemical family	: METAL ALCOHOLATE

1.2. Relevant identified uses of the substance or mixture and uses advised against**1.2.1. Relevant identified uses**

Use of the substance/mixture : Chemical intermediate

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet**GELEST, INC.**11 East Steel Road
Morrisville, PA 19067**USA**

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info@gelestde.com - www.gelestde.com**1.4. Emergency telephone number**

Emergency number : CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No. 1272/2008 [CLP]**

Flammable liquids, Category 3 H226

Serious eye damage/eye irritation, Category 2 H319

Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements**Labelling according to Regulation (EC) No. 1272/2008 [CLP]**

Hazard pictograms (CLP) :



GHS02

GHS07

Signal word (CLP) : Warning

Hazard statements (CLP) : H226 - Flammable liquid and vapour.
H319 - Causes serious eye irritation.

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Precautionary statements (CLP) : P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P264 - Wash hands thoroughly after handling.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P240 - Ground/bond container and receiving equipment.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance type : Mono-constituent
Name : ALUMINUM s-BUTOXIDE, 99+%
CAS-No. : 2269-22-9
EC-No. : 218-871-2

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Aluminum s-butoxide	(CAS-No.) 2269-22-9 (EC-No.) 218-871-2	> 99	Flam. Liq. 3, H226 Eye Irrit. 2, H319
2-Butanol	(CAS-No.) 78-92-2 (EC-No.) 201-158-5 (EC Index-No.) 603-127-00-5		Flam. Liq. 3, H226 Eye Irrit. 2, H319 STOT SE 3, H335 STOT SE 3, H336

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact : Wash with plenty of water/....

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

First-aid measures after ingestion : Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after inhalation : May cause irritation to the respiratory tract.
Symptoms/effects after skin contact : May cause skin irritation.
Symptoms/effects after eye contact : Causes serious eye irritation.
Symptoms/effects after ingestion : May be harmful if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Carbon dioxide. Dry chemical.
Unsuitable extinguishing media : Avoid water spray as s-butanol will be generated.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Flammable liquid and vapour. Irritating fumes and organic acid vapors may develop when material is exposed to elevated temperatures or open flame.

5.3. Advice for firefighters

Firefighting instructions : Exercise caution when fighting any chemical fire.
Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapour and mist.

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Remove ignition sources. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal. Use only non-sparking tools.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Avoid all eye and skin contact and do not breathe vapour and mist. Provide good ventilation in process area to prevent formation of vapour. Containers and transfer lines require grounding during use. Do not allow vapors or dust to accumulate in work areas. Use only non-sparking tools.

Hygiene measures : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Ground/bond container and receiving equipment.

Storage conditions : Keep container tightly closed.

Incompatible materials : Water :

Storage area : Store in a well-ventilated place. Store away from heat.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

2-Butanol (78-92-2)		
Austria	MAK (mg/m ³)	150 mg/m ³
Austria	MAK (ppm)	50 ppm
Austria	MAK Short time value (mg/m ³)	600 mg/m ³
Austria	MAK Short time value (ppm)	200 ppm
Belgium	Limit value (mg/m ³)	307 mg/m ³
Belgium	Limit value (ppm)	100 ppm
France	VME (mg/m ³)	300 mg/m ³
France	VME (ppm)	100 ppm
Greece	OEL TWA (mg/m ³)	300 mg/m ³
Greece	OEL TWA (ppm)	100 ppm
Greece	OEL STEL (mg/m ³)	450 mg/m ³
Greece	OEL STEL (ppm)	150 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	100 ppm
Latvia	OEL TWA (mg/m ³)	10 mg/m ³
USA IDLH	US IDLH (ppm)	2000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	305 mg/m ³
USA NIOSH	NIOSH REL (TWA) (ppm)	100 ppm
USA NIOSH	NIOSH REL (STEL) (mg/m ³)	455 mg/m ³
USA NIOSH	NIOSH REL (STEL) (ppm)	150 ppm
USA OSHA	OSHA PEL (TWA) (mg/m ³)	450 mg/m ³
USA OSHA	OSHA PEL (TWA) (ppm)	150 ppm
Spain	VLA-ED (mg/m ³)	308 mg/m ³

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2-Butanol (78-92-2)		
Spain	VLA-ED (ppm)	100 ppm
Switzerland	KZGW (mg/m ³)	600 mg/m ³
Switzerland	KZGW (ppm)	200 ppm
Switzerland	MAK (mg/m ³)	300 mg/m ³
Switzerland	MAK (ppm)	100 ppm
United Kingdom	WEL TWA (mg/m ³)	308 mg/m ³
United Kingdom	WEL TWA (ppm)	100 ppm
United Kingdom	WEL STEL (mg/m ³)	462 mg/m ³
United Kingdom	WEL STEL (ppm)	150 ppm
Czech Republic	Expoziční limity (PEL) (mg/m ³)	300 mg/m ³
Finland	HTP-arvo (8h) (mg/m ³)	150 mg/m ³
Finland	HTP-arvo (8h) (ppm)	50 ppm
Finland	HTP-arvo (15 min)	230 mg/m ³
Finland	HTP-arvo (15 min) (ppm)	75 ppm
Ireland	OEL (8 hours ref) (mg/m ³)	300 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	100 ppm
Ireland	OEL (15 min ref) (mg/m ³)	450 mg/m ³
Ireland	OEL (15 min ref) (ppm)	150 ppm
Lithuania	IPRV (mg/m ³)	150 mg/m ³
Lithuania	IPRV (ppm)	50 ppm
Lithuania	TPRV (mg/m ³)	250 mg/m ³
Lithuania	TPRV (ppm)	75 ppm
Norway	Grenseverdier (Takverdi) (mg/m ³)	75 mg/m ³
Norway	Grenseverdier (Takverdi) (ppm)	25 ppm
Poland	NDS (mg/m ³)	300 mg/m ³
Poland	NDSch (mg/m ³)	450 mg/m ³
Slovakia	NPHV (priemerná) (mg/m ³)	150 mg/m ³
Slovakia	NPHV (priemerná) (ppm)	50 ppm
Sweden	nivågränsvärde (NVG) (mg/m ³)	150 mg/m ³
Sweden	nivågränsvärde (NVG) (ppm)	50 ppm
Sweden	kortidsvärde (KTV) (mg/m ³)	250 mg/m ³
Sweden	kortidsvärde (KTV) (ppm)	75 ppm
Canada (Quebec)	VEMP (mg/m ³)	303 mg/m ³
Canada (Quebec)	VEMP (ppm)	100 ppm
Australia	TWA (mg/m ³)	303 mg/m ³
Australia	TWA (ppm)	100 ppm
Portugal	OEL TWA (ppm)	100 ppm

8.2. Exposure controls

Appropriate engineering controls:

Provide local exhaust or general room ventilation.

Personal protective equipment:

Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Hand protection:

Neoprene or nitrile rubber gloves

Eye protection:

Chemical goggles. Contact lenses should not be worn

Skin and body protection:

Wear suitable protective clothing

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Respiratory protection:

NIOSH-certified organic vapor (black cartridge) respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Liquid. Viscous.
Molecular mass	: 246.32 g/mol
Colour	: Pale yellow. Amber.
Odour	: Slight odor of s-butanol.
Odour threshold	: No data available
Refractive index	: 1.438
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: < 0 °C
Freezing point	: No data available
Boiling point	: 200 - 206 °C @ 30 mm Hg
Flash point	: 27 °C
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: Flammable liquid and vapour.
Vapour pressure	: No data available
Relative vapour density at 20 °C	: > 1
Relative density	: 0.9671
% Volatiles	: > 25 %
Solubility	: Reacts with water.
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable.

10.3. Possibility of hazardous reactions

Material decomposes slowly in contact with air by reaction with moisture, liberating s-butanol and aluminum hydroxide.

10.4. Conditions to avoid

Heat. Open flame. Sparks.

10.5. Incompatible materials

Water :

10.6. Hazardous decomposition products

Aluminium oxides. s-Butanol. Organic acid vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

2-Butanol (78-92-2)

LD50 oral rat	2200 mg/kg
LD50 dermal rabbit	> 2000 mg/kg

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Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Causes serious eye irritation.
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: Not classified
STOT-repeated exposure	: Not classified
Aspiration hazard	: Not classified
Symptoms/effects after inhalation	: May cause irritation to the respiratory tract.
Symptoms/effects after skin contact	: May cause skin irritation.
Symptoms/effects after eye contact	: Causes serious eye irritation.
Symptoms/effects after ingestion	: May be harmful if swallowed.
Reason for classification	: Expert judgment

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity	: Not classified
Chronic aquatic toxicity	: Not classified

2-Butanol (78-92-2)

LC50 fish 1	3380 - 3990 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
EC50 Daphnia 1	1859 - 7143 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

2-Butanol (78-92-2)

Log Pow	0.6
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12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

UN-No. (ADR)	: 1993
UN-No. (IMDG)	: 1993
UN-No. (IATA)	: 1993
UN-No. (ADN)	: 1993
UN-No. (RID)	: 1993

14.2. UN proper shipping name

Proper Shipping Name (ADR)	: FLAMMABLE LIQUID, N.O.S.
Proper Shipping Name (IMDG)	: FLAMMABLE LIQUID, N.O.S.
Proper Shipping Name (IATA)	: Flammable liquid, n.o.s.
Proper Shipping Name (ADN)	: FLAMMABLE LIQUID, N.O.S.
Proper Shipping Name (RID)	: FLAMMABLE LIQUID, N.O.S.

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Transport document description (ADR)	: UN 1993 FLAMMABLE LIQUID, N.O.S. (ALUMINUM s-BUTOXIDE), 3, III, (D/E)
Transport document description (IMDG)	: UN 1993 FLAMMABLE LIQUID, N.O.S. (ALUMINUM s-BUTOXIDE), 3, III
Transport document description (IATA)	: UN 1993 Flammable liquid, n.o.s. (ALUMINUM s-BUTOXIDE), 3, III
Transport document description (ADN)	: UN 1993 FLAMMABLE LIQUID, N.O.S. (ALUMINUM s-BUTOXIDE), 3, III
Transport document description (RID)	: UN 1993 FLAMMABLE LIQUID, N.O.S. (ALUMINUM s-BUTOXIDE), 3, III

14.3. Transport hazard class(es)

ADR

Transport hazard class(es) (ADR)	: 3
Danger labels (ADR)	: 3



IMDG

Transport hazard class(es) (IMDG)	: 3
Danger labels (IMDG)	: 3



IATA

Transport hazard class(es) (IATA)	: 3
Hazard labels (IATA)	: 3



ADN

Transport hazard class(es) (ADN)	: 3
Danger labels (ADN)	: 3



RID

Transport hazard class(es) (RID)	: 3
Danger labels (RID)	: 3



14.4. Packing group

Packing group (ADR)	: III
Packing group (IMDG)	: III
Packing group (IATA)	: III
Packing group (ADN)	: III

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Packing group (RID) : III

14.5. Environmental hazards

Dangerous for the environment : No
Marine pollutant : No
Other information : No supplementary information available

14.6. Special precautions for user

- Overland transport

Classification code (ADR) : F1
Special provisions (ADR) : 274, 601, 640E
Limited quantities (ADR) : 5I
Excepted quantities (ADR) : E1
Packing instructions (ADR) : P001, IBC03, LP01, R001
Mixed packing provisions (ADR) : MP19
Portable tank and bulk container instructions (ADR) : T4
Portable tank and bulk container special provisions (ADR) : TP1, TP29
Tank code (ADR) : LGBF
Vehicle for tank carriage : FL
Transport category (ADR) : 3
Special provisions for carriage - Packages (ADR) : V12
Special provisions for carriage - Operation (ADR) : S2
Hazard identification number (Kemler No.) : 30
Orange plates :

30
1993

Tunnel restriction code (ADR) : D/E

- Transport by sea

Special provisions (IMDG) : 223, 274, 955
Limited quantities (IMDG) : 5 L
Excepted quantities (IMDG) : E1
Packing instructions (IMDG) : P001, LP01
IBC packing instructions (IMDG) : IBC03
Tank instructions (IMDG) : T4
Tank special provisions (IMDG) : TP1, TP29
EmS-No. (Fire) : F-E
EmS-No. (Spillage) : S-E
Stowage category (IMDG) : A

- Air transport

PCA Excepted quantities (IATA) : E1
PCA Limited quantities (IATA) : Y344
PCA limited quantity max net quantity (IATA) : 10L
PCA packing instructions (IATA) : 355
PCA max net quantity (IATA) : 60L
CAO packing instructions (IATA) : 366
CAO max net quantity (IATA) : 220L
Special provisions (IATA) : A3
ERG code (IATA) : 3L

- Inland waterway transport

Classification code (ADN) : F1
Special provisions (ADN) : 274, 601, 640E
Limited quantities (ADN) : 5 L

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Excepted quantities (ADN)	: E1
Carriage permitted (ADN)	: T
Equipment required (ADN)	: PP, EX, A
Ventilation (ADN)	: VE01
Number of blue cones/lights (ADN)	: 0

- Rail transport

Classification code (RID)	: F1
Special provisions (RID)	: 274, 601, 640E
Limited quantities (RID)	: 5L
Excepted quantities (RID)	: E1
Packing instructions (RID)	: P001, IBC03, LP01, R001
Mixed packing provisions (RID)	: MP19
Portable tank and bulk container instructions (RID)	: T4
Portable tank and bulk container special provisions (RID)	: TP1, TP29
Tank codes for RID tanks (RID)	: LGBF
Transport category (RID)	: 3
Special provisions for carriage – Packages (RID)	: W12
Colis express (express parcels) (RID)	: CE4
Hazard identification number (RID)	: 30

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions

ALUMINUM s-BUTOXIDE, 99+% is not on the REACH Candidate List

ALUMINUM s-BUTOXIDE, 99+% is not on the REACH Annex XIV List

% Volatiles : > 25 %

15.1.2. National regulations

Germany

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

Denmark

Class for fire hazard : Class II-1

Store unit : 5 liter

Classification remarks : R10 <H226;H319>; Emergency management guidelines for the storage of flammable liquids must be followed

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

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Abbreviations and acronyms:

Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor

Other information

: Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 3	Flammable liquids, Category 3
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Narcosis
H226	Flammable liquid and vapour.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.

SDS EU (REACH Annex II) - Custom

The information contained in this document has been gathered from reference materials and/or Gelest, Inc. test data and is to the best knowledge and belief of Gelest, Inc. accurate and reliable. Such information is offered solely for your consideration, investigation and verification. It is not suggested or guaranteed that the hazard precautions or procedures described are the only ones which exist. Gelest, Inc. makes no warranties, express or implied, with respect to the use of such information and assumes no responsibility therefore. Information on this safety data sheet is not intended to constitute a basis for product specifications.

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The logo for Gelest, featuring the word "Gelest" in a large, white, serif font. The letters "e", "l", "e", and "s" are partially overlaid by a large, light purple triangle that points to the right.