

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

Trade name

Triisobutylaluminum, 25% w/w in hexane

Stock number:

89057

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

Identified use:

SU24 Scientific research and development

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar GmbH & Co.KG
A Johnson Matthey Company
Zeppelinstr. 7b
76185 Karlsruhe / Germany
Tel: +49 (0) 721 84007 280
Fax: +49 (0) 721 84007 300
Email: tech@alfa.com
www.alfa.com

Informing department:

Product safety Tel + +049 (0) 7275 988687-0

1.4 Emergency telephone number:

Carechem 24: +44 (0) 1235 239 670 (Multi-language emergency number)

Poison Information Center Mainz

www.giftinfo.uni-mainz.de Telephone: +49(0)6131/19240

SECTION 2: Hazards identification**2.1 Classification of the substance or mixture**

Classification according to Regulation (EC) No 1272/2008



GHS02 flame

Flam. Liq. 2

H225

Highly flammable liquid and vapour.

Pyr. Liq. 1

H250

Catches fire spontaneously if exposed to air.

Water-react. 1

H260

In contact with water releases flammable gases which may ignite spontaneously.



GHS08 health hazard

Repr. 2

H361f

Suspected of damaging fertility.

STOT RE 2

H373

May cause damage to the peripheral nervous system, the lung, the kidneys, the liver, the reproductive system and the brain through prolonged or repeated exposure. Route of exposure: Inhalative.

Asp. Tox. 1

H304

May be fatal if swallowed and enters airways.



GHS05 corrosion

Skin Corr. 1B

H314

Causes severe skin burns and eye damage.



GHS09 environment

Aquatic Chronic 2

H411

Toxic to aquatic life with long lasting effects.



GHS07

STOT SE 3

H336

May cause drowsiness or dizziness.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

C; Corrosive

R34:

Causes burns.

Xn; Harmful

R48/20-62-65: Harmful: danger of serious damage to health by prolonged exposure through inhalation. Possible risk of impaired fertility. Harmful: may cause lung damage if swallowed.



F; Highly flammable

R11-17:

Highly flammable. Spontaneously flammable in air.



N; Dangerous for the environment

R51/53:

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R14-67:

Reacts violently with water. Vapours may cause drowsiness and dizziness.

Information concerning particular hazards for human and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
Has a narcotizing effect.

Other hazards that do not result in classification

No information known.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard pictograms

The product is classified and labelled according to the CLP regulation.

GHS02, GHS05, GHS07, GHS08, GHS09

Signal word

Danger

Hazard-determining components of labelling:

n-Hexane

Triisobutylaluminum

H225 Highly flammable liquid and vapour.

H250 Catches fire spontaneously if exposed to air.

H260 In contact with water releases flammable gases which may ignite spontaneously.

H314 Causes severe skin burns and eye damage.

H361f Suspected of damaging fertility.

H336 May cause drowsiness or dizziness.

H373 May cause damage to the peripheral nervous system, the lung, the kidneys, the liver, the reproductive system and the brain through prolonged or repeated exposure. Route of exposure: Inhalative.

H304 May be fatal if swallowed and enters airways.

H411 Toxic to aquatic life with long lasting effects.

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P405

Store locked up.

Precautionary statements

Trade name **Triisobutylaluminum, 25% w/w in hexane**

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P422 Store contents under inert gas.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
EUH014 Reacts violently with water.

Additional information:**2.3 Other hazards****Results of PBT and vPvB assessment****PBT:** Not applicable.**vPvB:** Not applicable.**SECTION 3: Composition/information on ingredients****3.2 Mixtures****Dangerous components:**

CAS: 110-54-3 EINECS: 203-777-6	n-Hexane ☒ Xn R48/20-62-65; ☒ Xi R38; ☒ F R11; ☒ N R51/53 R67 Repr. Cat. 3 ◆ Flam. Liq. 2, H225; ◆ Repr. 2, H361f; STOT RE 2, H373; Asp. Tox. 1, H304; ◆ Aquatic Chronic 2, H411; ◆ Skin Irrit. 2, H315; STOT SE 3, H336	75,0%
CAS: 100-99-2 EINECS: 202-906-3	Triisobutylaluminum ☒ C R34; ☒ F R17 R14 ◆ Flam. Liq. 2, H225; Pyr. Liq. 1, H250; Water-react. 1, H260; ◆ Skin Corr. 1B, H314	25,0%

Additional information

None known.

SECTION 4: First aid measures**4.1 Description of first aid measures****General information****After inhalation**

Instantly remove any clothing soiled by the product. Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.

After skin contact

Seek immediate medical advice. Instantly wash with water and soap and rinse thoroughly.

After eye contact

Seek immediate medical advice.

After swallowing

Rinse opened eye for several minutes under running water. Then consult doctor.

4.2 Most important symptoms and effects, both acute and delayed

No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed

No further relevant information available.

SECTION 5: Firefighting measures**5.1 Extinguishing media****Suitable extinguishing agents****For safety reasons unsuitable extinguishing agents**

In case of fire, use sand, carbon dioxide or powdered extinguishing agent. Never use water.

5.2 Special hazards arising from the substance or mixture

Water.

Reacts violently with water
Spontaneously flammable in air.
If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
Metal oxide

5.3 Advice for firefighters**Protective equipment:**

Wear self-contained breathing apparatus.
Wear full protective suit.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources

6.2 Environmental precautions:

Do not allow material to be released to the environment without proper governmental permits.
Do not allow product to reach sewage system or water bodies.
Do not allow to enter the ground/soil.

6.3 Methods and material for containment and cleaning up:

Keep away from ignition sources.
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose of contaminated material as waste according to item 13.
Ensure adequate ventilation.

Prevention of secondary hazards:**6.4 Reference to other sections**

Do not flush with water or aqueous cleansing agents
Keep away from ignition sources.
See Section 7 for information on safe handling
See section 8 for information on personal protection equipment.
See Section 13 for information on disposal.

SECTION 7: Handling and storage**7.1 Precautions for safe handling**

Handle under dry protective gas.
Keep containers tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation/exhaustion at the workplace.

Information about protection against explosions and fires:

Protect against electrostatic charges.
Fumes can combine with air to form an explosive mixture.
Substance/product is auto-flammable.

7.2 Conditions for safe storage, including any incompatibilities**Storage Requirements to be met by storerooms and containers:**

Store in cool location.

Information about storage in one common storage facility:

Store away from air.
Store away from water.
Store away from oxidizing agents.

Further information about storage conditions:

Store under dry inert gas.

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Trade name **Triisobutylaluminum, 25% w/w in hexane**

(Contd. of page 2)

This product is moisture sensitive.
This product is air sensitive.
Protect from humidity and keep away from water.
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
Store in a locked cabinet or with access restricted to technical experts or their assistants.
No further relevant information available.

7.3 Specific end use(s)**SECTION 8: Exposure controls/personal protection****Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

8.1 Control parameters**Components with critical values that require monitoring at the workplace:****110-54-3 n-Hexane (75,0%)**

AGW (Germany)	180 mg/m ³ , 50 ppm 8(II);DFG, EU, Y
PEL (USA)	1800 mg/m ³ , 500 ppm
REL (USA)	180 mg/m ³ , 50 ppm
TLV (USA)	176 mg/m ³ , 50 ppm Skin; BEI

100-99-2 Triisobutylaluminum (25,0%)

REL (USA)	2 mg/m ³ as Al
TLV (USA)	1* mg/m ³ as Al;*as respirable fraction

Ingredients with biological limit values:**110-54-3 n-Hexane (75,0%)**

BGW (Germany)	5 mg/l U b 2,5-Hexandion plus 4,5-Dihydroxy-2-hexanon
BEI (USA)	0,4 mg/L urine end of shift at end of workweek 2,5-Hexanedione without hydrolysis

Additional information: No data

8.2 Exposure controls**Personal protective equipment****General protective and hygienic measures**

The usual precautionary measures should be adhered to in handling the chemicals.
Keep away from foodstuffs, beverages and food.
Instantly remove any soiled and impregnated garments.
Wash hands during breaks and at the end of the work.
Do not inhale dust / smoke / mist.
Avoid contact with the eyes and skin.

Breathing equipment:**Protection of hands:**

Maintain an ergonomically appropriate working environment.
Use breathing protection with high concentrations.
Check protective gloves prior to each use for their proper condition.
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Material of gloves**Penetration time of glove material****Eye protection:**

Impervious gloves
Not determined
Tightly sealed safety glasses.
Full face protection
Protective work clothing.

Body protection:**SECTION 9: Physical and chemical properties****9.1 Information on basic physical and chemical properties****General Information****Appearance:**

Form:	Liquid
Colour:	Colourless
Smell:	Not determined
Odour threshold:	Not determined.

pH-value: Not determined.

Change in condition

Melting point/Melting range:	Not determined
Boiling point/Boiling range:	Not determined
Sublimation temperature / start:	Not determined
Inflammability (solid, gaseous)	Not determined.
Ignition temperature:	240 °C
Decomposition temperature:	Not determined
Self-inflammability:	Spontaneously flammable in air.

Critical values for explosion:

Lower:	1,2 Vol %
Upper:	7,4 Vol %
Steam pressure at 20 °C:	160 hPa
Density at 20 °C	0,782 g/cm ³
Relative density	Not determined.
Vapour density	Not determined.
Evaporation rate	Not determined.
Solubility in / Miscibility with	
Water:	Reacts violently
Partition coefficient (n-octanol/water):	Not determined.
Viscosity:	
dynamic:	Not determined.
kinematic:	Not determined.

Solvent content:

Organic solvents: 75,0 %

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9.2 Other information No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity Reacts violently with water.
Catches fire spontaneously if exposed to air.
Stable under recommended storage conditions.

10.2 Chemical stability Spontaneously flammable in air.

Thermal decomposition / conditions to be avoided: No decomposition if used and stored according to specifications.

10.3 Possibility of hazardous reactions Reacts with strong oxidizing agents
Reacts violently with water

10.5 Incompatible materials: Air
Oxidizing agents
Water/moisture

10.6 Hazardous decomposition products: Carbon monoxide and carbon dioxide
Metal oxide

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity: Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.

LD/LC50 values that are relevant for classification:**110-54-3 n-Hexane**

Oral	LD50	15840 mg/kg (rat)
Inhalative	LC50/4H	48000 ppm/4H (rat)

Skin irritation or corrosion: Causes severe skin burns.

Eye irritation or corrosion: Causes serious eye damage.

Sensitization: No sensitizing effect known.

Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for components in this product.

Carcinogenicity: EPA-II: Inadequate information to assess carcinogenic potential.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for this product.

Reproductive toxicity: Suspected of damaging fertility or the unborn child.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for components in this product.

Specific target organ system toxicity - repeated exposure: May cause damage to organs through prolonged or repeated exposure.

Specific target organ system toxicity - single exposure: May cause drowsiness or dizziness.

Aspiration hazard: May be fatal if swallowed and enters airways.

Experience with humans: The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for components in this product.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
The product shows the following dangers according to the calculation method of the General EC Classification Guidelines for Preparations as issued in the latest version:
Corrosive

SECTION 12: Ecological information

12.1 Toxicity No further relevant information available.

12.2 Persistence and degradability No further relevant information available.

12.3 Bioaccumulative potential No further relevant information available.

12.4 Mobility in soil No further relevant information available.

Additional ecological information: Do not allow product to reach ground water, water bodies or sewage system.
Do not allow material to be released to the environment without proper governmental permits.
Water hazard class 2 (Self-assessment): hazardous for water.
Danger to drinking water if even small quantities leak into soil.
Also poisonous for fish and plankton in water bodies.
Toxic to aquatic life.
May cause long lasting harmful effects to aquatic life.
Avoid transfer into the environment.

12.5 Results of PBT and vPvB assessment Not applicable.

PBT: Not applicable.

vPvB: Not applicable.

12.6 Other adverse effects No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Recommendation Hand over to disposers of hazardous waste.
Must be specially treated under adherence to official regulations.
Consult state, local or national regulations for proper disposal.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

SECTION 14: Transport information

UN-Number ADR, IMDG, IATA	UN3399
14.2 UN proper shipping name ADR	3399 ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE
IMDG, IATA	ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE

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14.3 Transport hazard class(es)

ADR


**Class
Label
IMDG, IATA**

 4.3 (WF1) Substances which, in contact with water, emit flammable gases.
4.3+3

**Class
Label**

 4.3 Substances which, in contact with water, emit flammable gases.
4.3+3

**Packing group
ADR, IMDG, IATA**

I

**14.5 Environmental hazards:
Marine pollutant:**

No

**14.6 Special precautions for user
Kemler Number:**

 Warning: Substances which, in contact with water, emit flammable gases.
X323

**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC
Code**

Not applicable.

Transport/Additional information:

ADR

**Excepted quantities (EQ):
Limited quantities (LQ)
Transport category
Tunnel restriction code**

 E0
0
0
B/E
UN "Model Regulation":
 UN3399, ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE,
FLAMMABLE, 4.3 (3), I
SECTION 15: Regulatory information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****Australian Inventory of Chemical Substances**

All ingredients are listed.

Standard for the Uniform Scheduling of Drugs and Poisons

None of the ingredients is listed.

National regulations**Information about limitation of use:**
 Employment restrictions concerning young persons must be observed.
Employment restrictions concerning women of child-bearing age must be observed.
For use only by technically qualified individuals.
Not applicable

**Classification according to VbF:
Technical instructions (air):**

Class	Share in %
I	75,0

Water hazard class:

Water hazard class 2 (Self-assessment): hazardous for water.

Other regulations, limitations and prohibitive regulations**ELINCS (European List of Notified Chemical Substances)**

None of the ingredients is listed.

Substances of very high concern (SVHC) according to REACH, Article 57

None of the ingredients are listed.

REACH - Pre-registered substances

All ingredients are listed.

15.2 Chemical safety assessment:

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Relevant phrases
 H225 Highly flammable liquid and vapour.
 H250 Catches fire spontaneously if exposed to air.
 H260 In contact with water releases flammable gases which may ignite spontaneously.
 H304 May be fatal if swallowed and enters airways.
 H314 Causes severe skin burns and eye damage.
 H315 Causes skin irritation.
 H336 May cause drowsiness or dizziness.
 H361f Suspected of damaging fertility.
 H373 May cause damage to organs through prolonged or repeated exposure.
 H411 Toxic to aquatic life with long lasting effects.
 R11 Highly flammable.
 R14 Reacts violently with water.
 R17 Spontaneously flammable in air.
 R34 Causes burns.
 R38 Irritating to skin.
 R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.
 R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
 R62 Possible risk of impaired fertility.
 R65 Harmful: may cause lung damage if swallowed.
 R67 Vapours may cause drowsiness and dizziness.

**Department issuing data specification sheet:
Abbreviations and acronyms:**

 Health, Safety and Environmental Department.
 ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
 IMDG: International Maritime Code for Dangerous Goods
 IATA: International Air Transport Association
 GHS: Globally Harmonized System of Classification and Labelling of Chemicals
 VbF: Verordnung über brennbare Flüssigkeiten, Österreich (Ordinance on the storage of combustible liquids, Austria)
 LC50: Lethal concentration, 50 percent
 LD50: Lethal dose, 50 percent