

Linuron

sc-250252



The Power is Question

Material Safety Data Sheet

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Linuron

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY

ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

C9-H10-Cl2-N2-O2, "3-(3, 4-dichlorophenyl)-1-methoxymethylurea", "3-(3, 4-dichlorophenyl)-1-methoxy-1-methylurea", "N' -(3, 4-dichlorophenyl)-N-methoxy-N-methylurea", "N-(3, 4-dichlorophenyl)-N' -methyl-N' -methoxyurea", "1-methoxy-1-methyl-3-(3, 4-dichlorophenyl)urea", Afalon, Linurex, "Afolon Inuron", Lorex, Aphalon, Lorox, Cephalon, "Lorox Linuron Weed Killer", "Du Pont 326", Methoxydiuron, "Du Pont Herbicide 326", Premalin, Garnitan, Sarclax, "Herbicide 326", Scarclax, "Hoe 2810", Sinuron, "Linex 4L", Linorox, "phenylurea pesticide"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	1	
Toxicity:	4	
Body Contact:	2	
Reactivity:	1	
Chronic:	3	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Harmful if swallowed.
Very toxic by inhalation.
Limited evidence of a carcinogenic effect.
May cause harm to the unborn child.
Possible risk of impaired fertility.
Harmful: danger of serious damage to health by prolonged exposure if swallowed.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
- The substance and/or its metabolites may bind to hemoglobin inhibiting normal uptake of oxygen. This condition, known as "methemoglobinemia", is a form of oxygen starvation (anoxia).

EYE

- Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.

SKIN

- The material is not thought to be a skin irritant (as classified using animal models). Abrasive damage however, may result from prolonged exposures.
- Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

- The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified using animal models). Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

- Harmful: danger of serious damage to health by prolonged exposure if swallowed.
Harmful: danger of serious damage to health by prolonged exposure if swallowed.
This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.
Ample evidence exists, from results in experimentation, that developmental disorders are directly caused by human exposure to the material.
Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
Chronic effects of exposure may initially include skin irritation, or blurring of vision, liver enlargement; spleen and thyroid effects; red blood cell destruction; or reduction of the blood's oxygen carrying capacity with cyanosis (bluish discolourisation), weakness or shortness of breath by formation of methaemoglobin.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
linuron	330-55-2	>95

(3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea)

NOTE: May contain impurities, from manufacture, as

[3,4,3',4'-tetrachloroazobenzene](#)

14047-09-7

[3,3',4,4'-tetrachloroazoxybenzene](#)

21232-47-3

Section 4 - FIRST AID MEASURES

SWALLOWED

· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. · Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

EYE

■ If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Other measures are usually unnecessary.

NOTES TO PHYSICIAN

■ The material may induce methemoglobinemia following exposure.

· Initial attention should be directed at oxygen delivery and assisted ventilation if necessary. Hyperbaric oxygen has not demonstrated substantial benefits.

· Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible.
Upper Explosive Limit (%):	Not Available
Specific Gravity (water=1):	Not available.
Lower Explosive Limit (%):	Not Available

EXTINGUISHING MEDIA

· Foam.
· Dry chemical powder.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· Wear breathing apparatus plus protective gloves.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 100 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible solid which burns but propagates flame with difficulty.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), hydrogen chloride, phosgene, nitrogen oxides (NO_x), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

‡ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

ÿEXTINGUISHING MEDIA

· Foam.
· Dry chemical powder.

ÿFIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.
· Wear breathing apparatus plus protective gloves.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 100 metres in all directions.

ÿGENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible solid which burns but propagates flame with difficulty.
· Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), hydrogen chloride, phosgene, nitrogen oxides (NO_x), other

pyrolysis products typical of burning organic material.

⚡ FIRE INCOMPATIBILITY

⚠ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

Environmental hazard - contain spillage.

MAJOR SPILLS

⚠ Environmental hazard - contain spillage.

Moderate hazard.

- CAUTION: Advise personnel in area.
 - Alert Emergency Responders and tell them location and nature of hazard.
- Use lime or bleach to neutralise.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
 - Wear protective clothing when risk of exposure occurs.
- Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
- Do NOT cut, drill, grind or weld such containers.
 - In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- ⚠ Glass container.
- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS

⚠ Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
Canada - Ontario Occupational Exposure Limits	linuron (Particles (Insoluble or Poorly Soluble) Not Otherwise)		10 (I)						
Canada - British Columbia Occupational Exposure Limits	linuron (Particles (Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC))		10 (N)						
Canada - Ontario Occupational Exposure Limits	linuron (Specified (PNOS) / Particules (insolubles ou peu solubles) non précisées par ailleurs)		3 (R)						

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	linuron (Particulates not otherwise regulated Respirable fraction)		5	
US - California Permissible Exposure Limits for Chemical Contaminants	linuron (Particulates not otherwise regulated Respirable fraction)		5	(n)
US - Oregon Permissible Exposure Limits (Z-1)	linuron (Particulates not otherwise regulated (PNOR) (f) Total Dust)	-	10	Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means "particles not otherwise regulated."
US - Michigan Exposure Limits for Air Contaminants	linuron (Particulates not otherwise regulated, Respirable dust)		5	
US - Oregon Permissible Exposure Limits (Z-1)	linuron (Particulates not otherwise regulated (PNOR) (f) Respirable Fraction)	-	5	Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means "particles not otherwise regulated."
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	linuron (Particulates not otherwise regulated (PNOR)(f)- Respirable fraction)		5	
Canada - Prince Edward Island Occupational Exposure Limits	linuron (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)		10	See Appendix B current TLV/BEI Book

US OSHA Permissible Exposure Levels (PELs) - Table Z1	3,4,3',4'-tetrachloroazobenzene (Chlorobenzene)	75	350		
---	---	----	-----	--	--

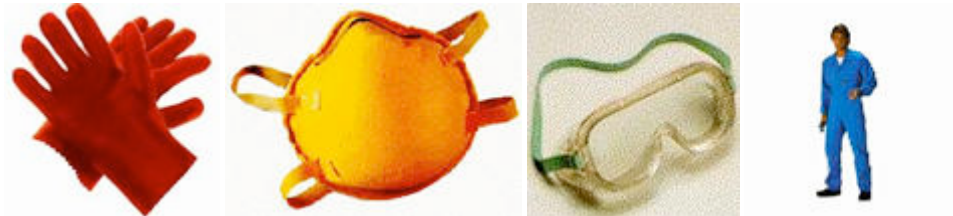
Canada - Northwest Territories Occupational Exposure Limits (English)	3,4,3',4'-tetrachloroazobenzene (Chlorobenzene))	75	345	115	520
---	--	----	-----	-----	-----

ENDOELTABLE

The following materials had no OELs on our records

- 3,3',4,4'-tetrachloroazoxybenzene: CAS:21232-47-3

PERSONAL PROTECTION



RESPIRATOR

·Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields
- Chemical goggles.

HANDS/FEET

Wear chemical protective gloves, eg. PVC.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

· Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

ENGINEERING CONTROLS

· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.

· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Does not mix with water.

State	Divided solid	Molecular Weight	249.09
Melting Range (°F)	199- 203	Viscosity	Not Applicable
Boiling Range (°F)	Not available.	Solubility in water (g/L)	Partly miscible

Flash Point (°F)	Not Available	pH (1% solution)	Not available.
Decomposition Temp (°F)	Not available.	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not Available	Vapour Pressure (mmHG)	Negligible.
Upper Explosive Limit (%)	Not Available	Specific Gravity (water=1)	Not available.
Lower Explosive Limit (%)	Not Available	Relative Vapor Density (air=1)	Not available.
Volatile Component (%vol)	Not applicable	Evaporation Rate	Not applicable

linuron

log Kow (Sangster 1997):

3.2

APPEARANCE

Crystalline solid, very slightly soluble in water (75 ppm). Partially soluble in acetone 500 g/kg, alcohol 150 g/kg, benzene 150 g/kg, toluene and xylene 130 g/kg.

log Kow 2.76-3.20

Material	Value
----------	-------

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

‡ Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

linuron

TOXICITY AND IRRITATION

3,3',4,4'-TETRACHLOROAZOXYBENZENE:

3,4,3',4'-TETRACHLOROAZOBENZENE:

■ No significant acute toxicological data identified in literature search.

LINURON:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
----------	------------

Oral (rat) LD50: 1146 mg/kg

Inhalation (rat) LC50: 48 mg/m³/4h

■ Linuron is of relatively low acute toxicity. It is slightly toxic by the oral, dermal and inhalation routes. It causes slight eye irritation in rabbits, and is not a skin irritant or sensitiser.

A subchronic toxicity study using rats resulted in changes in blood cell counts, and retarded growth at the high dose level. In a chronic toxicity and carcinogenicity study using beagle dogs. Linuron caused changes in blood, including red blood cell destruction, and in liver weight. A study using rats resulted in testicular tumors and blood cell destruction. Another rat study showed growth retardation and destruction of red blood cells. A third rat study showed significant changes in blood pigments. An oncogenicity study using mice caused a statistically significant increase in liver tumors, as well as decreased body weight and body weight gain, increased liver weights, and other liver effects.

In a developmental toxicity study using rats, the highest dose level caused maternal toxic effects including decreased body weight gain and food consumption, as well as increases in postimplantation loss and fetal resorptions. In a study using rabbits, linuron caused decreases in maternal body weight, food consumption and liver weight, as well as more abortions, fewer fetuses per litter, decreased fetal body weight, and an increased incidence of fetuses with skeletal skull variations. In a 2-generation reproductive toxicity study using rats, linuron caused effects on the parents including decreased body weight gain and abnormalities in the eyes and testes. Linuron was shown to interfere with the transmission of male hormones. Rats exposed to linuron could develop cell tumors in testicular tissue. A 3-generation study using rats showed reduced body weights and fertility, decreased pup survival, and decreased weanling body, liver and kidney weights, as well as liver atrophy. Linuron does not appear to be mutagenic.

NOTE: This substance may contain impurities (tetrachlorazobenzene and tetrachloroazoxybenzene).

Maximum levels of the impurities are proscribed under various jurisdictions

ADI: 0.01 mg/kg/day

NOEL: 1.25 mg/kg/day

3,4,3',4'-TETRACHLOROAZOBENZENE:

Bacterial cell mutagen

NOTE: This substance is known to produce the sometimes disfiguring cutaneous eruption, chloracne.(1)

The substance also exhibits an hepatotoxic effect in rats and mice. Liver hypertrophy is observed in all animals following intraperitoneal injection.(2) The injection also results in delayed starvation-like syndromes in rats which results in diminished food intake, weight loss and death.(3)

(1) Crow - New Scientist 78,1098, pp 78-80 1978

(2) Schrankel et al - Research Communications Vol 28 pp 527-540 1980

(3) Hsia & Kreamer - Toxicological Letters Vol 25 pp 247-258 1985

3,3',4,4'-TETRACHLOROAZOXYBENZENE:

Mouse cell mutagen

Reproductive effector in mice and rats.

NOTE: This substance is known to produce the sometimes disfiguring cutaneous eruption, chloracne.(1)

The substance also exhibits an hepatotoxic effect in rats and mice. Liver hypertrophy is observed in all animals following intraperitoneal injection.(2) The injection also results in delayed starvation-like syndromes in rats which results in diminished food intake, weight loss and death.(3)

(1) Crow - New Scientist 78,1098, pp 78-80 1978

(2) Schrankel et al - Research Communications Vol 28 pp 527-540 1980

(3) Hsia & Kreamer - Toxicological Letters Vol 25 pp 247-258 1985

CARCINOGEN

Linuron	US EPA Carcinogens Listing	Carcinogenicity	C
Linuron	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	C
LINURON	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	IRIS, OPP-CAN
linuron	US - Maine Chemicals of High Concern List	Carcinogen	C
VPVB_(VERY~	US - Maine Chemicals of High Concern List	Carcinogen	

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

This material and its container must be disposed of as hazardous waste.

Avoid release to the environment.

Refer to special instructions/ safety data sheets.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols: G Hazard class or Division: 9

Identification Numbers: UN3077 PG: III

Label Codes: 9 Special provisions: 8, 146,

335, B54,

IB8, IP3,

N20, T1,

TP33

Packaging: Exceptions: 155 Packaging: Non- bulk: 213

Packaging: Exceptions: 155 Quantity limitations: No limit

Passenger aircraft/rail:

Quantity Limitations: Cargo No limit Vessel stowage: Location: A aircraft only:

Vessel stowage: Other: None S.M.P.: YES

Hazardous materials descriptions and proper shipping names:

Environmentally hazardous substance, solid, n.o.s

Air Transport IATA:

UN/ID Number: 3077 Packing Group: III

Special provisions: A97

Cargo Only

Packing Instructions: 956 Maximum Qty/Pack: 400 kg

Passenger and Cargo Passenger and Cargo

Packing Instructions: Y956 Maximum Qty/Pack: 400 kg

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 956 Maximum Qty/Pack: 30 kg G

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID,

N.O.S. *(CONTAINS LINURON)

Maritime Transport IMDG:

IMDG Class: 9 IMDG Subrisk: None

UN Number: 3077 Packing Group: III

EMS Number: F-A,S-F Special provisions: 274 335

Limited Quantities: 5 kg Marine Pollutant: Yes

Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.(contains linuron)

Section 15 - REGULATORY INFORMATION

linuron (CAS: 330-55-2) is found on the following regulatory lists;

"Canada - Saskatchewan Environmental Persistent or Chronic Hazardous Substances","Canada Environmental Quality Guidelines (EQGs) Water: Aquatic life","Canada Non-Domestic Substances List (NDSL)","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity","US - California Proposition 65 - Reproductive Toxicity","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US Department of Transportation (DOT) Marine Pollutants - Appendix B","US EPA Carcinogens Listing","US EPCRA Section 313 Chemical List","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Regulations for ingredients

3,4,3',4'-tetrachloroazobenzene (CAS: 14047-09-7) is found on the following regulatory lists;

"Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)"

No data for 3,3',4,4'-tetrachloroazoxybenzene (CAS: , 21232-47-3)

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Skin contact may produce health damage*.

* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written permission from CHEMWATCH. TEL (+61 3) 9572 4700.

Issue Date: May-31-2008

Print Date: Sep-10-2011