

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended 2015/830.

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

1.1 Product identifier

Product name: Tetrahydrofuran

Product No. 8075, 9441

Additional identification

Chemical name: Tetrahydrofuran
Chemical formula: C₄H₈O
INDEX No. 603-025-00-0
CAS-No. 109-99-9
EC No. 203-726-8
REACH Registration No. 01-2119444314-46-XXXX

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

Identified uses: For Laboratory, Research or Manufacturing Use.

Uses advised against: Not determined.

1.3 Details of the supplier of the safety data sheet

Avantor Performance Materials Poland S.A.
Sowinskiego 11str., 44-101 Gliwice,
Poland

Telephone: 48 32 239-20-00
Fax: 48 32 239-23-70

Contact Person: Environmental Health & Safety
E-mail: export@avantormaterials.com

E-mail address of person responsible for this SDS: SDS@avantormaterials.com

1.4 Emergency telephone number: Chemtrec local numbers

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The product has been classified according to the legislation in force.

Classification according to Regulation (EC) No 1272/2008 as amended.

Physical Hazards

Flammable liquids Category 2 H225: Highly flammable liquid and vapor.

Health Hazards

Serious eye irritation Category 2 H319: Causes serious eye irritation.

Carcinogenicity Category 2 H351: Suspected of causing cancer.

Specific Target Organ Toxicity -
Single Exposure Category 3 H335: May cause respiratory irritation.

2.2 Label Elements

Contains:

Tetrahydrofuran



Signal Word:

Danger

Hazard Statement(s):

H225: Highly flammable liquid and vapor.
H319: Causes serious eye irritation.
H335: May cause respiratory irritation.
H351: Suspected of causing cancer.
EUH019: May form explosive peroxides.

Precautionary Statements

Prevention:

P201: Obtain special instructions before use.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233: Keep container tightly closed.
P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312: Call a POISON CENTER/doctor if you feel unwell.
P337+P313: If eye irritation persists: Get medical advice/attention.
P308+P313: IF exposed or concerned: Get medical advice/attention.
P370+P378: In case of fire: Use to extinguish.

2.3 Other hazards

No data available.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Concentration	CAS-No.	EC No.	REACH Registration No.	M-Factor:	Notes
Tetrahydrofuran	50 - <100%	109-99-9	203-726-8	01-2119444314-46-XXXX	No data available.	#

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

This substance has workplace exposure limit(s).

SECTION 4: First aid measures

General:

Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

4.1 Description of first aid measures

Inhalation:

Move to fresh air. Get medical attention if symptoms persist. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration.

- Skin Contact:** Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.
- Eye contact:** Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention.
- Ingestion:** Call a physician or poison control center immediately. Do not induce vomiting without advice from poison control center. Never give liquid to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed: Irritating to eyes, respiratory system and skin.

4.3 Indication of any immediate medical attention and special treatment needed

- Hazards:** No data available.
- Treatment:** Treat symptomatically. Symptoms may be delayed.

SECTION 5: Firefighting measures

General Fire Hazards: Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back.

5.1 Extinguishing media Suitable extinguishing media: Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

5.2 Special hazards arising from the substance or mixture: Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations. May form explosive peroxides.

5.3 Advice for firefighters Special fire fighting procedures: Use water spray to keep fire-exposed containers cool. Water may be ineffective in fighting the fire. Fight fire from a protected location. Move containers from fire area if you can do so without risk. Cool containers exposed to flames with water until well after the fire is out. Vapors may travel considerable distance to a source of ignition and flash back. Vapors may cause a flash fire or ignite explosively.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Keep unauthorized personnel away. Keep upwind. Ventilate closed spaces before entering them. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). See Section 8 of the SDS for Personal Protective Equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

- 6.2 Environmental Precautions:** Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.
- 6.3 Methods and material for containment and cleaning up:** In case of leakage, eliminate all ignition sources. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.
- 6.4 Reference to other sections:** No data available.

SECTION 7: Handling and storage:

- 7.1 Precautions for safe handling:** DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. Contact with air and light may form explosive peroxides. If peroxide formation is suspected, do not open or move container. Use personal protective equipment as required. Avoid breathing mists or vapors. Do not taste or swallow. Use only with adequate ventilation. Avoid contact with eyes, skin, and clothing. Wash hands thoroughly after handling. See Section 8 of the SDS for Personal Protective Equipment.
- 7.2 Conditions for safe storage, including any incompatibilities:** Keep away from food, drink and animal feeding stuffs. Prolonged contact with air may cause formation of explosive peroxides. Nitrogen blanketing of containers is recommended. Keep container tightly closed in a cool, well-ventilated place. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.
- 7.3 Specific end use(s):** No data available.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters Occupational Exposure Limits

Chemical name	Type	Exposure Limit Values	Source
Tetrahydrofuran	TWA	50 ppm 150 mg/m ³	EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU (12 2009)
	STEL	100 ppm 300 mg/m ³	EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU (12 2009)
	STEL	100 ppm 300 mg/m ³	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL (2014)
	TWA	50 ppm 120 mg/m ³	EU. Scientific Committee on Occupational Exposure Limit Values (SCOELs), European Commission - SCOEL (2014)
	TWA	50 ppm 150 mg/m ³	Malta. OELs. Protection of Health and Safety of Workers from Risks related to Chemical Agents at Work (L.N 227/2003, Schedules I and V) (2007)
	STEL	100 ppm 300 mg/m ³	Malta. OELs. Protection of Health and Safety of Workers from Risks related to Chemical Agents at Work (L.N 227/2003, Schedules I and V) (2007)

DNEL-Values

Critical component	Type	Route of Exposure	Health Warnings	Remarks
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PNEC-Values

Critical component	Environmental compartment	PNEC-Values
Tetrahydrofuran	Soil	2,13 mg/kg
	Predator	67 mg/kg
	Aquatic (marine water)	0,432 mg/l
	Sediment (marine water)	2,33 mg/kg
	Sewage treatment plant	4,6 mg/l
	Aquatic (freshwater)	4,32 mg/l
	Sediment (freshwater)	23,3 mg/kg

8.2 Exposure controls

Appropriate Engineering Controls: No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof ventilation equipment.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand Protection: Material: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory Protection: In case of inadequate ventilation use suitable respirator. Chemical respirator with organic vapor cartridge and full facepiece.

Hygiene measures: Provide eyewash station and safety shower. Observe good industrial hygiene practices. Do not eat, drink or smoke when using the product. Wash hands before breaks and immediately after handling the product. Wash contaminated clothing before reuse. Avoid contact with eyes, skin, and clothing.

Environmental Controls: No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state:	Liquid
Form:	Liquid
Color:	Colorless
Odor:	No data available.
Odor Threshold:	No data available.
pH:	No data available.
Freezing point:	-108,3 °C
Boiling Point:	65 °C

Flash Point:	-21 °C (Closed Cup)
Evaporation Rate:	8 (butyl acetate=1)
Flammability (solid, gas):	Class IB Flammable Liquid
Flammability limit - upper (%):	11,8 %(V)
Flammability limit - lower (%):	1,8 %(V)
Vapor pressure:	21,60 kPa (25 °C)
Vapor density (air=1):	2,56 (Air=1)
Density:	0,89 g/ml (20 °C)
Relative density:	0,89 (20 °C)
Solubility(ies)	
Solubility in Water:	Miscible
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	0,46
Autoignition Temperature:	321 °C
Decomposition Temperature:	No data available.
Viscosity:	No data available.
Explosive properties:	No data available.
Oxidizing properties:	No data available.

9.2 Other information

Molecular weight:	72,11 g/mol (C ₄ H ₈ O)
VOC Content:	EC Directive 2004/42: 890 g/l ~100 % (calculated)
Minimum ignition energy:	0,54 mJ

SECTION 10: Stability and reactivity

10.1 Reactivity:	No data available.
10.2 Chemical Stability:	Material is stable under normal conditions.
10.3 Possibility of hazardous reactions:	Hazardous polymerization does not occur.
10.4 Conditions to avoid:	Heat, sparks, flames. Protect against direct sunlight.
10.5 Incompatible Materials:	Strong oxidizing agents. Acids. Bases, alkalies (organic). Air. May attack some plastics, rubber and coatings.
10.6 Hazardous Decomposition Products:	Thermal decomposition may release oxides of carbon.

SECTION 11: Toxicological information

Information on likely routes of exposure

Inhalation:	None known or expected under normal use.
Skin Contact:	None known or expected under normal use.
Eye contact:	Causes serious eye irritation.
Ingestion:	No adverse effects due to ingestion are expected.

11.1 Information on toxicological effects

Acute toxicity

Oral

Product: LD 50 (Rat): 1.650 mg/kg

Dermal

Product: LD 50 (Rat) > 2.000 mg/kg

Inhalation

Product: LC 50 (Rat, 1 h): 80975 ppm
LC 50 (Rat, 4 h): 18000 - 22000 ppm
NOAEL (Rat, 6 h): 15,9 mg/l
NOAEL (Rat, 6 h): 16,8 mg/l

Repeated dose toxicity

Product: None known.

Skin Corrosion/Irritation:

Product: Not known.

Serious Eye Damage/Eye Irritation:

Product: Causes eye irritation.

Respiratory or Skin Sensitization:

Product: Not a skin nor a respiratory sensitizer.

Germ Cell Mutagenicity

In vitro

Product: No mutagenic components identified

In vivo

Product: No mutagenic components identified

Carcinogenicity

Product: Suspected of causing cancer.

Reproductive toxicity

Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure

Product: Narcotic effect. Respiratory tract irritation.

Specific Target Organ Toxicity - Repeated Exposure

Product: None known.

Aspiration Hazard

Product: Not classified

Other adverse effects:

None known.

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity

Fish

Product: No data available.

Specified substance(s)

Tetrahydrofuran LC 50 (Fathead minnow (*Pimephales promelas*), 96 h): 1.970 - 2.360 mg/l
EC 50 (Fathead minnow (*Pimephales promelas*), 96 h): 1.930 mg/l

Aquatic Invertebrates

Product: No data available.

Specified substance(s)

Tetrahydrofuran LC 50 (Water flea (*Daphnia magna*), 24 h): > 10.000 mg/l
EC 50 (*Daphnia magna*, 24 h): 5.930 mg/l

Chronic Toxicity

Fish

Product: No data available.

Specified substance(s)

Tetrahydrofuran LOAEL (*Pimephales promelas*, 33 d): 367 mg/l
NOAEL (*Pimephales promelas*, 33 d): 216 mg/l

Aquatic Invertebrates

Product: No data available.

Specified substance(s)

Tetrahydrofuran No data available.

Toxicity to Aquatic Plants

Product: No data available.

Specified substance(s)

Tetrahydrofuran No data available.

12.2 Persistence and Degradability

Biodegradation

Product: The product is moderately biodegradable.

Specified substance(s)

Tetrahydrofuran No data available.

BOD/COD Ratio

Product: No data available.

Specified substance(s)

Tetrahydrofuran No data available.

12.3 Bioaccumulative potential

Product: No data available on bioaccumulation.

Specified substance(s)

Tetrahydrofuran No data available.

12.4 Mobility in soil:

The product is water soluble and may spread in water systems.

Known or predicted distribution to environmental compartments

Tetrahydrofuran No data available.

12.5 Results of PBT and vPvB assessment: Not available.
Tetrahydrofuran No data available.

12.6 Other adverse effects: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

12.7 Additional Information: No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: No data available.

Disposal methods: Discharge, treatment, or disposal may be subject to national, state, or local laws.

SECTION 14: Transport information

ADR

14.1 UN Number: UN 2056
 14.2 UN Proper Shipping Name: TETRAHYDROFURAN
 14.3 Transport Hazard Class(es)
 Class: 3
 Label(s): 3
 Hazard No. (ADR): 33
 Tunnel restriction code: (D/E)
 14.4 Packing Group: II
 14.5 Environmental Hazards: No
 14.6 Special precautions for user: Not determined.

RID

14.1 UN Number: UN 2056
 14.2 UN Proper Shipping Name: TETRAHYDROFURAN
 14.3 Transport Hazard Class(es)
 Class: 3
 Label(s): 3
 14.4 Packing Group: II
 14.5 Environmental Hazards: No
 14.6 Special precautions for user: Not determined.

IMDG

14.1 UN Number: UN 2056
 14.2 UN Proper Shipping Name: TETRAHYDROFURAN
 14.3 Transport Hazard Class(es)
 Class: 3
 Label(s): 3
 EmS No.: F-E, S-D
 14.4 Packing Group: II
 14.5 Environmental Hazards: No
 14.6 Special precautions for user: Not determined.

IATA

14.1 UN Number: UN 2056
 14.2 Proper Shipping Name: Tetrahydrofuran
 14.3 Transport Hazard Class(es):
 Class: 3
 Label(s): 3
 14.4 Packing Group: II
 14.5 Environmental Hazards: No
 14.6 Special precautions for user: Not determined.

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:

EU Regulations

Regulation (EC) No. 2037/2000 Substances that deplete the ozone layer: none

Regulation (EC) No. 850/2004 on persistent organic pollutants: none

Regulation (EC) No. 689/2008 Import and export of dangerous chemicals: none

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorisation, as amended: none

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:

Chemical name	CAS-No.	Concentration
Tetrahydrofuran	109-99-9	100%

Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work.: none

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breast feeding.: none

Directive 96/82/EC (Seveso III): on the control of major accident hazards involving dangerous substances:

Chemical name	CAS-No.	Concentration
Tetrahydrofuran	109-99-9	100%

EU. Regulation No. 166/2006 PRTR (Pollutant Release and Transfer Registry), Annex II: Pollutants:
none

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:

Chemical name	CAS-No.	Concentration
Tetrahydrofuran	109-99-9	100%

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Revision Information: Not relevant.

References

PBT PBT: persistent, bioaccumulative and toxic substance.
vPvB vPvB: very persistent and very bioaccumulative substance.

Key literature references and sources for data: No data available.

Wording of the H-statements in section 2 and 3

H225 Highly flammable liquid and vapor.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Training information: No data available.

Issue Date: 17.05.2018

SDS No.:

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