

Tetrabutylammonium fluoride 1M in THF

article number: **1448**
Version: **GHS 1.0 en**

date of compilation: 2017-08-28

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

1.1 Product identifier

Identification of the substance	Tetrabutylammonium fluoride
Article number	1448
Registration number (REACH)	
EC number	207-057-2
CAS number	429-41-4

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

Identified uses:

1.3 Details of the supplier of the safety data sheet

Carl Roth GmbH + Co KG
Schoemperlenstr. 3-5
D-76185 Karlsruhe
Germany

Telephone: +49 (0) 721 - 56 06 0

Telefax: +49 (0) 721 - 56 06 149

e-mail: sicherheit@carlroth.de

Website: www.carlroth.de

Competent person responsible for the safety data sheet : Department Health, Safety and Environment

e-mail (competent person) : sicherheit@carlroth.de

1.4 Emergency telephone number

Emergency information service **Poison Centre Munich: +49/(0)89 19240**

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification acc. to GHS

Classification acc. to GHS			
Section	Hazard class	Hazard class and category	Hazard statement
2.6	flammable liquid	(Flam. Liq. 2)	H225
3.1I	acute toxicity (inhal.)	(Acute Tox. 4)	H332
3.2	skin corrosion/irritation	(Skin Corr. 1B)	H314
3.3	serious eye damage/eye irritation	(Eye Dam. 1)	H318
3.6	carcinogenicity	(Carc. 2)	H351
3.7	reproductive toxicity	(Repr. 2)	H361
3.8	specific target organ toxicity - single exposure	(STOT SE 1)	H370

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Classification acc. to GHS			
Section	Hazard class	Hazard class and category	Hazard statement
3.8R	specific target organ toxicity - single exposure (respiratory tract irritation)	(STOT SE 3)	H335
3.9	specific target organ toxicity - repeated exposure	(STOT RE 1)	H372

Supplemental hazard information

Code	Supplemental hazard information
EUH019	may form explosive peroxides

2.2 Label elements

Labelling GHS

Signal word

Danger

Pictograms



Hazard statements

H225	Highly flammable liquid and vapour
H314	Causes severe skin burns and eye damage
H332	Harmful if inhaled
H335	May cause respiratory irritation
H351	Suspected of causing cancer
H361	Suspected of damaging fertility or the unborn child
H370	Causes damage to organs
H372	Causes damage to organs through prolonged or repeated exposure

Precautionary statements

Precautionary statements - prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statements - response

P303+P361+P353	IF ON SKIN (or hair): 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.
P308+P311	IF exposed or concerned: Call a POISON CENTER/doctor.
P370+P378	In case of fire: Use sand, carbon dioxide or powder extinguisher to extinguish.

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Precautionary statements - storage

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
 P403+P235 Store in a well-ventilated place. Keep cool.

For professional users only

Supplemental hazard information

EUH019 May form explosive peroxides.

Hazardous ingredients for labelling:

Tetrahydrofuran, Tetrabutylammonium fluoride

Labelling of packages where the contents do not exceed 125 ml

Signal word: **Danger**

Symbol(s)



H314 Causes severe skin burns and eye damage.
 H351 Suspected of causing cancer.
 H361 Suspected of damaging fertility or the unborn child.
 H370 Causes damage to organs.
 H372 Causes damage to organs through prolonged or repeated exposure.

P303+P361+P353 IF ON SKIN (or hair): 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.

EUH019 May form explosive peroxides.
 contains: Tetrahydrofuran, Tetrabutylammonium fluoride

2.3 Other hazards



There is no additional information.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Description of the mixture

Composition/information on ingredients.

Name of substance	Identifier	wt%	Classification acc. to 1272/2008/EC	Pictograms	Specific Conc. Limits
Tetrahydrofuran	CAS No 109-99-9 EC No 203-726-8 Index No 603-025-00-0 REACH Reg. No 01-2119444314-46-xxxx	> 70	Flam. Liq. 2 / H225 Eye Irrit. 2 / H319 Carc. 2 / H351 STOT SE 3 / H335 EUH019		Eye Irrit. 2; H319: C ≥ 25 % STOT SE 3; H335: C ≥ 25 %
Tetrabutylammonium fluoride	CAS No 429-41-4 EC No 207-057-2	20 – 30	Skin Corr. 1B / H314		

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SECTION 4: First aid measures

4.1 Description of first aid measures



General notes

Take off immediately all contaminated clothing.

Following inhalation

Remove person to fresh air and keep comfortable for breathing. If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions.

Following skin contact

After contact with skin, wash immediately with plenty of water. In case of skin irritation, consult a physician.

Following eye contact

In case of contact with eyes flush immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart and consult an ophthalmologist. Protect uninjured eye.

Following ingestion

Rinse mouth immediately and drink plenty of water. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

Irritation, Corrosion, Narcotic effects, Nausea, Vomiting, Risk of serious damage to eyes, Dyspnoea

4.3 Indication of any immediate medical attention and special treatment needed

none

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Co-ordinate fire-fighting measures to the fire surroundings
water spray, foam, dry extinguishing powder, carbon dioxide (CO₂)

Unsuitable extinguishing media

water jet

5.2 Special hazards arising from the substance or mixture

Combustible. Vapours can form explosive mixtures with air.

5.3 Advice for firefighters

Vapours are heavier than air. Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus. Wear full chemical protective clothing.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Do not breathe vapour/spray. Avoid contact with skin and eyes. Avoidance of ignition sources. Provide adequate ventilation.

6.2 Environmental precautions

Keep away from drains, surface and ground water. Explosive properties.

6.3 Methods and material for containment and cleaning up

Advices on how to contain a spill

Covering of drains.

Advices on how to clean up a spill

Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents).

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provide adequate ventilation as well as local exhaustion at critical locations. Avoid exposure. When not in use, keep containers tightly closed.

• Measures to prevent fire as well as aerosol and dust generation



Keep away from sources of ignition - No smoking.

Take precautionary measures against static discharge.

Advice on general occupational hygiene

Wash hands before breaks and after work. When using do not smoke.

7.2 Conditions for safe storage, including any incompatibilities

Keep in a cool place.

Incompatible substances or mixtures

Observe hints for combined storage.

Consideration of other advice

• Ventilation requirements

Use local and general ventilation.

• Specific designs for storage rooms or vessels

Recommended storage temperature: 4 °C.

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7.3 Specific end use(s)

No information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

Country	Name of agent	CAS No	Notation	Identifier	TWA [ppm]	TWA [mg/m ³]	STEL [ppm]	STEL [mg/m ³]	Source
AU	tetrahydrofuran	109-99-9		WES	100	295			WES

Notation

STEL Short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period unless otherwise specified

TWA Time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average

Relevant DNELs/DMELs/PNECs and other threshold levels

• relevant DNELs of components of the mixture

Name of substance	CAS No	Endpoint	Threshold level	Protection goal, route of exposure	Used in	Exposure time
Tetrahydrofuran	109-99-9	DNEL	300 mg/m ³	human, inhalatory	worker (industry)	acute - local effects
Tetrahydrofuran	109-99-9	DNEL	300 mg/m ³	human, inhalatory	worker (industry)	acute - systemic effects
Tetrahydrofuran	109-99-9	DNEL	150 mg/m ³	human, inhalatory	worker (industry)	chronic - local effects
Tetrahydrofuran	109-99-9	DNEL	25 mg/kg	human, dermal	worker (industry)	chronic - systemic effects
Tetrahydrofuran	109-99-9	DNEL	150 mg/m ³	human, inhalatory	worker (industry)	chronic - systemic effects

• relevant PNECs of components of the mixture

Name of substance	CAS No	Endpoint	Threshold level	Environmental compartment
Tetrahydrofuran	109-99-9	PNEC	4.32 mg/l	freshwater
Tetrahydrofuran	109-99-9	PNEC	0.432 mg/l	marine water
Tetrahydrofuran	109-99-9	PNEC	4.6 mg/l	sewage treatment plant (STP)
Tetrahydrofuran	109-99-9	PNEC	23.3 mg/kg	freshwater sediment
Tetrahydrofuran	109-99-9	PNEC	2.33 mg/kg	marine sediment
Tetrahydrofuran	109-99-9	PNEC	67 mg/kg	water
Tetrahydrofuran	109-99-9	PNEC	2.13 mg/kg	soil

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8.2 Exposure controls

Individual protection measures (personal protective equipment)



Eye/face protection

Use safety goggle with side protection. Wear face protection.

Skin protection

• hand protection

Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. Check leak-tightness/impermeability prior to use. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

• type of material

Butyl caoutchouc (butyl rubber)

• material thickness

0,7mm

• breakthrough times of the glove material

>10 minutes (permeation: level 1)

• other protection measures

Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended.

Flame-retardant protective clothing.

Respiratory protection

Respiratory protection necessary at: Aerosol or mist formation. Type: A-P2 (combined filters against particles and organic gases and vapours, colour code: Brown/White).

Environmental exposure controls

Keep away from drains, surface and ground water.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	liquid (fluid)
Colour	colourless
Odour	like ether
Odour threshold	No data available

Other physical and chemical parameters

pH (value)	This information is not available.
Melting point/freezing point	not determined
Initial boiling point and boiling range	65 – 66 °C (data apply to the main component)
Flash point	-17 °C
Evaporation rate	no data available
Flammability (solid, gas)	not relevant (fluid)

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Explosive limits

- lower explosion limit (LEL) 1.5 vol% (data apply to the main component)
- upper explosion limit (UEL) 12.4 vol% (data apply to the main component)

Explosion limits of dust clouds not relevant

Vapour pressure This information is not available.

Density 0.9 – 1.1 g/cm³ at 20 °C

Vapour density This information is not available.

Bulk density Not applicable

Relative density Information on this property is not available.

Solubility(ies)

Water solubility miscible in any proportion

Partition coefficient

n-octanol/water (log KOW) This information is not available.

Auto-ignition temperature 215 °C - (data apply to the main component)

Decomposition temperature no data available

Viscosity not determined

Explosive properties Shall not be classified as explosive

Oxidising properties none

9.2 Other information

SECTION 10: Stability and reactivity

10.1 Reactivity

Risk of ignition. Vapours can form explosive mixtures with air.

10.2 Chemical stability

Reactivity if exposed to light. May form explosive peroxides.

10.3 Possibility of hazardous reactions

Violent reaction with: Alkali hydroxide (caustic alkali), Peroxides, Phenols, Bromine, Oxidisers, Oxygen,
=> Explosive properties

10.4 Conditions to avoid

Direct light irradiation. Keep away from heat.

10.5 Incompatible materials

plastic and rubber

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10.6 Hazardous decomposition products

Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

- **Acute toxicity of components of the mixture**

Name of substance	CAS No	Exposure route	ATE
Tetrahydrofuran	109-99-9	oral	1,650 mg/kg
Tetrahydrofuran	109-99-9	inhalation: vapour	11 mg/l/4h

Skin corrosion/irritation

Causes severe burns.

Serious eye damage/eye irritation

Causes serious eye damage.

Respiratory or skin sensitisation

Shall not be classified as a respiratory or skin sensitiser.

Summary of evaluation of the CMR properties

Carcinogenicity:

Suspected of causing cancer

Reproductive toxicity:

Suspected of damaging fertility or the unborn child

- **Specific target organ toxicity - single exposure**

Causes damage to organs. May cause respiratory irritation.

- **Specific target organ toxicity - repeated exposure**

Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

Symptoms related to the physical, chemical and toxicological characteristics

- **If swallowed**

vomiting, nausea, If swallowed danger of perforation of the esophagus and the stomach (strong corrosive effects)

- **If in eyes**

causes burns, Causes serious eye damage, risk of blindness

- **If inhaled**

Irritation to respiratory tract, breathing difficulties, Dyspnoea

- **If on skin**

irritation, corrosion

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Other information

None

SECTION 12: Ecological information

12.1 Toxicity

acc. to 1272/2008/EC: Shall not be classified as hazardous to the aquatic environment.

Aquatic toxicity (acute)

Aquatic toxicity (acute) of components of the mixture

Name of substance	CAS No	Endpoint	Value	Species	Exposure time
Tetrahydrofuran	109-99-9	LC50	2,160 mg/l	Pimephales promelas	96 h

12.2 Process of degradability

The substance is readily biodegradable.

Degradability of components of the mixture

Name of substance	CAS No	Process	Degradation rate	Time
Tetrahydrofuran	109-99-9	biotic/abiotic	39 %	28 d
Tetrahydrofuran	109-99-9	oxygen depletion	39 %	28 d

12.3 Bioaccumulative potential

Data are not available.

Bioaccumulative potential of components of the mixture

Name of substance	CAS No	Log KOW
Tetrahydrofuran	109-99-9	0.45 (25 °C)

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Data are not available.

12.6 Other adverse effects

Data are not available.

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

This material and its container must be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

Sewage disposal-relevant information

Do not empty into drains.

Waste treatment of containers/packagings

It is a dangerous waste; only packagings which are approved (e.g. acc. to ADR) may be used.

13.2 Relevant provisions relating to waste

The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process.

13.3 Remarks

Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Please consider the relevant national or regional provisions.

SECTION 14: Transport information

14.1	UN number	2924
14.2	UN proper shipping name	FLAMMABLE LIQUID, CORROSIVE, N.O.S.
	Hazardous ingredients	Tetrahydrofuran, Tetrabutylammonium fluoride
14.3	Transport hazard class(es)	
	Class	3 (flammable liquids)
14.4	Packing group	II (substance presenting medium danger)
14.5	Environmental hazards	none (non-environmentally hazardous acc. to the dangerous goods regulations)
14.6	Special precautions for user	
	Provisions for dangerous goods (ADR) should be complied within the premises.	
14.7	Transport in bulk according to Annex II of MARPOL and the IBC Code	
	The cargo is not intended to be carried in bulk.	
14.8	Information for each of the UN Model Regulations	
	• Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN)	
	UN number	2924
	Proper shipping name	FLAMMABLE LIQUID, CORROSIVE, N.O.S.
	Particulars in the transport document	UN2924, FLAMMABLE LIQUID, CORROSIVE, N.O.S., (contains: Tetrahydrofuran, Tetrabutylammonium fluoride), 3 (8), II, (D/E)
	Class	3
	Classification code	FC
	Packing group	II
	Danger label(s)	3+8

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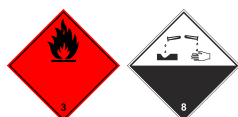
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Special provisions (SP)	274
Excepted quantities (EQ)	E2
Limited quantities (LQ)	1 L
Transport category (TC)	2
Tunnel restriction code (TRC)	D/E
Hazard identification No	338
Emergency Action Code	3WE

• **International Maritime Dangerous Goods Code (IMDG)**

UN number	2924
Proper shipping name	FLAMMABLE LIQUID, CORROSIVE, N.O.S.
Particulars in the shipper's declaration	UN2924, FLAMMABLE LIQUID, CORROSIVE, N.O.S., (contains: Tetrahydrofuran, Tetrabutylammonium fluoride), 3 (8), II, -17°C c.c.
Class	3
Subsidiary risk(s)	8
Marine pollutant	-
Packing group	II
Danger label(s)	3+8




Special provisions (SP)	274
Excepted quantities (EQ)	E2
Limited quantities (LQ)	1 L
EmS	F-E, S-C
Stowage category	B

• **International Civil Aviation Organization (ICAO-IATA/DGR)**

UN number	2924
Proper shipping name	Flammable liquid, corrosive, n.o.s.
Particulars in the shipper's declaration	UN2924, Flammable liquid, corrosive, n.o.s., (contains: Tetrahydrofuran, Tetrabutylammonium fluoride), 3 (8), II
Class	3
Subsidiary risk(s)	8
Packing group	II

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Danger label(s)	3+8
	
Special provisions (SP)	A3
Excepted quantities (EQ)	E2
Limited quantities (LQ)	0,5 L

SECTION 15: Regulatory information

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

National inventories

- EINECS/ELINCS/NLP (Europe)
- DSL/NDSL (Canada)
- Toxic Substance Control Act (TSCA)

15.2 Chemical Safety Assessment

SECTION 16: Other information

Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
ADN	Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)
ADR	Accord européen relatif au transport international des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
ATE	Acute Toxicity Estimate
Carc.	carcinogenicity
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
CMR	Carcinogenic, Mutagenic or toxic for Reproduction
DGR	Dangerous Goods Regulations (see IATA/DGR)
DMEL	Derived Minimal Effect Level
DNEL	Derived No-Effect Level
EC No	The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union)
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EmS	Emergency Schedule
Eye Dam.	seriously damaging to the eye
Eye Irrit.	irritant to the eye
Flam. Liq.	flammable liquid
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
IATA	International Air Transport Association

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Abbr.	Descriptions of used abbreviations
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
index No	the Index number is the identification code given to the substance in Part 3 of Annex VI to Regulation (EC) No 1272/2008
log KOW	n-octanol/water
MARPOL	International Convention for the Prevention of Pollution from Ships (abbr. of "Marine Pollutant")
NLP	No-Longer Polymer
PBT	Persistent, Bioaccumulative and Toxic
PNEC	Predicted No-Effect Concentration
ppm	parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Règlement concernant le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the International carriage of Dangerous goods by Rail)
Skin Corr.	corrosive to skin
Skin Irrit.	irritant to skin
STEL	short-term exposure limit
STOT SE	specific target organ toxicity - single exposure
TWA	time-weighted average
vPvB	very Persistent and very Bioaccumulative
WES	Safe Work Australia: Workplace exposure standards for airborne conatminants

Key literature references and sources for data

- UN Recommendations on the Transport of Dangerous Good
- Dangerous Goods Regulations (DGR) for the air transport (IATA)
- International Maritime Dangerous Goods Code (IMDG)

List of relevant phrases (code and full text as stated in chapter 2 and 3)

Code	Text
H225	highly flammable liquid and vapour
H314	causes severe skin burns and eye damage
H318	causes serious eye damage
H319	causes serious eye irritation
H332	harmful if inhaled
H335	may cause respiratory irritation
H351	suspected of causing cancer
H361	suspected of damaging fertility or the unborn child
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Disclaimer

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.