

TITANIUM CHLORIDE TRIISOPROPOXIDE, 1.25M in tetrahydrofuran

Safety Data Sheet AKT851.2

Date of issue: 15/03/2017

Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form	: Mixture
Physical state	: Liquid
Product name	: TITANIUM CHLORIDE TRIISOPROPOXIDE, 1.25M in tetrahydrofuran
Product code	: AKT851.2
Formula	: C ₉ H ₂₁ ClO ₃ Ti
Synonyms	: TRIISOPROPYLCHLOROTITANATE CHLOROTITANIUM TRIISOPROPOXIDE
Chemical family	: METAL ESTER

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

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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 2	H225
Skin corrosion/irritation, Category 1B	H314
Serious eye damage/eye irritation, Category 1	H318
Carcinogenicity, Category 2	H351
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	H335

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



GHS05



GHS07



GHS08

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Signal word (CLP)	: Danger
Hazardous ingredients	: Tetrahydrofuran; Titanium chloride triisopropoxide
Hazard statements (CLP)	: H225 - Highly flammable liquid and vapour. H314 - Causes severe skin burns and eye damage. H335 - May cause respiratory irritation. H351 - Suspected of causing cancer.
Precautionary statements (CLP)	: P202 - Do not handle until all safety precautions have been read and understood. P280 - Wear protective gloves/protective clothing/eye protection/face protection. P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P240 - Ground/bond container and receiving equipment. P264 - Wash hands thoroughly after handling. P310 - Immediately call a POISON CENTER or doctor/physician
EUH-statements	: EUH019 - May form explosive peroxides.

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Tetrahydrofuran	(CAS-No.) 109-99-9 (EC-No.) 203-726-8 (EC Index-No.) 603-025-00-0	65 - 70	Flam. Liq. 2, H225 Eye Irrit. 2, H319 Carc. 2, H351 STOT SE 3, H335
Titanium chloride triisopropoxide	(CAS-No.) 20717-86-6	30 - 35	Flam. Sol. 2, H228 Skin Corr. 1B, H314 Eye Dam. 1, H318
Isopropanol	(CAS-No.) 67-63-0 (EC-No.) 200-661-7 (EC Index-No.) 603-117-00-0	0 - 2	Flam. Liq. 2, H225 Eye Irrit. 2, H319 STOT SE 3, H336

Specific concentration limits:

Name	Product identifier	Specific concentration limits
Tetrahydrofuran	(CAS-No.) 109-99-9 (EC-No.) 203-726-8 (EC Index-No.) 603-025-00-0	(25 =<C < 100) Eye Irrit. 2, H319 (25 =<C < 100) STOT SE 3, H335

Full text of H-statements: see section 16

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/.... Get medical advice/attention.
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. Immediately call a POISON CENTER/doctor.

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

Symptoms/effects	: May cause cancer. Causes severe skin burns and eye damage.
Symptoms/effects after inhalation	: May cause respiratory irritation. Headache. Nausea.
Symptoms/effects after skin contact	: Causes (severe) skin burns.
Symptoms/effects after eye contact	: Causes serious eye damage.
Symptoms/effects after ingestion	: May be harmful if swallowed.

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Chronic symptoms : TETRAHYDROFURAN: Mildly toxic by inhalation. Mutagenic data has been reported. Reported as causing injury to liver and kidneys.

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

Note to physician: Activated charcoal slurry may be administered. Activated charcoal slurry is prepared by suspending 50 grams of activated charcoal in 400 ml water and mixing thoroughly. Administer 5 ml/kg.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Water spray. Water fog. Foam. Carbon dioxide. Dry chemical.

Unsuitable extinguishing media : Do not use straight streams.

5.2. Special hazards arising from the substance or mixture

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

Explosion hazard : May form flammable/explosive vapour-air mixture.

5.3. Advice for firefighters

Firefighting instructions : Exercise caution when fighting any chemical fire. Use water spray or fog for cooling exposed containers.

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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Eliminate every possible source of ignition. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment as described in Section 8.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: "Exposure controls/personal protection".

Emergency procedures : Ventilate area.

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

For containment : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

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

Additional hazards when processed : Handle empty containers with care because residual vapours are flammable. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Precautions for safe handling : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid all eye and skin contact and do not breathe vapour and mist. Ground/bond container and receiving equipment. Take precautionary measures against static discharge. Use only outdoors or in a well-ventilated area. Use only non-sparking tools.

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

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof electrical equipment.

Storage conditions : Keep container tightly closed. Keep in a cool place. Store locked up.

Incompatible materials : Oxidizing agent.

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

7.3. Specific end use(s)

No additional information available

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Tetrahydrofuran (109-99-9)		
EU	IOELV TWA (mg/m ³)	150 mg/m ³
EU	IOELV TWA (ppm)	50 ppm
EU	IOELV STEL (mg/m ³)	300 mg/m ³
EU	IOELV STEL (ppm)	100 ppm
Austria	MAK (mg/m ³)	150 mg/m ³
Austria	MAK (ppm)	50 ppm
Austria	MAK Short time value (mg/m ³)	300 mg/m ³
Austria	MAK Short time value (ppm)	100 ppm
Belgium	Limit value (mg/m ³)	150 mg/m ³
Belgium	Limit value (ppm)	50 ppm
Belgium	Short time value (mg/m ³)	300 mg/m ³
Belgium	Short time value (ppm)	100 ppm
Bulgaria	OEL TWA (mg/m ³)	150 mg/m ³
Bulgaria	OEL TWA (ppm)	50 ppm
Bulgaria	OEL STEL (mg/m ³)	100 mg/m ³
Bulgaria	OEL STEL (ppm)	300 ppm
Cyprus	OEL TWA (mg/m ³)	150 mg/m ³
Cyprus	OEL TWA (ppm)	50 ppm
Cyprus	OEL STEL (mg/m ³)	300 mg/m ³
Cyprus	OEL STEL (ppm)	100 ppm
France	VLE (mg/m ³)	300 mg/m ³ (restrictive limit)
France	VLE (ppm)	100 ppm (restrictive limit)
France	VME (mg/m ³)	150 mg/m ³ (restrictive limit)
France	VME (ppm)	50 ppm (restrictive limit)
Germany	TRGS 900 Occupational exposure limit value (mg/m ³)	150 mg/m ³ (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 900 Occupational exposure limit value (ppm)	50 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 903 Biological limit value	2 mg/l (Medium: urine - Time: end of shift - Parameter: Tetrahydrofuran)
Gibraltar	Eight hours mg/m ³	150 mg/m ³
Gibraltar	Eight hours ppm	50 ppm
Gibraltar	Short-term mg/m ³	300 mg/m ³
Gibraltar	Short-term ppm	100 ppm
Greece	OEL TWA (mg/m ³)	590 mg/m ³
Greece	OEL TWA (ppm)	200 ppm
Greece	OEL STEL (mg/m ³)	735 mg/m ³
Greece	OEL STEL (ppm)	250 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	50 ppm
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	100 ppm
Italy	OEL TWA (mg/m ³)	150 mg/m ³
Italy	OEL TWA (ppm)	50 ppm
Italy	OEL STEL (mg/m ³)	300 mg/m ³
Italy	OEL STEL (ppm)	100 ppm
Latvia	OEL TWA (mg/m ³)	150 mg/m ³
Latvia	OEL TWA (ppm)	50 ppm
USA IDLH	US IDLH (ppm)	2000 ppm (10% LEL)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	590 mg/m ³
USA NIOSH	NIOSH REL (TWA) (ppm)	200 ppm
USA NIOSH	NIOSH REL (STEL) (mg/m ³)	735 mg/m ³
USA NIOSH	NIOSH REL (STEL) (ppm)	250 ppm
USA OSHA	OSHA PEL (TWA) (mg/m ³)	590 mg/m ³

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Tetrahydrofuran (109-99-9)		
USA OSHA	OSHA PEL (TWA) (ppm)	200 ppm
Spain	VLA-ED (mg/m ³)	150 mg/m ³ (indicative limit value)
Spain	VLA-ED (ppm)	50 ppm (indicative limit value)
Spain	VLA-EC (mg/m ³)	300 mg/m ³
Spain	VLA-EC (ppm)	100 ppm
Switzerland	KZGW (mg/m ³)	300 mg/m ³
Switzerland	KZGW (ppm)	100 ppm
Switzerland	MAK (mg/m ³)	150 mg/m ³
Switzerland	MAK (ppm)	50 ppm
Netherlands	Grenswaarde TGG 8H (mg/m ³)	300 mg/m ³
Netherlands	Grenswaarde TGG 15MIN (mg/m ³)	600 mg/m ³
United Kingdom	WEL TWA (mg/m ³)	150 mg/m ³
United Kingdom	WEL TWA (ppm)	50 ppm
United Kingdom	WEL STEL (mg/m ³)	300 mg/m ³
United Kingdom	WEL STEL (ppm)	100 ppm
Czech Republic	Expoziční limity (PEL) (mg/m ³)	150 mg/m ³
Denmark	Grænseværdie (langvarig) (mg/m ³)	150 mg/m ³
Denmark	Grænseværdie (langvarig) (ppm)	50 ppm
Finland	HTP-arvo (8h) (mg/m ³)	150 mg/m ³
Finland	HTP-arvo (8h) (ppm)	50 ppm
Finland	HTP-arvo (15 min)	300 mg/m ³
Finland	HTP-arvo (15 min) (ppm)	100 ppm
Hungary	AK-érték	150 mg/m ³
Hungary	CK-érték	300 mg/m ³
Ireland	OEL (8 hours ref) (mg/m ³)	150 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	50 ppm
Ireland	OEL (15 min ref) (mg/m ³)	300 mg/m ³
Ireland	OEL (15 min ref) (ppm)	100 ppm
Lithuania	IPRV (mg/m ³)	150 mg/m ³
Lithuania	IPRV (ppm)	50 ppm
Lithuania	TPRV (mg/m ³)	300 mg/m ³
Lithuania	TPRV (ppm)	100 ppm
Malta	OEL TWA (mg/m ³)	150 mg/m ³
Malta	OEL TWA (ppm)	50 ppm
Malta	OEL STEL (mg/m ³)	300 mg/m ³
Malta	OEL STEL (ppm)	100 ppm
Norway	Grenseverdier (AN) (mg/m ³)	150 mg/m ³
Norway	Grenseverdier (AN) (ppm)	50 ppm
Norway	Grenseverdier (Korttidsverdi) (mg/m ³)	150 mg/m ³
Norway	Grenseverdier (Korttidsverdi) (ppm)	50 ppm
Poland	NDS (mg/m ³)	150 mg/m ³
Poland	NDSCh (mg/m ³)	300 mg/m ³
Romania	OEL TWA (mg/m ³)	150 mg/m ³
Romania	OEL TWA (ppm)	50 ppm
Romania	OEL STEL (mg/m ³)	300 mg/m ³
Romania	OEL STEL (ppm)	100 ppm
Slovakia	NPHV (priemerná) (mg/m ³)	150 mg/m ³
Slovakia	NPHV (priemerná) (ppm)	50 ppm
Slovakia	NPHV (Hraničná) (mg/m ³)	300 mg/m ³
Sweden	nivågränsvärde (NVG) (mg/m ³)	150 mg/m ³
Sweden	nivågränsvärde (NVG) (ppm)	50 ppm

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Tetrahydrofuran (109-99-9)		
Sweden	kortidsvärde (KTV) (mg/m ³)	250 mg/m ³
Sweden	kortidsvärde (KTV) (ppm)	80 ppm
Canada (Quebec)	VEMP (mg/m ³)	300 mg/m ³
Canada (Quebec)	VEMP (ppm)	100 ppm
Australia	TWA (mg/m ³)	295 mg/m ³
Australia	TWA (ppm)	100 ppm
Portugal	OEL TWA (mg/m ³)	150 mg/m ³ (indicative limit value)
Portugal	OEL TWA (ppm)	50 ppm (indicative limit value)
Portugal	OEL STEL (mg/m ³)	300 mg/m ³ (indicative limit value)
Portugal	OEL STEL (ppm)	100 ppm (indicative limit value)
Portugal	OEL chemical category (PT)	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans, skin - potential for cutaneous exposure indicative limit value
Isopropanol (67-63-0)		
Austria	MAK (mg/m ³)	500 mg/m ³ (short time value for large casting)
Austria	MAK (ppm)	200 ppm (short time value for large casting)
Austria	MAK Short time value (mg/m ³)	2000 mg/m ³ 2000 mg/m ³ (STEL for large casting valid till 12/31/2013)
Austria	MAK Short time value (ppm)	800 ppm 800 ppm (STEL for large casting valid till 12/31/2013)
Belgium	Limit value (mg/m ³)	500 mg/m ³
Belgium	Limit value (ppm)	200 ppm
Belgium	Short time value (mg/m ³)	1000 mg/m ³
Belgium	Short time value (ppm)	400 ppm
Bulgaria	OEL TWA (mg/m ³)	980 mg/m ³
Bulgaria	OEL STEL (mg/m ³)	1225 mg/m ³
France	VLE (mg/m ³)	980 mg/m ³
France	VLE (ppm)	400 ppm
Germany	TRGS 900 Occupational exposure limit value (mg/m ³)	500 mg/m ³ (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 900 Occupational exposure limit value (ppm)	200 ppm (The risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Germany	TRGS 903 Biological limit value	25 mg/l (Medium: whole blood - Time: end of shift - Parameter: Acetone) 25 mg/l (Medium: urine - Time: end of shift - Parameter: Acetone)
Greece	OEL TWA (mg/m ³)	980 mg/m ³
Greece	OEL TWA (ppm)	400 ppm
Greece	OEL STEL (mg/m ³)	1225 mg/m ³
Greece	OEL STEL (ppm)	500 ppm
Italy - Portugal - USA ACGIH	ACGIH TWA (ppm)	200 ppm
Italy - Portugal - USA ACGIH	ACGIH STEL (ppm)	400 ppm
Latvia	OEL TWA (mg/m ³)	350 mg/m ³
USA IDLH	US IDLH (ppm)	2000 ppm (10% LEL)
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	980 mg/m ³
USA NIOSH	NIOSH REL (TWA) (ppm)	400 ppm
USA NIOSH	NIOSH REL (STEL) (mg/m ³)	1225 mg/m ³
USA NIOSH	NIOSH REL (STEL) (ppm)	500 ppm
USA OSHA	OSHA PEL (TWA) (mg/m ³)	980 mg/m ³
USA OSHA	OSHA PEL (TWA) (ppm)	400 ppm
Spain	VLA-ED (mg/m ³)	500 mg/m ³ (it is prohibited the partial or complete commercialization or use of this substance as a phytosanitary or biocide compound)
Spain	VLA-ED (ppm)	200 ppm (it is prohibited the partial or complete commercialization or use of this substance as a phytosanitary or biocide compound)
Spain	VLA-EC (mg/m ³)	1000 mg/m ³

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Isopropanol (67-63-0)		
Spain	VLA-EC (ppm)	400 ppm
Switzerland	KZGW (mg/m ³)	1000 mg/m ³
Switzerland	KZGW (ppm)	400 ppm
Switzerland	MAK (mg/m ³)	500 mg/m ³
Switzerland	MAK (ppm)	200 ppm
United Kingdom	WEL TWA (mg/m ³)	999 mg/m ³
United Kingdom	WEL TWA (ppm)	400 ppm
United Kingdom	WEL STEL (mg/m ³)	1250 mg/m ³
United Kingdom	WEL STEL (ppm)	500 ppm
Czech Republic	Expoziční limity (PEL) (mg/m ³)	500 mg/m ³
Denmark	Grænseværdie (langvarig) (mg/m ³)	490 mg/m ³
Denmark	Grænseværdie (langvarig) (ppm)	200 ppm
Finland	HTP-arvo (8h) (mg/m ³)	500 mg/m ³
Finland	HTP-arvo (8h) (ppm)	200 ppm
Finland	HTP-arvo (15 min)	620 mg/m ³
Finland	HTP-arvo (15 min) (ppm)	250 ppm
Hungary	AK-érték	500 mg/m ³
Hungary	CK-érték	2000 mg/m ³
Ireland	OEL (8 hours ref) (ppm)	200 ppm
Ireland	OEL (15 min ref) (ppm)	400 ppm
Lithuania	IPRV (mg/m ³)	350 mg/m ³
Lithuania	IPRV (ppm)	150 ppm
Lithuania	TPRV (mg/m ³)	600 mg/m ³
Lithuania	TPRV (ppm)	250 ppm
Norway	Grenseverdier (AN) (mg/m ³)	245 mg/m ³
Norway	Grenseverdier (AN) (ppm)	100 ppm
Norway	Grenseverdier (Korttidsverdi) (mg/m ³)	245 mg/m ³
Norway	Grenseverdier (Korttidsverdi) (ppm)	100 ppm
Poland	NDS (mg/m ³)	900 mg/m ³
Poland	NDSCh (mg/m ³)	1200 mg/m ³
Romania	OEL TWA (mg/m ³)	200 mg/m ³
Romania	OEL TWA (ppm)	81 ppm
Romania	OEL STEL (mg/m ³)	500 mg/m ³
Romania	OEL STEL (ppm)	203 ppm
Slovakia	NPHV (priemerná) (mg/m ³)	500 mg/m ³
Slovakia	NPHV (priemerná) (ppm)	200 ppm
Slovakia	NPHV (Hraničná) (mg/m ³)	1000 mg/m ³
Sweden	nivågränsvärde (NVG) (mg/m ³)	350 mg/m ³
Sweden	nivågränsvärde (NVG) (ppm)	150 ppm
Sweden	kortidsvärde (KTV) (mg/m ³)	600 mg/m ³
Sweden	kortidsvärde (KTV) (ppm)	250 ppm
Canada (Quebec)	VECD (mg/m ³)	1230 mg/m ³
Canada (Quebec)	VECD (ppm)	500 ppm
Canada (Quebec)	VEMP (mg/m ³)	985 mg/m ³
Canada (Quebec)	VEMP (ppm)	400 ppm
Australia	TWA (mg/m ³)	983 mg/m ³
Australia	TWA (ppm)	400 ppm
Australia	STEL (mg/m ³)	1230 mg/m ³
Australia	STEL (ppm)	500 ppm
Portugal	OEL TWA (ppm)	200 ppm
Portugal	OEL STEL (ppm)	400 ppm
Portugal	OEL chemical category (PT)	A4 - Not Classifiable as a Human Carcinogen

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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 or face shield. Contact lenses should not be worn

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. 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.
Molecular mass	: 260.62 g/mol
Colour	: Pale yellow.
Odour	: No data available
Odour threshold	: No data available
Refractive index	: No additional information available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: < 15 °C
Freezing point	: No data available
Boiling point	: 66 °C -initial
Flash point	: -14 °C
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Flammability (solid, gas)	: Highly flammable liquid and vapour.
Vapour pressure	: 114 mm Hg @ 15°C (THF)
Relative vapour density at 20 °C	: > 1
Relative density	: 0.941
% 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.

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10.3. Possibility of hazardous reactions

Material decomposes slowly in contact with moist air and rapidly in contact with water liberating isopropanol.

10.4. Conditions to avoid

Heat. Open flame. Sparks.

10.5. Incompatible materials

Oxidizing agent.

10.6. Hazardous decomposition products

Hydrogen chloride. Isopropanol. Organic acid vapors. Titanium oxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Tetrahydrofuran (109-99-9)

LD50 oral rat	1650 mg/kg
LC50 inhalation rat (ppm)	21000 ppm (Exposure time: 3 h)
ATE CLP (oral)	1650 mg/kg bodyweight

Isopropanol (67-63-0)

LD50 oral rat	1870 mg/kg
LD50 dermal rabbit	4059 mg/kg
LC50 inhalation rat (mg/l)	72600 mg/m ³ (Exposure time: 4 h)
ATE CLP (oral)	4396 mg/kg bodyweight
ATE CLP (dermal)	12800 mg/kg bodyweight

Skin corrosion/irritation : Causes severe skin burns and eye damage.

Serious eye damage/irritation : Causes serious eye damage.

Respiratory or skin sensitisation : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Suspected of causing cancer.

This product contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH classification.

Tetrahydrofuran (109-99-9)

National Toxicology Program (NTP) Status : 1 - Evidence of Carcinogenicity

Isopropanol (67-63-0)

IARC group : 3 - Not classifiable

Reproductive toxicity : Not classified

STOT-single exposure : May cause respiratory irritation.

STOT-repeated exposure : Not classified

Aspiration hazard : Not classified

Potential adverse human health effects and symptoms : Material generates isopropanol on contact with water or moisture in skin, eyes and mucous membranes and has an irritating, dehydrating effect on overexposed tissue.

Symptoms/effects after inhalation : May cause respiratory irritation. Headache. Nausea.

Symptoms/effects after skin contact : Causes (severe) skin burns.

Symptoms/effects after eye contact : Causes serious eye damage.

Symptoms/effects after ingestion : May be harmful if swallowed.

Chronic symptoms : TETRAHYDROFURAN: Mildly toxic by inhalation. Mutagenic data has been reported. Reported as causing injury to liver and kidneys.

Reason for classification : Expert judgment

SECTION 12: Ecological information

12.1. Toxicity

Ecology - water : Toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Acute aquatic toxicity : Not classified

Chronic aquatic toxicity : Not classified

Tetrahydrofuran (109-99-9)

LC50 fish 1	1970 - 2360 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
LC50 fish 2	2700 - 3600 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])

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Isopropanol (67-63-0)	
LC50 fish 1	9640 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
EC50 Daphnia 1	13299 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC50 fish 2	11130 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

Tetrahydrofuran (109-99-9)	
BCF fish 1	(will not bioconcentrate)
Log Pow	0.45 (at 25 °C)

Isopropanol (67-63-0)	
Log Pow	0.05 (at 25 °C)

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

Other adverse effects : This substance may be hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Sewage disposal recommendations : Do not dispose of waste into sewer.
Product/Packaging disposal recommendations : Incinerate. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.
Additional information : Handle empty containers with care because residual vapours are flammable.
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) : 2056
UN-No. (IMDG) : 2056
UN-No. (IATA) : 2056
UN-No. (ADN) : 2056
UN-No. (RID) : 2056

14.2. UN proper shipping name

Proper Shipping Name (ADR) : TETRAHYDROFURAN
Proper Shipping Name (IMDG) : TETRAHYDROFURAN
Proper Shipping Name (IATA) : Tetrahydrofuran
Proper Shipping Name (ADN) : TETRAHYDROFURAN
Proper Shipping Name (RID) : TETRAHYDROFURAN
Transport document description (ADR) : UN 2056 TETRAHYDROFURAN (TITANIUM CHLORIDE TRIISOPROPOXIDE, 1.25M in tetrahydrofuran), 3, II, (D/E)
Transport document description (IMDG) : UN 2056 TETRAHYDROFURAN (TITANIUM CHLORIDE TRIISOPROPOXIDE, 1.25M in tetrahydrofuran), 3, II (< -18°C c.c.)
Transport document description (IATA) : UN 2056 Tetrahydrofuran (TITANIUM CHLORIDE TRIISOPROPOXIDE, 1.25M in tetrahydrofuran), 3, II
Transport document description (ADN) : UN 2056 TETRAHYDROFURAN (TITANIUM CHLORIDE TRIISOPROPOXIDE, 1.25M in tetrahydrofuran), 3, II
Transport document description (RID) : UN 2056 TETRAHYDROFURAN (TITANIUM CHLORIDE TRIISOPROPOXIDE, 1.25M in tetrahydrofuran), 3, II

14.3. Transport hazard class(es)

ADR

Transport hazard class(es) (ADR) : 3

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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) : II

Packing group (IMDG) : II

Packing group (IATA) : II

Packing group (ADN) : II

Packing group (RID) : II

14.5. Environmental hazards

Dangerous for the environment : No

Marine pollutant : No

Other information : No supplementary information available

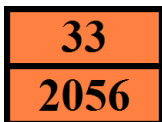
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14.6. Special precautions for user

- Overland transport

Classification code (ADR)	: F1
Limited quantities (ADR)	: 11
Excepted quantities (ADR)	: E2
Packing instructions (ADR)	: P001, IBC02, R001
Mixed packing provisions (ADR)	: MP19
Portable tank and bulk container instructions (ADR)	: T4
Portable tank and bulk container special provisions (ADR)	: TP1
Tank code (ADR)	: LGBF
Vehicle for tank carriage	: FL
Transport category (ADR)	: 2
Special provisions for carriage - Operation (ADR)	: S2, S20
Hazard identification number (Kemler No.)	: 33
Orange plates	:



Tunnel restriction code (ADR) : D/E

- Transport by sea

Limited quantities (IMDG)	: 1 L
Excepted quantities (IMDG)	: E2
Packing instructions (IMDG)	: P001
IBC packing instructions (IMDG)	: IBC02
Tank instructions (IMDG)	: T4
Tank special provisions (IMDG)	: TP1
EmS-No. (Fire)	: F-E
EmS-No. (Spillage)	: S-D
Stowage category (IMDG)	: B
Flash point (IMDG)	: below -18°C c.c.
Properties and observations (IMDG)	: Colourless liquid with an ethereal odour. Flashpoint: below -18°C c.c. Explosive limits: 1.5% to 12% Miscible with water.

- Air transport

PCA Excepted quantities (IATA)	: E2
PCA Limited quantities (IATA)	: Y341
PCA limited quantity max net quantity (IATA)	: 1L
PCA packing instructions (IATA)	: 353
PCA max net quantity (IATA)	: 5L
CAO packing instructions (IATA)	: 364
CAO max net quantity (IATA)	: 60L
ERG code (IATA)	: 3H

- Inland waterway transport

Classification code (ADN)	: F1
Limited quantities (ADN)	: 1 L
Excepted quantities (ADN)	: E2
Carriage permitted (ADN)	: T
Equipment required (ADN)	: PP, EX, A
Ventilation (ADN)	: VE01
Number of blue cones/lights (ADN)	: 1

- Rail transport

Classification code (RID)	: F1
Limited quantities (RID)	: 1L
Excepted quantities (RID)	: E2

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Packing instructions (RID)	: P001, IBC02, R001
Mixed packing provisions (RID)	: MP19
Portable tank and bulk container instructions (RID)	: T4
Portable tank and bulk container special provisions (RID)	: TP1
Tank codes for RID tanks (RID)	: LGBF
Transport category (RID)	: 2
Colis express (express parcels) (RID)	: CE7
Hazard identification number (RID)	: 33

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

Contains no REACH substances with Annex XVII restrictions

Contains no substance on the REACH candidate list

Contains no REACH Annex XIV substances

Contains no substance subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.

Substance(s) are not subject to Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC.

Contains no REACH Annex XIV substances

% 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 : Tetrahydrofuran is listed

SZW-lijst van mutagene stoffen : None of the components are listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : None of the components are listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : None of the components are listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : None of the components are listed

Denmark

Classification remarks : Emergency management guidelines for the storage of flammable liquids must be followed

Danish National Regulations : Young people below the age of 18 years are not allowed to use the product
Pregnant/breastfeeding women working with the product must not be in direct contact with the product
The requirements from the Danish Working Environment Authorities regarding work with carcinogens must be followed during use and disposal

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

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

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Other information : Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

Carc. 2	Carcinogenicity, Category 2
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 2	Flammable liquids, Category 2
Flam. Sol. 2	Flammable solids, Category 2
Skin Corr. 1B	Skin corrosion/irritation, Category 1B
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
H225	Highly flammable liquid and vapour.
H228	Flammable solid.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
EUH019	May form explosive peroxides.

SDS EU (REACH Annex II) - Custom

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The image shows a large, light blue watermark of the word "Gelest" in a stylized font, set against a blue triangular background that points to the right. The watermark is centered on the page.