

Tetrahydrofuran (340, 341, 342, 343)**000000011440**

Version 1.5

Revision Date 04/14/2014

Print Date 09/10/2014

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Tetrahydrofuran (340, 341, 342, 343)

MSDS Number : 000000011440

Product Use Description : Solvent

Manufacturer or supplier's details : Honeywell International Inc.
101 Columbia Road
Morristown, NJ 07962-1057

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 : clear and colourless

Odor : ether-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,

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Respiratory system

GHS Label elements, including precautionary statements

Symbol(s)



Signal word

: Danger

Hazard statements

: Highly flammable liquid and vapour.
Harmful if swallowed.
Causes serious eye irritation.
May cause respiratory irritation.
Suspected of causing cancer.

Precautionary statements

: **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting/ equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ eye protection/ face protection.**Response:**IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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IF exposed or concerned: Get medical advice/ attention.
Rinse mouth.
If eye irritation persists: Get medical advice/ attention.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:

Store in a well-ventilated place. Keep container tightly closed.
Keep cool.
Store locked up.

Disposal:

Dispose of contents/ container to an approved waste disposal plant.

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

Inhalation : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.

Skin contact : Wash off immediately with plenty of water for at least 15 minutes. Take off contaminated clothing and shoes

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- immediately. Wash contaminated clothing before re-use. Call a physician.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician.
- Ingestion : Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician.

Notes to physician

- Treatment : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry chemical
Cool closed containers exposed to fire with water spray.
- Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.
- Specific hazards during firefighting : Extremely 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.
In case of fire hazardous decomposition products may be produced such as:
Carbon monoxide
Carbon dioxide (CO₂)
- Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Wear personal protective equipment.

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- Immediately evacuate personnel to safe areas.
Keep people away from and upwind of spill/leak.
Ensure adequate ventilation.
Remove all sources of ignition.
Do not swallow.
Do not breathe vapours or spray mist.
Avoid contact with skin, eyes and clothing.
- Environmental precautions : Prevent further leakage or spillage if safe to do so.
Prevent product from entering drains.
Discharge into the environment must be avoided.
Do not flush into surface water or sanitary sewer system.
Do not allow run-off from fire fighting to enter drains or water courses.
- Methods for cleaning up : Ventilate the area.
No sparking tools should be used.
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**

- Handling : Wear personal protective equipment.
Use only in well-ventilated areas.
Keep container tightly closed.
Do not smoke.
Do not swallow.
Do not breathe vapours or spray mist.
Avoid contact with skin, eyes and clothing.
- Advice on protection against fire and explosion : May form explosive peroxides.
Keep away from fire, sparks and heated surfaces.
Take precautionary measures against static discharges.
Ensure all equipment is electrically grounded before beginning transfer operations.
Use explosion-proof equipment.
Keep product and empty container away from heat and sources of ignition.
No sparking tools should be used.

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No smoking.

Storage

Requirements for storage areas and containers : 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.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep away from heat and sources of ignition.
Keep away from direct sunlight.
Protect from exposure to air/oxygen (peroxide formation).
Protect against light.
Store away from incompatible substances.
Container hazardous when empty.
Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures : Ensure that eyewash stations and safety showers are close to the workstation location.

Engineering measures : Use with local exhaust ventilation.
Prevent vapour buildup by providing adequate ventilation during and after use.

Eye protection : Do not wear contact lenses.
Wear as appropriate:
Safety glasses with side-shields
If splashes are likely to occur, wear:
Goggles or face shield, giving complete protection to eyes

Hand protection : Solvent-resistant gloves
Gloves must be inspected prior to use.
Replace when worn.

Skin and body protection : Wear as appropriate:
Solvent-resistant apron
Flame retardant antistatic protective clothing
If splashes are likely to occur, wear:

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Protective suit

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
Use NIOSH approved respiratory protection.

Hygiene measures : When using, do not eat, drink or smoke.
Wash hands before breaks and immediately after handling the product.
Keep working clothes separately.
Remove and wash contaminated clothing before re-use.
Do not swallow.
Do not breathe vapours or spray mist.
Avoid contact with skin, eyes and clothing.
This material has an established AIHA ERPG exposure limit.
The current list of ERPG exposure limits can be found at http://www.aiha.org/insideaiha/GuidelineDevelopment/ERPG/Documents/2011erpgweelhandbook_table-only.pdf.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
Tetrahydrofuran	109-99-9	SKIN_DES : Skin designation:	Can be absorbed through the skin.	2008	ACGIH:US. ACGIH Threshold Limit Values
Tetrahydrofuran	109-99-9	TWA : time weighted average	(50 ppm)	2008	ACGIH:US. ACGIH Threshold Limit Values
Tetrahydrofuran	109-99-9	STEL : Short term exposure limit	(100 ppm)	2008	ACGIH:US. ACGIH Threshold Limit Values

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Tetrahydrofuran	109-99-9	REL : Recomm ended exposure limit (REL):	590 mg/m3 (200 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards
Tetrahydrofuran	109-99-9	STEL : Short term exposure limit	735 mg/m3 (250 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards
Tetrahydrofuran	109-99-9	PEL : Permissi ble exposure limit	590 mg/m3 (200 ppm)	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
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)
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)

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	: liquid
Color	: clear and colourless
Odor	: ether-like
pH	: Note: not applicable
Melting point/freezing point	: -108.5 °C

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Boiling point/boiling range : 66 °C

Flash point : 7 °F (-14 °C)
Method: closed cup

Evaporation rate : 14.5
Method: Compared to Butyl acetate.

Lower explosion limit : 2 %(V)

Upper explosion limit : 11.8 %(V)

Vapor pressure : 189 hPa
at 20 °C(68 °F)

Vapor density : 2.5 Note: (Air = 1.0)

Density : 0.8892 g/cm³ at 20 °C

Water solubility : Note: completely soluble

Ignition temperature : 321 °C

Molecular weight : 72.11 g/mol

SECTION 10. STABILITY AND REACTIVITY

Chemical stability : Stable under recommended storage conditions.

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Possibility of hazardous reactions	: Hazardous polymerisation may occur.
Conditions to avoid	: Heat, flames and sparks. Keep away from direct sunlight. Protect from exposure to air/oxygen (peroxide formation). Protect against light.
Incompatible materials to avoid	: Strong oxidizing agents Strong acids and strong bases May form explosive peroxides. May attack many plastics, rubbers and coatings.
Hazardous decomposition products	: Peroxides In case of fire hazardous decomposition products may be produced such as: Carbon monoxide Carbon dioxide (CO ₂)

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	: LD50: 1,650 mg/kg Species: rat
Acute inhalation toxicity	: LC50: 53.1 mg/l Exposure time: 4 h Species: rat
	: LC50: 21000 ppm Exposure time: 3 h Species: rat
Skin irritation	: Species: rabbit Result: Irritating to skin.
Eye irritation	: Species: rabbit Result: Irritating to eyes.

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Further information : Note: Confirmed animal carcinogen with unknown relevance to humans.

SECTION 12. ECOLOGICAL INFORMATION**Ecotoxicity effects**

Toxicity to fish : LC50: 2,160 mg/l
Exposure time: 96 h
Species: Pimephales promelas (fathead minnow)

: LC50: 2,820 mg/l
Species: Leuciscus idus (Golden orfe)

Toxicity to bacteria : LC50: > 580 mg/l
Exposure time: 16 h
Species: Bacteria

Further information on ecology

Additional ecological information : Bioaccumulation is unlikely.

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

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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**

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act : On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) : 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. Toxic Chemical Control Law (TCCL) List : On the inventory, or in compliance with the inventory

Philippines. The Toxic : On the inventory, or in compliance with the inventory

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Substances and Hazardous
and Nuclear Waste Control
Act

China. Inventory of Existing
Chemical Substances : On the inventory, or in compliance with the inventory

New Zealand. Inventory of
Chemicals (NZIoC), as
published by ERMA New
Zealand : On the inventory, or in compliance with the inventory

National regulatory information

US. EPA CERCLA
Hazardous Substances (40
CFR 302) : The following component(s) of this product is/are subject to
release reporting under 40 CFR 302 when release exceeds the
Reportable Quantity (RQ):

Reportable quantity: 1000 lbs
: Tetrahydrofuran 109-99-9

SARA 302 Components : SARA 302: No chemicals in this material are subject to the
reporting requirements of SARA Title III, Section 302.

SARA 313 Components : SARA 313: 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

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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

WHMIS Classification : B2: Flammable liquid
D2B: Toxic Material Causing Other Toxic Effects
This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

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

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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.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Previous Issue Date: 06/15/2012

Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group