Tetrahydrofuran

34865-6X100ML

SECTION 1. IDENTIFICATION

Product name	:	Tetrahydrofuran
Number	:	000000020372
Product Use Description	:	Laboratory chemicals
Manufacturer or supplier's details	:	Solstice Advanced Materials US, Inc. 115 Tabor Road Morris Plains, NJ 07950-2546
For more information call	:	1-800-368-0050 +1-231-726-3171(Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**Medical: 1-800-498-5701 or +1-303-389-1414**
	:	**Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887**
	:	
	:	(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	:	liquid
Color	:	colourless
Odor	:	characteristic acetone-like

Classification of the substance or mixture

Classification of the substance or mixture	:	Flammable liquids, Category 2 Acute toxicity, Category 4, Oral Eye irritation, Category 2A Carcinogenicity, Category 2 Specific target organ toxicity - single exposure, Category 3, Respiratory system

GHS Label elements, including precautionary statements

Symbol(s) :

Signal word : Danger

Hazard statements	: H225	Highly flammable liquid and vapour.
	H302	Harmful if swallowed.
	H319	Causes serious eye irritation.
	H335	May cause respiratory irritation.
	H351	Suspected of causing cancer.
Precautionary statements	: **Prevention:**	
	P201	Obtain special instructions before use.
	P202	Do not handle until all safety precautions have been read and understood.
	P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
	P233	Keep container tightly closed.
	P240	Ground/bond container and receiving equipment.
	P241	Use explosion-proof electrical/ ventilating/ lighting equipment.
	P242	Use only non-sparking tools.
	P243	Take precautionary measures against static discharge.
	P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
	P264	Wash skin thoroughly after handling.
	P270	Do not eat, drink or smoke when using this product.
	P271	Use only outdoors or in a well-ventilated area.
	P280	Wear protective gloves/protective clothing/eye protection/face protection.
	Response:	
	P301 + P312	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell.
	P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
	P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable

	for breathing.
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 + P313	IF exposed or concerned: Get medical advice/ attention.
P330	Rinse mouth.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
Storage:	
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P235	Keep cool.
P405	Store locked up.
Disposal:	
P501	Dispose of contents/ container to an approved waste disposal plant.

Hazards not otherwise classified : May form explosive peroxides.

Carcinogenicity

ACGIH:	Tetrahydrofuran	109-99-9
	A3: Confirmed animal carcinogen	

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C4H8O

Chemical nature : Substance

Chemical name	CAS-No.	Concentration
Tetrahydrofuran	109-99-9	100.00 %

SECTION 4. FIRST AID MEASURES

General advice	:	First aider needs to protect himself. Move out of dangerous area. Take off all contaminated clothing immediately. If unconscious, place in recovery position and seek medical advice.
Inhalation	:	If inhaled, remove to fresh air. Call a physician if irritation develops or persists.
Skin contact	:	After contact with skin, wash immediately with plenty of water.
Eye contact	:	Protect unharmed eye. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.
Ingestion	:	Rinse mouth with water. Do NOT induce vomiting. Call a physician immediately.

Notes to physician

Most important symptoms/effects, acute and delayed	:	No information available.
Indication of immediate medical attention and special treatment needed, if necessary	:	Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Water spray Foam Carbon dioxide (CO2) Dry powder
Unsuitable extinguishing media	:	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards during firefighting	:	Flammable. Vapours may form explosive mixtures with air. Vapours are heavier than air and may spread along floors.

Vapors may travel to areas away from work site before igniting/flashing back to vapor source.
May form explosive peroxides.
Fire may cause evolution of:
Carbon oxides

Special protective equipment for firefighters	:	Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.
Further information	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Evacuate personnel to safe areas. Wear personal protective equipment. Unprotected persons must be kept away. Ensure adequate ventilation. Remove all sources of ignition. Do not breathe vapours or spray mist.
Environmental precautions	:	Do not let product enter drains. Should not be released into the environment.
Methods and materials for containment and cleaning up	:	Ventilate the area. Do not use sparking tools. Use explosion-proof equipment. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Handling

Precautions for safe handling	:	Wear personal protective equipment. Use only in well-ventilated areas.
Advice on protection against fire and explosion	:	Keep product and empty container away from heat and sources of ignition.

No smoking.
Take precautionary measures against static discharges.
Vapours may form explosive mixtures with air.
May form explosive peroxides.

Storage

Conditions for safe storage, including any incompatibilities	:	Store in area designed for storage of flammable liquids. Protect from physical damage. Keep containers tightly closed in a dry, cool and well-ventilated place. Store in original container. Protect from exposure to air/oxygen (peroxide formation).

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures	:	Ensure that eyewash stations and safety showers are close to the workstation location. Legal requirements are to be considered in regard of the selection, use and care of personal protective equipment. Do not breathe vapours or spray mist.
Engineering measures	:	Local exhaust Use explosion-proof equipment.
Eye protection	:	Safety goggles
Hand protection	:	Impervious gloves Gloves must be inspected prior to use. Replace when worn.
Skin and body protection	:	Protective suit
Respiratory protection	:	In case of insufficient ventilation, wear suitable respiratory equipment.
Hygiene measures	:	Take off all contaminated clothing immediately. Remove and wash contaminated clothing before re-use. Keep working clothes separately. Wash hands before breaks and at the end of workday. When using do not eat, drink or smoke.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
Tetrahydrofuran	109-99-9	REL : Recommended exposure limit (REL):	590 mg/m3 (200 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Tetrahydrofuran	109-99-9	STEL : Short term exposure limit	735 mg/m3 (250 ppm)	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended
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Tetrahydrofuran	109-99-9	PEL : Permissible exposure limit	590 mg/m3 (200 ppm)	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended
Tetrahydrofuran	109-99-9	TWA : Time weighted average	(50 ppm)	2008	ACGIH:US. ACGIH Threshold Limit Values, as amended
Tetrahydrofuran	109-99-9	TWA : Time weighted average	590 mg/m3 (200 ppm)	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended

Tetrahydrofuran	109-99-9	STEL : Short term exposure limit	(100 ppm)	2008	ACGIH:US. ACGIH Threshold Limit Values, as amended

Tetrahydrofuran	109-99-9	SKIN_DES : Skin designation:	Danger of cutaneous absorption	01 2020	ACGIH:US. ACGIH Threshold Limit Values, as amended

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	:	liquid
Color	:	colourless
Odor	:	characteristic acetone-like
Odor threshold	:	Note: No data available
pH	:	Note: neutral
Melting point/ range	:	-108 °C
Boiling point/boiling range	:	65 °C at 1,013 hPa
Flash point	:	-6 °F (-21 °C)
Evaporation rate	:	Note: No data available
Flammability	:	No data available
Lower explosion limit	:	1.5 %(V)
Upper explosion limit	:	12 %(V)

Vapor pressure	:	200 hPa at 20 °C(68 °F)
Vapor density	:	Note: No data available
Density	:	0.89 g/cm3at 20 °C
Water solubility	:	Note: completely miscible
Solubility in other solvents	:	Note: Soluble in most organic solvents
Partition coefficient: n-octanol/water	:	log Pow: 0.45 at 20 °C
Ignition temperature	:	215 °C Method: DIN 51794
Decomposition temperature	:	Note: May form explosive peroxides.
Viscosity, dynamic	:	0.48 mPa.s at 20 °C
Viscosity, kinematic	:	Note: No data available
Molecular weight	:	72.11 g/mol

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	Vapours may form explosive mixture with air. Hazardous polymerisation does not occur.
Conditions to avoid	:	Heat, flames and sparks.

Protect from exposure to air/oxygen (peroxide formation).

Incompatible materials	:	Oxidizing agents Strong acids and strong bases
Hazardous decomposition products	:	Fire may cause evolution of: Carbon oxides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	:	LD50: 1,650 mg/kg Species: Rat
Acute inhalation toxicity	:	LC50: > 14.7 mg/l > 5000 ppm Exposure time: 6 h Species: Rat
Acute dermal toxicity	:	LD50: > 2,000 mg/kg Species: Rat Method: OECD Test Guideline 402
Skin irritation	:	Species: Rabbit Result: Mild skin irritation Note: According to the classification criteria of the European Union, the product is not considered as being a skin irritant.
Eye irritation	:	Species: Rabbit Result: Risk of serious damage to eyes.
Sensitisation	:	Mouse local lymph node assay Species: Mouse Classification: non-sensitizing Method: OECD 429
Repeated dose toxicity	:	Species: Rat Application Route: Oral Exposure time: 4 Weeks

NOAEL (No observed adverse effect level): 1,000 mg/l
Method: OECD Test Guideline 407

Genotoxicity in vitro : Test Method: Chromosome aberration test in vitro
Metabolic activation: with and without metabolic activation
Result: negative
Method: OECD Test Guideline 473

: Test Method: In vitro gene mutation study in mammalian cells
Metabolic activation: with and without metabolic activation
Result: negative
Method: OECD Test Guideline 476

: Test Method: Ames test
Metabolic activation: with and without metabolic activation
Result: negative
Method: OECD Test Guideline 471

Genotoxicity in vivo : Test Method: Chromosome aberration test
Species: Mouse
Method: OECD Test Guideline 474
Result: negative

Carcinogenicity
Tetrahydrofuran : Species: Rat, male
Application Route: Inhalation
Target Organs : Kidney
Result : Sufficient evidence of carcinogenicity in inhalation studies with animals
Note: Suspect cancer hazard

Further information : Note: Confirmed animal carcinogen with unknown relevance to humans. Risk of serious damage to the lungs (by aspiration).

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Toxicity to fish : flow-through test

LC50: 2,160 mg/l
Exposure time: 96 h
Species: Pimephales promelas (fathead minnow)
Method: OECD Test Guideline 203

: NOEC: 216 mg/l
Exposure time: 33 d
Species: Pimephales promelas (fathead minnow)

Toxicity to daphnia and other aquatic invertebrates : static test
EC50: 3485 ppm
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 202

Toxicity to algae : Growth rate
3,700 mg/l
Exposure time: 8 d
Species: Scenedesmus quadricauda (Green algae)

Toxicity to bacteria : static test
IC50: 460 mg/l
Exposure time: 3 h
Species: activated sludge
Method: OECD 209

Elimination information (persistence and degradability)

Biodegradability : Result: Not readily biodegradable.
Method: OECD 301 D

Further information on ecology

Ecotoxicology Assessment

Results of PBT assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher., Product does not contain substances that are persistent, mobile, and toxic (PMT/vPvM) at levels of 0.1 % or higher.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

SECTION 14. TRANSPORT INFORMATION

DOT

UN/ID No.	:	UN 2056
Proper shipping name	:	TETRAHYDROFURAN
Class		3
Packing group		II
Hazard Labels		3

IATA

UN/ID No.	:	UN 2056
Description of the goods	:	TETRAHYDROFURAN
Class	:	3
Packaging group	:	II
Hazard Labels	:	3
Packing instruction (cargo aircraft)	:	364
Packing instruction (passenger aircraft)	:	353
Packing instruction (passenger aircraft)	:	Y341

IMDG

UN/ID No.	:	UN 2056
Description of the goods	:	TETRAHYDROFURAN
Class	:	3
Packaging group	:	II
Hazard Labels	:	3
EmS Number	:	F-E, S-D
Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

Inventories

USA. List of Active Substances on the Toxic : All substances listed as active on the TSCA inventory

Substances Control Act (TSCA) Chemical Substances Inventory, as amended		
Australian Inventory of Industrial Chemicals	:	All components are listed on the inventory, regulatory obligations/restrictions apply
Canada. Domestic Substances List (DSL), as amended	:	All components of this product are on the Canadian DSL
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory
Korea. Existing Chemicals Inventory (KECI)	:	On the inventory, or in compliance with the inventory
Philippines. Inventory of Chemicals and Chemical Substances (PICCS)	:	On the inventory, or in compliance with the inventory
China. Inventory of Existing Chemical Substances (IECSC)	:	On the inventory, or in compliance with the inventory
Thailand. Existing Chemicals Inventory from FDA (TECI List)	:	On the inventory, or in compliance with the inventory
Taiwan Chemical Substance Inventory (TCSI)	:	On the inventory, or in compliance with the inventory
TSCA 5A	:	US. Toxic Substances Control Act (TSCA) Section 5(a)(2) Proposed Significant New Use Rules (SNURs) (40 CFR 721 and 725) No substances are subject to a Significant New Use Rule.
TSCA 12B	:	US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D) No substances are subject to TSCA 12(b) export notification requirements.

National regulatory information

US. EPA CERCLA	:	The following component(s) of this product is/are subject to

Hazardous Substances (40 CFR 302)		release reporting under 40 CFR 302 when release exceeds the Reportable Quantity (RQ):	
		Reportable quantity: 1000 lbs	
	:	Tetrahydrofuran	109-99-9
SARA 302 Components	:	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.	
SARA 313 Components	:	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.	
SARA 311/312 Hazards	:	Fire Hazard Acute Health Hazard Chronic Health Hazard Reactivity Hazard	
CERCLA Reportable Quantity	:	1000 lbs	
California Prop. 65	:	This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.	
Massachusetts RTK	:	Tetrahydrofuran	109-99-9
New Jersey RTK	:	Tetrahydrofuran	109-99-9
Pennsylvania RTK	:	Tetrahydrofuran	109-99-9

SECTION 16. OTHER INFORMATION

		HMIS III	**NFPA**
Health hazard	:	2*	2
Flammability	:	3	3
Physical Hazard	:	1	
Instability	:		1

* - Chronic health hazard
Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

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