

**Tetrahydrofuran (BDH1149-19L, BDH1149-204L, BDH1149-4LG)****00000011708**

Version 1

Revision Date 06/15/2012

Print Date 06/20/2012

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Tetrahydrofuran (BDH1149-19L, BDH1149-204L, BDH1149-4LG)

MSDS Number : 00000011708

Product Use Description : Solvent

Manufacturer : Honeywell  
1953 South Harvey Street  
Muskegon, MI 49442

Manufactured for : VWR International LLC  
Radnor Corporate Center  
Building One  
Suite 200  
100 Matsonford Road  
Radnor PA 19087

For more information call : (Monday-Friday, 8:00am-5:00pm)  
1-800-932-5000

In case of emergency call : (24 hours/day, 7 days/week)  
1-800-424-9300 (USA Only)  
**For Transportation Emergencies:**  
1-800-424-9300 (CHEMTREC - Domestic)  
1-613-966-6666 (CANUTEC - Canada)

**SECTION 2. HAZARDS IDENTIFICATION****Emergency Overview**

Form : liquid, clear

Color : colourless

Odor : ether-like

Hazard Summary : Extremely flammable. In use, may form flammable/explosive vapour-air mixture. May form explosive peroxides. Harmful by inhalation. May be harmful if swallowed. Irritating to eyes, respiratory system and skin. May cause irritation of the gastrointestinal tract. Repeated exposure may cause skin dryness or cracking. Confirmed animal carcinogen with


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unknown relevance to humans.

**Potential Health Effects**

- Skin** : Irritating to skin.  
Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.
- Eyes** : Irritating to eyes.  
Causes itching, burning, redness and tearing.
- Ingestion** : May cause irritation of the gastrointestinal tract.  
May cause nausea, vomiting, diarrhea, and abdominal discomfort.  
May cause systemic poisoning with symptoms paralleling those of inhalation.
- Inhalation** : Causes respiratory tract irritation.  
Causes headache, drowsiness or other effects to the central nervous system.  
Vapours may cause drowsiness and dizziness.  
Inhalation of high vapour concentrations can cause CNS-depression and narcosis.  
Causes damage to the following organs: liver, kidneys.
- Chronic Exposure** : Repeated or prolonged exposure to the substance can produce liver damage.  
Repeated or prolonged exposure to the substance can produce kidney damage.  
Repeated and prolonged exposure to solvents may cause brain and nervous system damage.  
Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness and possible blistering.  
Confirmed animal carcinogen with unknown relevance to humans.
- Aggravated Medical Condition** : Liver disorders  
Kidney disorders  
Respiratory disorders  
Skin disorders
- Target Organs** : Eyes  
Skin  
Respiratory system  
Central nervous system


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**Carcinogenicity**

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

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Formula : C<sub>4</sub>H<sub>8</sub>O  
 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 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 (CO<sub>2</sub>)  
 Dry chemical  
 Cool closed containers exposed to fire with water spray.



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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 (CO <sub>2</sub> )
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus and protective suit.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Wear personal protective equipment. 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).

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**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.  
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.


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- Engineering measures : Use with local exhaust ventilation.  
Prevent vapor 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:  
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](http://www.aiha.org/insideaiha/GuidelineDevelopment/ERPG/Documents/2011erpgweelhandbook_table-only.pdf).

**Exposure Guidelines–**

Components	CAS-No	Value	Control parameters	Update	Basis
	.				



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Tetrahydrofuran	109-99-9	STEL : Short term exposure limit	295 mg/m3 (100 ppm)	07 2009	CAD AB OEL:Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)
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		TWA : time weighted average	147 mg/m3 (50 ppm)	07 2009	CAD AB OEL:Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)
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		SKIN_DES : Skin designation:	Can be absorbed through the skin.	07 2009	CAD AB OEL:Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)
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		STEL : Short term exposure limit	(100 ppm)	07 2007	CAD BC OEL:Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)
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		TWA : time weighted average	(50 ppm)	07 2007	CAD BC OEL:Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)
--	--	-----------------------------	----------	---------	--

		SKIN_DES : Skin designation:	Can be absorbed through the skin.	07 2007	CAD BC OEL:Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)
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		STEL : Short term exposure limit	(100 ppm)	03 2011	CAD MB OEL:Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)
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		SKIN_DES : Skin designation:	Can be absorbed through the skin.	03 2011	CAD MB OEL:Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)
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		TWA : time weighted average	(50 ppm)	03 2011	CAD MB OEL:Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)
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		SKIN_DES : Skin designation:	Can be absorbed through the skin.	08 2008	CAD ON OEL:Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)
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		STEV : Short Term Exposure Limit (STEV):	(100 ppm)	08 2008	CAD ON OEL:Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)
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		TWA : time weighted average	(50 ppm)	08 2008	CAD ON OEL:Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)
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		SKIN_DES : Skin designation:	Can be absorbed through the skin.	05 2009	CAD SK OEL:Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21)
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		15 MIN ACL : 15 minute average contamination limit:	(100 ppm)	05 2009	CAD SK OEL:Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21)
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		8 HR ACL : 8 hour average contamination limit:	(50 ppm)	05 2009	CAD SK OEL:Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21)
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		TWA : time weighted average	300 mg/m3 (100 ppm)	12 2008	OEL (QUE):Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)
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**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical state	: liquid, clear
Colour	: colourless
Odour	: ether-like
pH	: Note: not applicable
Melting point/freezing point	: -108.5 °C
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)
Vapour pressure	: 189 hPa

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at 20 °C(68 °F)

Vapour density	:	2.5 Note: (Air = 1.0)
Density	:	0.8892 g/cm <sup>3</sup> at 20 °C
Water solubility	:	Note: completely soluble
Ignition temperature	:	321 °C
Molecular Weight	:	72.11 g/mol

**SECTION 10. STABILITY AND REACTIVITY**

Conditions to avoid	:	Heat, flames and sparks. Keep away from direct sunlight. Protect from exposure to air/oxygen (peroxide formation). Protect against light.
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 <sub>2</sub> )
Hazardous reactions	:	Hazardous polymerisation may occur. Stable under recommended storage conditions.

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**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  
Tetrahydrofuran : Species: rabbit  
Result: Irritating to skin.

Eye irritation  
Tetrahydrofuran : Species: rabbit  
Result: Irritating to eyes.

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


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 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.

Contaminated packaging : Empty remaining contents. Empty containers should be taken to an approved waste handling site for recycling or disposal.

**SECTION 14. TRANSPORT INFORMATION**

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

<b>IATA</b>	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	

<b>IMDG</b>	UN/ID No.	: UN 2056
	Description of the goods	: TETRAHYDROFURAN
	Class	: 3
	Packaging group	: II
	Hazard Labels	: 3
	EmS Number	: F-E
	Marine pollutant	: no

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**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 list.
- 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. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory
- 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**

- 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.

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**WHMIS****Components** : Tetrahydrofuran 109-99-9**NPRI****Components** : Tetrahydrofuran 109-99-9**SECTION 16. OTHER INFORMATION**

	<b>HMIS III</b>	<b>NFPA</b>
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.

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

Previous Issue Date: 03/25/2009

Prepared by: Honeywell Performance Materials and Technologies Product Stewardship Group