

## SAFETY DATA SHEET

according to Regulation (EC) No 1907/2006 (REACH) as amended

### Tetrahydrofuran

Creation date	06th February 2019	Version	4.0
Revision date	27th June 2023		

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

##### 1.1. Product identifier

Substance / mixture	Tetrahydrofuran
Chemical name	substance
CAS number	tetrahydrofuran
Index number	109-99-9
EC (EINECS) number	603-025-00-0
Registration number	203-726-8
	01-2119444314-46-xxxx

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

###### Substance's intended use

Chemical production, analytical chemistry, laboratory synthesis, industrial applications.

###### Substance uses advised against

The product should not be used in ways other than those referred in Section 1.

##### 1.3. Details of the supplier of the safety data sheet

###### Supplier

Name or trade name	Ing. Petr Švec - PENTA s.r.o.
Address	Radiová 1122/1, Praha 10, 102 00
	Czech Republic
Identification number (CRN)	02096013
VAT Reg No	CZ02096013
Phone	+420 226 060 681
E-mail	info@pentachemicals.eu
Web address	www.pentachemicals.eu

###### Competent person responsible for the safety data sheet

Name	Ing. Petr Švec - PENTA s.r.o.
E-mail	info@pentachemicals.eu

##### 1.4. Emergency telephone number

European emergency number: 112

#### SECTION 2: Hazards identification

##### 2.1. Classification of the substance or mixture

###### Classification of the substance in accordance with Regulation (EC) No 1272/2008

The substance is classified as dangerous.

Flam. Liq. 2, H225  
Acute Tox. 4, H302  
Eye Irrit. 2, H319  
STOT SE 3, H335, H336  
Carc. 2, H351

Full text of all classifications and hazard statements is given in the section 16.

###### Most serious adverse physico-chemical effects

Highly flammable liquid and vapour.

###### Most serious adverse effects on human health and the environment

Causes serious eye irritation. May cause respiratory irritation. Suspected of causing cancer.

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#### 2.2. Label elements

##### Hazard pictogram



##### Signal word

Danger

##### Dangerous substance

tetrahydrofuran  
(Index: 603-025-00-0; CAS: 109-99-9)

##### Hazard statements

H225 Highly flammable liquid and vapour.  
H302 Harmful if swallowed.  
H319 Causes serious eye irritation.  
H335 May cause respiratory irritation.  
H336 May cause drowsiness or dizziness.  
H351 Suspected of causing cancer.

##### Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P243 Take action to prevent static discharges.  
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

##### Supplemental information

EUH019 May form explosive peroxides.

#### 2.3. Other hazards

The substance does not have endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605. Substance does not meet the criteria for PBT or vPvB in accordance with Annex XIII of Regulation (EC) No. 1907/2006 (REACH) as amended.

### SECTION 3: Composition/information on ingredients

#### 3.1. Substances

##### Chemical characterization

The substance specified below.

Identification numbers	Substance name	Content in % weight	Classification according to Regulation (EC) No 1272/2008	Note
Index: 603-025-00-0 CAS: 109-99-9 EC: 203-726-8 Registration number: 01-2119444314-46-xxxx	<b>substance main component</b> tetrahydrofuran	>99	Flam. Liq. 2, H225 Acute Tox. 4, H302 Eye Irrit. 2, H319 STOT SE 3, H335, H336 Carc. 2, H351 EUH019 Specific concentration limit: Eye Irrit. 2, H319: C ≥ 25 % STOT SE 3, H335: C ≥ 25 % STOT SE 3, H335: C < 100 %	1

##### Notes

1 A substance for which exposure limits are set.

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Full text of all classifications and hazard statements is given in the section 16.

#### SECTION 4: First aid measures

##### 4.1. Description of first aid measures

Take care of your own safety. If any health problems are manifested or if in doubt, inform a doctor and show him information from this safety data sheet. If unconscious, put the person in the stabilized (recovery) position on his side with his head slightly bent backwards and make sure that airways are free; never induce vomiting. If the person vomits by himself, make sure that the vomit is not inhaled. In life threatening conditions first of all provide resuscitation of the affected person and ensure medical assistance. Respiratory arrest - provide artificial respiration immediately. Cardiac arrest - provide indirect cardiac massage immediately.

##### If inhaled

Terminate the exposure immediately; move the affected person to fresh air. Protect the person against growing cold. Provide medical treatment if irritation, dyspnoea or other symptoms persist.

##### If on skin

Remove contaminated clothes. Wash the affected area with plenty of water, lukewarm if possible. Soap, soap solution or shampoo should be used if there is no skin injury. Provide medical treatment if skin irritation persists. Rinse skin with water or shower.

##### If in eyes

Rinse eyes immediately with a flow of running water, open the eyelids (also using force if needed); remove contact lenses immediately if worn by the affected person. Rinsing should continue at least for 10 minutes. Provide medical treatment, specialized if possible.

##### If swallowed

Provide medical treatment. For persons with no symptoms, call the Toxicological Information Centre to decide about the need of medical treatment; provide information about the substances or composition of the product from the original packaging or the Safety Data Sheet of the product.

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

##### If inhaled

May cause respiratory irritation.

##### If on skin

Not expected.

##### If in eyes

Causes serious eye irritation.

##### If swallowed

Irritation, nausea.

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

Symptomatic treatment.

#### SECTION 5: Firefighting measures

##### 5.1. Extinguishing media

##### Suitable extinguishing media

Alcohol-resistant foam, carbon dioxide, powder, water spray jet, water mist.

##### Unsuitable extinguishing media

Water - full jet.

##### 5.2. Special hazards arising from the substance or mixture

In the event of fire, carbon monoxide, carbon dioxide and other toxic gases may arise. Inhalation of hazardous degradation (pyrolysis) products may cause serious health damage.

##### 5.3. Advice for firefighters

Self-Contained Breathing Apparatus (SCBA) with a chemical protection suit only where personal (close) contact is likely. Use a self-contained breathing apparatus and full-body protective clothing. Closed containers with the product near the fire should be cooled with water. Do not allow run-off of contaminated fire extinguishing material to enter drains or surface and ground water.

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#### SECTION 6: Accidental release measures

##### 6.1. Personal precautions, protective equipment and emergency procedures

Provide sufficient ventilation. The substance is flammable. Remove all ignition sources. Use personal protective equipment for work. Follow the instructions in the Sections 7 and 8. Do not inhale mist/vapours/spray. Prevent contact with skin and eyes.

##### 6.2. Environmental precautions

Prevent contamination of the soil and entering surface or ground water.

##### 6.3. Methods and material for containment and cleaning up

Spilled product should be covered with suitable (non-flammable) absorbing material (sand, diatomaceous earth, earth and other suitable absorption materials); to be contained in well closed containers and removed as per the Section 13. In the event of leakage of the substantial amount of the product, inform fire brigade and other competent bodies. After removal of the product, wash the contaminated site with plenty of water. Do not use solvents.

##### 6.4. Reference to other sections

See the Section 7, 8 and 13.

#### SECTION 7: Handling and storage

##### 7.1. Precautions for safe handling

Prevent formation of gases and vapours in flammable or explosive concentrations and concentrations exceeding the occupational exposure limits. The product should be used only in the areas where it is not in contact with open fire and other ignition sources. Use non-sparking tools. Use of antistatic clothes and footwear is recommended. Do not inhale mist/vapours/spray. Prevent contact with skin and eyes. No smoking. Obtain special instructions before use. Wash hands and exposed parts of the body thoroughly after handling. Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Use personal protective equipment as per Section 8. Observe valid legal regulations on safety and health protection. Ground and bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Take action to prevent static discharges.

##### 7.2. Conditions for safe storage, including any incompatibilities

Store in tightly closed containers in cold, dry and well ventilated areas designated for this purpose. Do not expose to sunlight. Store locked up. Keep container tightly closed. Keep cool.

##### The specific requirements or rules relating to the substance/mixture

Solvent vapours are heavier than air and accumulate especially near the floor where they may form an explosive mixture with the air.

##### 7.3. Specific end use(s)

not available

#### SECTION 8: Exposure controls/personal protection

##### 8.1. Control parameters

##### European Union

##### Commission Directive 2000/39/EC

Substance name (component)	Type	Value	Note
tetrahydrofuran (CAS: 109-99-9)	OEL 8 hours	150 mg/m <sup>3</sup>	Skin
	OEL 8 hours	50 ppm	
	OEL 15 minutes	300 mg/m <sup>3</sup>	
	OEL 15 minutes	100 ppm	

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#### 8.2. Exposure controls

Follow the usual measures intended for health protection at work and especially for good ventilation. This can be achieved only by local suction or efficient general ventilation. If exposure limits cannot be observed in this mode, suitable protection of airways must be used. Do not eat, drink and smoke during work. Wash your hands thoroughly with water and soap after work and before breaks for a meal and rest.

##### Eye/face protection

Protective goggles.

##### Skin protection

Hand protection: Protective gloves resistant to the product (butyl rubber, Viton). When choosing appropriate thickness, material and permeability of the gloves, observe recommendations of their particular manufacturer. Contaminated skin should be washed thoroughly.

##### Respiratory protection

Halfmask with a filter against organic vapours or a self-contained breathing apparatus as appropriate if exposure limit values of substances are exceeded or in a poorly ventilated environment.

##### Thermal hazard

Not available.

##### Environmental exposure controls

Observe usual measures for protection of the environment, see Section 6.2.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	liquid
Colour	colourless
Odour	after ether
Melting point/freezing point	-108,5 °C
Boiling point or initial boiling point and boiling range	66-67 °C
Flammability	data not available
Lower and upper explosion limit	
bottom	1,8 %
upper	11,8 %
Flash point	-17 °C
Auto-ignition temperature	data not available
Decomposition temperature	data not available
pH	7-8 (undiluted)
Kinematic viscosity	0,48 mm <sup>2</sup> /s at 40 °C
Solubility in water	data not available
Partition coefficient n-octanol/water (log value)	data not available
Vapour pressure	data not available
Density and/or relative density	data not available
Relative vapour density	data not available
Particle characteristics	data not available
Form	liquid

### 9.2. Other information

Ignition temperature	321,0 °C
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## SECTION 10: Stability and reactivity

### 10.1. Reactivity

The substance is highly flammable.

### 10.2. Chemical stability

The product is stable under normal conditions.

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#### 10.3. Possibility of hazardous reactions

Unknown.

#### 10.4. Conditions to avoid

The product is stable and no degradation occurs under normal use. Protect against flames, sparks, overheating and against frost.

#### 10.5. Incompatible materials

Protect against strong acids, bases and oxidizing agents.

#### 10.6. Hazardous decomposition products

Not developed under normal uses. Dangerous outcomes such as carbon monoxide and carbon dioxide are formed at high temperature and in fire.

### SECTION 11: Toxicological information

#### 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

No toxicological data is available for the substance.

##### Acute toxicity

Based on available data the classification criteria are not met.  
tetrahydrofuran

Route of exposure	Parameter	Value	Exposure time	Species	Sex
Oral	LD <sub>50</sub>	1650 mg/kg		Rat	
Inhalation (vapor)	LC <sub>50</sub>	21000 mg/kg	4 hours	Rat	

##### Skin corrosion/irritation

Based on available data the classification criteria are not met.

##### Serious eye damage/irritation

Causes serious eye irritation.

##### Respiratory or skin sensitisation

Based on available data the classification criteria are not met.

##### Germ cell mutagenicity

Based on available data the classification criteria are not met.

##### Carcinogenicity

Suspected of causing cancer.

##### Reproductive toxicity

Based on available data the classification criteria are not met.

##### Toxicity for specific target organ - single exposure

May cause respiratory irritation.

##### Toxicity for specific target organ - repeated exposure

Based on available data the classification criteria are not met.

##### Aspiration hazard

Inhalation of solvent vapors above values exceeding exposure limits for working environment may result in acute inhalation poisoning, depending on the level of concentration and exposure time. Based on available data the classification criteria are not met.

#### 11.2. Information on other hazards

The substance does not have endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

### SECTION 12: Ecological information

#### 12.1. Toxicity

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**Acute toxicity**  
tetrahydrofuran

Parameter	Value	Exposure time	Species	Environment
LC <sub>50</sub>	2 160 mg/l	96 hours	Fish (Pimephales promelas)	
LC <sub>50</sub>	382 mg/l	48 hours	Daphnia (Daphnia magna)	

**12.2. Persistence and degradability****Biodegradability**  
tetrahydrofuran

Parameter	Method	Value	Exposure time	Environment	Result
	OECD 301	39 %	28 days		Hardly biodegradable

Data not available.

**12.3. Bioaccumulative potential**

## tetrahydrofuran

Parameter	Method	Value	Exposure time	Species	Environment	Temperature [°C]
Log Pow	OECD 107	0.45				

Not available.

**12.4. Mobility in soil**

Not available.

**12.5. Results of PBT and vPvB assessment**

Product does not contain any substance meeting the criteria for PBT or vPvB in accordance with the Annex XIII of Regulation (EC) No 1907/2006 (REACH) as amended.

**12.6. Endocrine disrupting properties**

This substance does not have endocrine disrupting properties with respect to non-target organisms as it does not meet the criteria set out in section B of Regulation (EU) No 2017/2100.

**12.7. Other adverse effects**

Not available.

**SECTION 13: Disposal considerations****13.1. Waste treatment methods**

Hazard of environmental contamination; dispose of the waste in accordance with the local and/or national regulations. Proceed in accordance with valid regulations on waste disposal. Any unused product and contaminated packaging should be put in labelled containers for waste collection and submitted for disposal to a person authorised for waste removal (a specialized company) that is entitled for such activity. Do not empty unused product in drainage systems. The product must not be disposed of with municipal waste. Empty containers may be used at waste incinerators to produce energy or deposited in a dump with appropriate classification. Perfectly cleaned containers can be submitted for recycling.

**Waste management legislation**

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste, as amended. Decision 2000/532/EC establishing a list of wastes, as amended.

**SECTION 14: Transport information****14.1. UN number or ID number**

UN 2056

**14.2. UN proper shipping name**

TETRAHYDROFURAN

**14.3. Transport hazard class(es)**

3 Flammable liquids

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#### 14.4. Packing group

II - substances presenting medium danger

#### 14.5. Environmental hazards

not relevant

#### 14.6. Special precautions for user

Reference in the Sections 4 to 8.

#### 14.7. Maritime transport in bulk according to IMO instruments

not relevant

#### Additional information

Hazard identification No.

33

UN number

2056

Classification code

F1

Safety signs

3



#### Air transport - ICAO/IATA

Packaging instructions passenger

353

Cargo packaging instructions

364

#### Marine transport - IMDG

EmS (emergency plan)

F-E, S-D

## SECTION 15: Regulatory information

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

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18th December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing the European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, as amended. REGULATION (EC) No. 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL as amended. Commission Regulation (EU) 2020/878 of 18 June 2020 amending Annex II to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

### 15.2. Chemical safety assessment

A Chemical Safety Assessment has been carried out.

## SECTION 16: Other information

### A list of standard risk phrases used in the safety data sheet

H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.

### Guidelines for safe handling used in the safety data sheet

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P243	Take action to prevent static discharges.



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P305+P351+P338

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

#### A list of additional standard phrases used in the safety data sheet

EUH019

May form explosive peroxides.

#### Other important information about human health protection

The product must not be - unless specifically approved by the manufacturer/importer - used for purposes other than as per the Section 1. The user is responsible for adherence to all related health protection regulations.

#### Key to abbreviations and acronyms used in the safety data sheet

ADR	European agreement concerning the international carriage of dangerous goods by road
BCF	Bioconcentration Factor
CAS	Chemical Abstracts Service
CLP	Regulation (EC) No 1272/2008 on classification, labelling and packaging of substance and mixtures
EC	Identification code for each substance listed in EINECS
EINECS	European Inventory of Existing Commercial Chemical Substances
EmS	Emergency plan
EU	European Union
EuPCS	European Product Categorisation System
IATA	International Air Transport Association
IBC	International Code For The Construction And Equipment of Ships Carrying Dangerous Chemicals
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
INCI	International Nomenclature of Cosmetic Ingredients
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
LC <sub>50</sub>	Lethal concentration of a substance in which it can be expected death of 50% of the population
LD <sub>50</sub>	Lethal dose of a substance in which it can be expected death of 50% of the population
log K <sub>ow</sub>	Octanol-water partition coefficient
OEL	Occupational Exposure Limits
PBT	Persistent, Bioaccumulative and Toxic
ppm	Parts per million
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Agreement on the transport of dangerous goods by rail
UN	Four-figure identification number of the substance or article taken from the UN Model Regulations
UVCB	Substances of unknown or variable composition, complex reaction products or biological materials
VOC	Volatile organic compounds
vPvB	Very Persistent and very Bioaccumulative
Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquid
STOT SE	Specific target organ toxicity - single exposure

#### Training guidelines

Inform the personnel about the recommended ways of use, mandatory protective equipment, first aid and prohibited ways of handling the product.

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#### Recommended restrictions of use

not available

#### Information about data sources used to compile the Safety Data Sheet

REGULATION (EC) No. 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL (REACH) as amended.  
REGULATION (EC) No. 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL as amended. Data from the manufacturer of the substance / mixture, if available - information from registration dossiers.

#### The changes (which information has been added, deleted or modified)

The version 4.0 replaces the SDS version from 18 May 2022. Changes were made in sections 1, 2, 11, 12, 13, 15 and 16.

#### More information

Classification procedure - calculation method.

#### Statement

The safety data sheet provides information aimed at ensuring safety and health protection at work and environmental protection. The provided information corresponds to the current status of knowledge and experience and complies with valid legal regulations. The information should not be understood as guaranteeing the suitability and usability of the product for a particular application.