

ATORN BRAKE CLEANER 500ML

Chemwatch Independent Material Safety Data Sheet

Issue Date: 17-Nov-2009

NC317ECP

CHEMWATCH 4744-44

Version No:2.0

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

ATORN BRAKE CLEANER 500ML

SYNONYMS

"Manufacturer's Code .69377"

PROPER SHIPPING NAME

AEROSOLS

PRODUCT USE

■ Application is by spray atomisation from a hand held aerosol pack.
Brake cleaner.

SUPPLIER

Company: Thomas Warburton Pty Ltd

Address:

16- 26 Dunlop Road

Mulgrave

VIC, 3170

AUS

Telephone: +61 3 9574 3400

Emergency Tel: +61 3 9547 3400

Fax: +61 3 9574 3456

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

HAZARDOUS SUBSTANCE. DANGEROUS GOODS. According to NOHSC Criteria, and ADG Code.

POISONS SCHEDULE

None

RISK

- Highly flammable.
- Irritating to eyes and skin.
- Risk of explosion if heated under confinement.
- Toxic to aquatic organisms may cause long-term adverse effects in the aquatic environment.
- Vapours may cause drowsiness and dizziness.

SAFETY

- Keep away from sources of ignition. No smoking.
- Do not breathe gas/ fumes/ vapour/ spray.
- Avoid contact with skin.

- Wear eye/ face protection.

- Use only in well ventilated areas.
- Keep container in a well ventilated place.
- To clean the floor and all objects contaminated by this material use water and detergent.
- Keep container tightly closed.
- This material and its container must be disposed of in a safe way.
- In case of contact with eyes rinse with plenty of water and contact Doctor or Poisons Information Centre.
- If swallowed IMMEDIATELY contact Doctor or Poisons Information Centre (show this container or

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Section 2 - HAZARDS IDENTIFICATION

label).

- Use appropriate container to avoid environment contamination.
- Avoid release to the environment. Refer to special instructions/ safety data sheets.
- This material and its container must be disposed of as hazardous waste.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
naphtha petroleum, light, hydrotreated	64742-49-0.	>80
carbon dioxide	124-38-9	1-10

Section 4 - FIRST AID MEASURES

SWALLOWED

- Not considered a normal route of entry.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

- If aerosols come in contact with the eyes:
- Immediately hold the eyelids apart and flush the eye continuously for at least 15 minutes 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.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- If solids or aerosol mists are deposited upon the skin:
- Flush skin and hair with running water (and soap if available).
- Remove any adhering solids with industrial skin cleansing cream.
- DO NOT use solvents.
- Seek medical attention in the event of irritation.

INHALED

- If aerosols, fumes or combustion products are inhaled:
- Remove to fresh air.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- If breathing is shallow or has stopped, ensure clear airway and apply resuscitation, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

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Section 4 - FIRST AID MEASURES

NOTES TO PHYSICIAN

- For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:
 - Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
 - Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ 50 mm Hg) should be intubated.
 - Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
 - A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
 - Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
 - Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology].
- Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- SMALL FIRE:
 - Water spray, dry chemical or CO₂
- LARGE FIRE:
 - Water spray or fog.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

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

FIRE/EXPLOSION HAZARD

- Liquid and vapour are flammable.
- Moderate fire hazard when exposed to heat or flame.
- Vapour forms an explosive mixture with air.
- Moderate explosion hazard when exposed to heat or flame.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- Aerosol cans may explode on exposure to naked flame.
- Rupturing containers may rocket and scatter burning materials.
- Hazards may not be restricted to pressure effects.
- May emit acrid, poisonous or corrosive fumes.
- On combustion, may emit toxic fumes of carbon monoxide (CO).

Combustion products include: carbon dioxide (CO₂), other pyrolysis products typical of burning organic material.

Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

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Section 5 - FIRE FIGHTING MEASURES

FIRE INCOMPATIBILITY

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

HAZCHEM: 2YE

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

! None required when handling small quantities.

Respirator:

Type A Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Wear protective clothing, impervious gloves and safety glasses.
- Shut off all possible sources of ignition and increase ventilation.
- Wipe up.
- If safe, damaged cans should be placed in a container outdoors, away from all ignition sources, until pressure has dissipated.
- Undamaged cans should be gathered and stowed safely.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse / absorb vapour.
- Absorb or cover spill with sand, earth, inert materials or vermiculite.
- If safe, damaged cans should be placed in a container outdoors, away from ignition sources, until pressure has dissipated.
- Undamaged cans should be gathered and stowed safely.
- Collect residues and seal in labelled drums for disposal.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.

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Section 7 - HANDLING AND STORAGE

- When handling, DO NOT eat, drink or smoke.
- DO NOT incinerate or puncture aerosol cans.
- DO NOT spray directly on humans, exposed food or food utensils.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER

- Aerosol dispenser.
- Check that containers are clearly labelled.

STORAGE INCOMPATIBILITY

- Avoid reaction with oxidising agents.

STORAGE REQUIREMENTS

- Keep dry to avoid corrosion of cans. Corrosion may result in container perforation and internal pressure may eject contents of can.
- Store in original containers in approved flammable liquid storage area.
- DO NOT store in pits, depressions, basements or areas where vapours may be trapped.
- No smoking, naked lights, heat or ignition sources.
- Keep containers securely sealed. Contents under pressure.
- Store away from incompatible materials.
- Store in a cool, dry, well ventilated area.
- Avoid storage at temperatures higher than 40 deg C.
- Store in an upright position.
- Protect containers against physical damage.
- Check regularly for spills and leaks.
- 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	Notes
Australia Exposure Standards	naphtha petroleum, light, hydrotreated (Petrol (gasoline))		900			(see Chapter 16)
Australia Exposure Standards	carbon dioxide (Carbon dioxide in coal mines)	12500	22500	30000	54000	
Australia Exposure Standards	carbon dioxide (Carbon dioxide)	5000	9000	30000	54000	

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
carbon dioxide		40,000

MATERIAL DATA

ATORN BRAKE CLEANER 500ML:

Not available

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

- Odour Threshold Value: 34 ppm (detection), 97 ppm (recognition)

NOTE: Detector tubes for benzene, measuring in excess of 0.5 ppm, are commercially available. The relative quality of epidemiological data and quantitative health risk assessments related to documented and theoretical leukaemic deaths constitute the basis of the TLV-recommendation.

One study [Dow Chemical] demonstrates a significant fourfold increase in myelogenous leukaemia for workers exposed to average benzene concentrations of about 5 ppm for an average of 9 years and that 2 out of four individuals in the study who died from leukaemia were characterised as having been exposed to average benzene levels below 2 ppm. Based on such findings the estimated risk of leukaemia in workers exposed at daily benzene concentrations of 10 ppm for 40 years is 155 times that of unexposed workers; at 1 ppm the risk falls to 1.7 times whilst at 0.1 ppm the risk is about the same in the two groups. A revision of the TLV-TWA to 0.1 ppm was proposed in 1990 but this has been revised upwards as result of industry initiatives.

Typical toxicities displayed following inhalation:

- At 25 ppm (8 hours): no effect
- 50-150 ppm: signs of intoxication within 5 hours
- 500-1500 ppm: signs of intoxication within 1 hour
- 7500 ppm: severe intoxication within 30-60 minutes
- 20000 ppm: fatal within 5-10 minutes

Some jurisdictions require that health surveillance be conducted on occupationally exposed workers. Some surveillance should emphasise (i) demography, occupational and medical history and health advice (ii) baseline blood sample for haematological profile (iii) records of personal exposure.

for heptane (all isomers)

The TLV-TWA is protective against narcotic and irritant effects which are greater than those of pentane or n-hexane but less than those of octane. The TLV-TWA applies to all isomers.

Inhalation by humans of 1000 ppm for 6 minutes produced slight dizziness. Higher concentrations for shorter periods produce marked vertigo, incoordination and hilarity. Signs of central nervous system depression occur in the absence of mucous membrane irritation. Brief exposures to high levels (5000 ppm for 4 minutes) produce nausea, loss of appetite and a "gasoline-like" taste in the mouth that persists for many hours after exposure ceases.

Odour threshold: 0.25 ppm.

The TLV-TWA is protective against ocular and upper respiratory tract irritation and is recommended for bulk handling of gasoline based on calculations of hydrocarbon content of gasoline vapour. A STEL is recommended to prevent mucous membrane and ocular irritation and prevention of acute depression of the central nervous system. Because of the wide variation in molecular weights of its components, the conversion of ppm to mg/m³ is approximate. Sweden recommends hexane type limits of 100 ppm and heptane and octane type limits of 300 ppm. Germany does not assign a value because of the widely differing compositions and resultant differences in toxic properties.

Odour Safety Factor (OSF)

OSF=0.042 (gasoline).

for petroleum distillates:

CEL TWA: 500 ppm, 2000 mg/m³ (compare OSHA TWA).

CARBON DIOXIDE:

■ May act as a simple asphyxiants; these are gases which, when present in high concentrations, reduce the oxygen content in air below that required to support breathing, consciousness and life; loss of consciousness, with death by suffocation may rapidly occur in an oxygen deficient atmosphere.

CARE: Most simple asphyxiants are odourless or possess low odour and there is no warning on entry into an oxygen deficient atmosphere. If there is any doubt, oxygen content can be checked simply and quickly. It may not be appropriate to only recommend an exposure standard for simple asphyxiants rather it is essential that sufficient oxygen be maintained. Air normally has 21 percent oxygen by volume, with 18 percent regarded as minimum under normal atmospheric pressure to maintain consciousness / life. At pressures significantly higher or lower than normal atmospheric pressure, expert guidance should be sought.

For carbon dioxide:

NOTE: Detector tubes for carbon dioxide, measuring in excess of 0.01 % vol., are commercially available.

Long-term measurements (4 hrs) may be conducted to detect concentrations exceeding 250 ppm.

Studies using physically fit males in confined spaces indicate the TLV-TWA and STEL provides a wide margin of safety against asphyxiation and from undue metabolic stress, provided normal amounts of oxygen are present in inhaled air. Lowered oxygen content, increased physical activity and prolonged exposures each impact on systemic and respiratory effects.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Stimulation of the respiratory centre is produced at 50,000 ppm (5%). The gas is weakly narcotic at 30,000 ppm giving rise to reduced acuity of hearing and increasing blood pressure and pulse, Persons exposed a 20,000 ppm for several hours developed headaches and dyspnea on mild exertion, Acidosis and adrenal cortical exhaustion occurred as a result of prolonged continuous exposure at 10,000-20,000 ppm.

Intoxication occurs after a 30 minute exposure at 50,000 ppm whilst exposure at 70,000-100,000 ppm produces unconsciousness within a few minutes.

Odour Safety Factor (OSF)

OSF=0.068 (CARBON DIOXIDE).

PERSONAL PROTECTION

EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

- No special equipment needed when handling small quantities.
- OTHERWISE:
 - For potentially moderate exposures:
 - Wear general protective gloves, eg. light weight rubber gloves.
 - For potentially heavy exposures:
 - Wear chemical protective gloves, eg. PVC. and safety footwear.

OTHER

- No special equipment needed when handling small quantities.
 - OTHERWISE:
 - Overalls.
 - Skin cleansing cream.
 - Eyewash unit.
 - Do not spray on hot surfaces.
 - The clothing worn by process operators insulated from earth may develop static charges far higher (up to 100 times) than the minimum ignition energies for various flammable gas-air mixtures. This holds true for a wide range of clothing materials including cotton.
 - Avoid dangerous levels of charge by ensuring a low resistivity of the surface material worn outermost.
- BREThERICK: Handbook of Reactive Chemical Hazards.

RESPIRATOR

- Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	A- AUS	-
1000	50	-	A- AUS
5000	50	Airline *	-
5000	100	-	A- 2
10000	100	-	A- 3
	100+		Airline**

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

■ CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear. General exhaust is adequate under normal conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection.

Provide adequate ventilation in warehouse or closed storage areas.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

■ Supplied as an aerosol pack. Contents under PRESSURE. Contains highly flammable hydrocarbon propellant. Colourless liquid spray with a solvent odour; does not mix with water. Supplied in aerosol pack containing carbon dioxide propellant.

PHYSICAL PROPERTIES

Does not mix with water.

Molecular Weight: Not Applicable

Boiling Range (°C): Not Available

Melting Range (°C): Not Available

Specific Gravity (water=1): Not Available

Solubility in water (g/L):

pH (as supplied): Not Applicable

pH (1% solution): Not Applicable

Immiscible

Volatile Component (%vol): Not Available

Evaporation Rate: Not Available

Vapour Pressure (kPa): 6.0 bar @ 20C

Flash Point (°C): - 12 (CC) (naphtha petroleum)

Lower Explosive Limit (%): 0.8 (naphtha petroleum)

Relative Vapour Density (air=1): Not Available

Autoignition Temp (°C): 220

Decomposition Temp (°C): Not Available

Upper Explosive Limit (%): 8.0 (naphtha petroleum)

Viscosity: Not Available

State: Liquid

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Elevated temperatures.
- Presence of open flame.
- Product is considered stable.
- Hazardous polymerisation will not occur.

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

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

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Section 11 - TOXICOLOGICAL INFORMATION

ACUTE HEALTH EFFECTS

SWALLOWED

- Not normally a hazard due to physical form of product.

Considered an unlikely route of entry in commercial/industrial environments.

Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

EYE

- This material can cause eye irritation and damage in some persons.

Direct eye contact with petroleum hydrocarbons can be painful, and the corneal epithelium may be temporarily damaged. Aromatic species can cause irritation and excessive tear secretion.

SKIN

- Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.

Spray mist may produce discomfort.

Open cuts, abraded or irritated skin should not be exposed to this material.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

INHALED

- Inhalation hazard is increased at higher temperatures.

Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.

WARNING: Intentional misuse by concentrating/inhaling contents may be lethal.

CHRONIC HEALTH EFFECTS

- Repeated application of mildly hydrotreated oils (principally paraffinic), to mouse skin, induced skin tumours; no tumours were induced with severely hydrotreated oils.

Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. [PATTYS].

WARNING: Aerosol containers may present pressure related hazards.

TOXICITY AND IRRITATION

- Not available. Refer to individual constituents.

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

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

■ Lifetime exposure of rodents to gasoline produces carcinogenicity although the relevance to humans has been questioned. Gasoline induces kidney cancer in male rats as a consequence of accumulation of the alpha2-microglobulin protein in hyaline droplets in the male (but not female) rat kidney. Such abnormal accumulation represents lysosomal overload and leads to chronic renal tubular cell degeneration, accumulation of cell debris, mineralisation of renal medullary tubules and necrosis. A sustained regenerative proliferation occurs in epithelial cells with subsequent neoplastic transformation with continued exposure. The alpha2-microglobulin is produced under the influence of hormonal controls in male rats but not in females and, more importantly, not in humans.

The High Benzene Naphthas (HBNs) Category was developed for the HPV Program by grouping ethylene manufacturing streams (products) that exhibit commonalities from both manufacturing process and compositional perspectives. intermediates. The category includes hydrocarbon product streams associated with the ethylene industry that contain significant levels of benzene, generally with a benzene content greater than 10% and averaging about 55%. This grouping of CAS numbers represents hydrocarbon streams with a carbon number distribution that is predominantly C5- C11, through components boiling at 350 C or higher..

Benzene, as the predominant component in most streams, is expected to be the key driver with respect to health effects endpoints within the SIDS battery of tests. However, as the concentration of benzene is decreased and the concentrations of other components are increased, the observed effects of benzene are expected to diminish and the effects of other components are expected to increase.

The existing epidemiology and toxicology database for the components other than benzene and for mixtures containing the components is extensive. All components present in the streams at concentrations greater than

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Section 11 - TOXICOLOGICAL INFORMATION

5% have been tested in at least one toxicity study. Those components having only limited data lack structural alerts for mammalian toxicity and data exist for their structural analogs. The C5 and C6 alkanes and alkenes present in the streams are not expected to significantly contribute to the toxicity profile as these substances are present in the streams at low concentrations

and, with the exception of hexane, generally have a low level of toxicity. The toxic effects of hexane (present at < 15%) are unlikely to be observed due to the presence of the other components.

Genotoxicity: When tested as pure substances, some of the components other than benzene have caused genetic damage and adverse target organ effects in repeated-dose animal studies. When tested as pure substances, some of the components other than benzene have caused genetic damage and adverse target organ effects in repeated-dose animal studies. However, since the biologically active components of the High Benzene Naphthas streams are metabolized through a common P450 metabolic pathway, it is anticipated that multiple components will compete for the same active enzyme sites. Component toxicities, which are dependent on the formation of biologically active metabolites, may be reduced as less metabolite(s) will be produced through competition for these sites. Direct support for reduction or elimination of toxicities of individual components is provided by results of an existing mouse bone marrow micronucleus test with one of the High Benzene Naphthas streams, Hydrotreated C6-8 Fraction. This stream, containing approximately 55% benzene, was negative in a mouse bone marrow micronucleus test when administered by oral gavage at 5000 mg/kg to male and female CD-1 mice. Several studies have shown that benzene administered orally to CD-1 mice induces high frequencies of micronuclei in bone marrow erythrocytes at doses as low as 110 mg/kg. The presence in the Hydrotreated C6-8 Fraction of other components (approximately 25% toluene, 10% xylene, 7% pentane, 7% ethylbenzene, 3% cyclohexane, and 2% hexane) apparently inhibited the expected clastogenicity of benzene. Other similar interactions between components of the category have also been reported.

Repeat dose toxicity: Repeated oral or inhalation exposures to many of the components of the streams in the category have been shown to cause adverse health effects in a variety of organs. However, existing data also show that antagonistic and synergistic interactions occur between some components comprising the streams.

Developmental toxicity: Developmental toxicity data exist for most components present in this category at concentrations greater than 5%. In these studies, no convincing evidence was seen for teratogenicity in the absence of maternal toxicity. Foetotoxicity has been reported for some components, but mostly in the presence of maternal toxicity. A Pyrolysis

Gasoline Fraction stream similar to the Pyrolysis Gasoline streams in the HBNs Category has been tested in an oral developmental toxicity study in rabbits. No developmental effects were seen.

Reproductive toxicity: Some data for benzene indicates adverse gonadal effects (e.g., atrophy/degeneration, decrease in spermatozoa, moderate increases in abnormal sperm forms), data on reproductive outcomes are either inconclusive or conflicting. However, most studies indicate no effects on reproductive indices, even at high doses. Reproductive organ effects were seen after inhalation exposure to isoprene and hexane.

Gene Mutation: Of the identified category components present at concentrations greater than 5%, only 1,3-butadiene

and benzene have consistently caused gene mutations in genetic toxicity tests. 1,3-Butadiene was positive in several in vivo and in vitro tests. Benzene was negative in several standard tests but was positive in an in vivo HPRT gene mutation test in mouse spleenocytes. Based on the data for components, the streams in the category are predicted to be negative in the HPV gene mutation test (Ames Test). Negative Ames Tests conducted with two streams (one from this category and one similar to category streams) support this prediction

Chromosome Aberration: Benzene has caused chromosome aberrations in in vitro and in vivo tests. The other most prevalent component in streams in this category, toluene, is negative in both in vitro and in vivo tests. Of the remaining identified category components present at concentrations greater than 5%, only vinyl acetate, 1,3-butadiene, isoprene, hexane, and naphthalene have been reported to cause chromosome aberrations. No significant acute toxicological data identified in literature search.

CARBON DIOXIDE:

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

TOXICITY

Inhalation (rat) LCLo: 657190 ppm/15 m

Inhalation (human) TCLo: 2000 ppm

Inhalation (human) LCLo: 9 pph/5 m (9%)
- pulmonary effects

IDLH: 50,000 ppm

IRRITATION

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Section 11 - TOXICOLOGICAL INFORMATION

CARCINOGEN

Gasoline (NB: Overall evaluation upgraded from 3 to 2B with supporting evidence from other relevant data)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2B
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Petroleum solvents	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
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REPROTOXIN

carbon dioxide	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility or sterility
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Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

ATORN BRAKE CLEANER 500ML:
NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

- Toxic to aquatic organisms.

ATORN BRAKE CLEANER 500ML:
NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

- DO NOT discharge into sewer or waterways.

ATORN BRAKE CLEANER 500ML:
Marine Pollutant: Not Determined

Water hazard class 1: slightly hazardous to water.

NAPHTHA PETROLEUM, LIGHT, HYDROTREATED:

- Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters. Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
- May cause long-term adverse effects in the aquatic environment.
- For High Benzene Naphthas (HBNs) category:

Environmental fate:

The chemical components in HBNs are relatively volatile, and if released they would be expected to partition to the air phase to a significant extent. In the air, they are subject to rapid physical degradation through hydroxyl radical attack. Therefore, as a result of both biological and physical degradation processes, these products are not expected to persist in the environment

Read across biodegradation data show that products in the HBNs have the potential to exhibit a high extent of biodegradability. The carbon number of products in this category ranges primarily between C5 to C11. Results for several chemicals, including benzene, with carbon numbers in this range that are contained by these products have been shown to biodegrade from 63 to 100% after 14 or 28 days, while results for several comparable, complex products containing several components range from 21 to 96% after 28 days. Hydrocarbons are not expected to hydrolyse at a measurable rate.

Ecotoxicity:

Read across aquatic toxicity data show that HBNs have the potential to produce a moderate level of toxicity in freshwater algae and acute toxicity in freshwater fish and invertebrates. The aquatic toxicity data within a narrow range of values regardless of their varying chemical class content and carbon number range.

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This is not unexpected, because the constituent chemicals of products in this category are neutral organic hydrocarbons whose toxic mode of action is non-polar narcosis. The mechanism of short-term toxicity for these chemicals is disruption of biological membrane function. The existing fish toxicity database for narcotic chemicals supports a critical body residue (CBR, the internal concentration that causes mortality) of between approximately 2-8 mmol/kg fish (wet weight), supporting the assessment that these chemicals have equal potencies. When normalized to lipid content, the CBR is approximately 50 μmol of hydrocarbon/g of lipid for most organisms. Because the products in this category are all complex mixtures containing relatively similar series of homologous chemicals, their short-term toxicities are expected to fall within the range of toxicity demonstrated by the individual chemicals.

The fish and invertebrate acute and alga toxicity values for individual chemicals and complex products similar to those in this category fall within a range of approximately 1-64 mg/L and overlap between the three trophic levels. Because HBNs will range in paraffin, alkene, and/or aromatic carbon number content within approximately C5 to C11, a range in toxicity for products in this category is expected. Experimental data, this category will exhibit a moderate range of acute toxicity to fish and invertebrates and a moderate range of toxicity to algae. For representative chemicals and products, experimental acute fish toxicity values range between 2.5 to 46 mg/L for two species while acute invertebrate toxicity values range between 0.9 to 32 mg/L for one species. In comparison, alga toxicity values for one species range between 1.0 to 64 mg/L (for biomass and growth rate endpoints), while alga NOELR values range between 1.0 to 51 mg/L (for biomass or growth rate endpoints).

■ For benzene:

log Kow: 1.95-2.15

log Koc: 1.7-2

Koc: 85

log Kom: 1.04-2.56

Half-life (hr) air: 2.4-501

Half-life (hr) H₂O surface water: 4.81-384

Half-life (hr) H₂O ground: 240-17280

Half-life (hr) soil: 48-922

Henry's Pa m³ /mol: 441-595

Henry's atm m³ /mol: 5.43E-03

BOD 5 if unstated: 2.18

COD: 0.25-2.8

ThOD: 3.1

BCF: 3.5-3.9

Log BCF: 0.54-1.48

Drinking Water Standards: hydrocarbon total: 10 $\mu\text{g/l}$ (UK max.); benzene: 10 $\mu\text{g/l}$ (WHO guideline)

Soil Guidelines: Dutch Criteria: 0.05 mg/kg (detection limit) target; 1 mg/kg (intervention)

Air Quality Standards: 1 ppb averaging time 1 year (UK)

No safe level recommended due to carcinogenic properties (WHO Guideline)

If benzene is released to the atmosphere it remains predominantly in the vapour phase.

Vapour phase benzene is not subject to direct photolysis but reacts with photochemically produced hydroxyl radicals (half-life approximately 13.4 days). Reaction time in polluted atmospheres which contain nitrogen oxide (NO) or sulfur dioxide (SO₂) is accelerated (half-life 4-6 hours); products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid and peroxyacetyl nitrates.

In water, benzene is rapidly volatilised (half-life 2.7 hours).

In soil benzene undergoes rapid volatilisation; it is not absorbed, to any appreciable degree, by sediments.

Benzene does not bioaccumulate in the food chain.

Environmental Fate

Terrestrial fate: A Koc value of 85, indicates that benzene is expected to have high mobility in soil.

Volatilisation of benzene from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of 5.43×10^{-3} atm-cu m/mole. The potential for volatilisation of benzene from dry soil surfaces may exist based upon a vapor pressure of 94.8 mm Hg. Benzene is expected to biodegrade in soils based on a biodegradation study in a base-rich para-brownish soil where 20 ppm benzene was 24% degraded in 1 week, 44% in 5 weeks, and 47% in 10 weeks. Anaerobic degradation of benzene in soil is not expected to be an important loss process based on various studies. In one study of chemical biotransformation under nitrate- and sulfate-reducing conditions, benzene was found to be stable for 60 days. In a related study, benzene did not undergo biodegradation in situ nor in laboratory controlled soil samples under denitrifying conditions.

Aquatic fate: The Koc value of 85, indicates that benzene is not expected to adsorb to sediment and suspended solids in water. Volatilisation from water surfaces is expected based upon the Henry's Law constant. Using

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this Henry's Law constant, volatilisation half-lives for a model river and model lake are estimated to be 1 hr and 3.5 days, respectively. Anaerobic degradation of benzene in water is not expected to be an important loss process based on various studies. In one study of chemical biotransformation under nitrate- and sulfate-reducing conditions, benzene was found to be stable for 60 days. In aqueous solution, benzene will react with hydroxyl radical at a reaction rate of 7.8×10^9 L/mol sec; using the average OH radical concentration (1.0×10^{-17} molec/cu cm), benzene would have a half-life of 103 days. A BCF ranging from 1.1-20 suggests the potential for bioconcentration in aquatic organisms is low.

Aquatic fate: Evaporation was the primary loss mechanism in winter in a mesocosm experiment which simulated a northern bay where the half-life was 13 days. In spring and summer the half-lives were 23 and 3.1 days, respectively. In these cases biodegradation plays a major role and takes about 2 days. However, acclimation is critical and this takes much longer in the colder water in spring. According to one experiment, benzene has a half-life of 17 days due to photodegradation which could contribute to benzene's removal. In situations of cold water, poor nutrients, or other conditions less conducive to microbial growth, photolysis will play an important role in degradation. The half-life of benzene in sea water is about 5 hrs based on its high Henry's Law constant of 5.56×10^{-3} atm-cu m/mole.

Atmospheric fate: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere benzene, which has a vapour pressure of 94.8 mm Hg at 25 deg C, is expected to exist solely as a vapor in the ambient atmosphere. Vapour-phase benzene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 13 days, calculated from its rate constant of 1.23×10^{-12} cu cm/molecule-sec at 25 deg C. The half-life in polluted atmospheres which contain nitrogen oxides or sulfur dioxide has been observed to shorten to 4-6 hrs. Vapour-phase benzene is also degraded in the atmosphere by atmospheric ozone radicals at an extremely slow rate; the half-life for this reaction in air is estimated to be 170,000 days. The reaction rate of benzene with nitrate radical in the atmosphere is estimated to be less than 0.3×10^{-16} cu cm/molecule sec at 25 deg C; the half-life for this reaction in air is estimated to be greater than or equal to 111 days based on an average concentration of nitrate radicals of 2.4×10^8 molec/cu cm. Benzene has a maximum absorbance frequency of 253 nm suggesting that direct photolysis will not be an important degradation process. Due to benzene's high water solubility, it may be removed from the atmosphere by rainfall

Ecotoxicity:

Fish LC50 (96 h): bass (*Morone saxatilis*) 5.8-11 mg/l

Fish LC50 (24-96 h) fathead minnow (*Pimephales promelus*) 33-35 mg/l (softwater); 24-32 mg/l (hardwater); bluegill sunfish (*Lepomis macrochirus*) 22 mg/l; goldfish (*Carassius auratus*) 36 mg/l (softwater); mosquito fish (*Gambusia affinis*) 395 mg/l

Fish LC50 (24-48 h): bluegill sunfish (*Lepomis macrochirus*) 20 mg/l

Fish LC50 (24 h): goldfish (*Carassius auratus*) 46 mg/l; blue gill sunfish (*Lepomis macrochirus*) 34 mg/l

Fish LC100 (2 h): blue gill sunfish (*Lepomis macrochirus*) 60 mg/l

Fish LC50 (14 d): guppy (*Poecilia reticulata*) 63 mg/l

Fish LC50 (1 h): brown trout yearlings (*Salmo trutta*) 12 mg/l (static assay)

Ciliate LC100 (24 h): *Tetrahymena pyriformis* 12.8 mmole/l

Grass shrimp (*Palaemonetes pugio*) LC50 (96 h): 27 ppm

Shrimp (*Crangon franciscorum*) LC50 (96 h): 20 mg/l

Crab larvae (*Cancer magister*) LC50 (96 h): 108 ppm

Mexican axolotl (*Ambystoma mexicanum*) LC50 (48 h): 370 mg/l (3-4 weeks after hatching)

Clawed toad LC50 (48 h): 190 mg/l (3-4 weeks after hatching).

■ For n-heptane:

log Kow : 4.66

Koc : 2400-8100

Half-life (hr) air: 52.8

Half-life (hr) H2O surface water: 2.9-312

Henry's atm m³/mol: 2.06

BOD 5 if unstated: 1.92

COD : 0.06

BCF : 340-2000

log BCF : 2.53-3.31

Environmental fate:

Photolysis or hydrolysis of n-heptane are not expected to be important environmental fate processes.

Biodegradation of n-heptane may occur in soil and water, however volatilisation and adsorption are expected to be more important fate processes. A high Koc (2400-8200) indicates n-heptane will be slightly mobile to immobile in soil. In aquatic systems n-heptane may partition from the water column to organic matter in

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sediments and suspended solids. The bioconcentration of n-heptane may be important in aquatic environments. The Henry's Law constant suggests rapid volatilisation from environmental waters and surface soils. The volatilisation half-lives from a model river and a model pond (the latter considers the effect of adsorption) have been estimated to be 2.9 hr and 13 days, respectively.

n-Heptane is expected to exist entirely in the vapour phase in ambient air. Reactions with photochemically produced hydroxyl radicals in the atmosphere have been shown to be important (estimated half-life of 2.4 days calculated from its rate constant of 7.15×10^{-12} cu cm/molecule-sec at 25 deg C). Data also suggests that night-time reactions with nitrate radicals may contribute to the atmospheric transformation of n-heptane, especially in urban environments. n-Heptane does not contain chromophores that absorb at wavelengths >290 nm and therefore is not expected to be susceptible to direct photolysis by sunlight

An estimated BCF of 2,000 using log Kow suggests the potential for bioconcentration in aquatic organisms is very high. Based on 100% degradation after 4 days in water inoculated with gasoline contaminated soil and 100% degradation after 25 days in water inoculated with activated sewage sludge, biodegradation is expected to be an important fate process for n-heptane in water.

Ecotoxicity:

Fish LC50 (48 h): goldfish (*Carrasius auratus*) 4 mg/l; golden orfe (*Idus melanotus*) 2940 mg/l; western mosquitofish (*Gambusia affinis*) 4924 mg/l

Daphnia LC50 (24 h): >10 mg/l

Daphnia EC50 (96 h): 82 mg/l (immobilisation)

Opposum shrimp (*Mysidopsis bahia*) LC50 (96 h): 0.1 mg/l

Snail EC50 (96 h): 472 mg/l.

CARBON DIOXIDE:

■ log Kow (Sangster 1997): 0.83

■ For carbon dioxide:

Environmental fate:

Carbon dioxide in earth's atmosphere is considered a trace gas currently occurring at an average concentration of about 385 parts per million by volume or 582 parts per million by mass. The mass of the Earth atmosphere is 5.14×10^{18} kg, so the total mass of atmospheric carbon dioxide is 3.0×10^{15} kg (3,000 gigatonnes). Atmospheric concentrations of carbon dioxide fluctuate slightly with the change of the seasons, driven primarily by seasonal plant growth.

Due to human activities such as the combustion of fossil fuels and deforestation, the concentration of atmospheric carbon dioxide has increased by about 35% since preindustrial times. In 1999, 2,244,804,000 ($\approx 2.2 \times 10^9$) metric tons of CO₂ were produced in the U.S. as a result of electric energy generation. This is an output rate of 0.6083 kg (1.341 pounds) per kWh.

There is about 50 times as much carbon dissolved in the oceans in the form of CO₂ and CO₂ hydration products as exists in the atmosphere. The oceans act as an enormous carbon sink, having "absorbed about one-third of all human-generated CO₂ emissions to date." Generally, gas solubility decreases as water temperature increases. Accordingly the ability of the oceans to absorb carbon dioxide from the atmosphere decreases as ocean temperatures rise.

Carbon dioxide is soluble in water, in which it spontaneously interconverts between CO₂ and H₂CO₃ (carbonic acid). The relative concentrations of CO₂, H₂CO₃, and the deprotonated forms HCO₃⁻ (bicarbonate) and CO₃²⁻ (carbonate) depend on the pH. In neutral or slightly alkaline water (pH > 6.5), the bicarbonate form predominates ($>50\%$) becoming the most prevalent ($>95\%$) at the pH of seawater, while in very alkaline water (pH > 10.4) the predominant ($>50\%$) form is carbonate. The bicarbonate and carbonate forms are very soluble, such that air-equilibrated ocean water (mildly alkaline with typical pH = 8.2 - 8.5) contains about 120 mg of bicarbonate per liter.

Most of the CO₂ taken up by the ocean forms carbonic acid. Some is consumed in photosynthesis by organisms in the water, and a small proportion of that sinks and leaves the carbon cycle. There is considerable concern that as a result of increased CO₂ in the atmosphere the acidity of seawater has been increasing and may adversely affect organisms living in the water. In particular, with increasing acidity, the availability of carbonates for forming shells decreases.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
Atorn Brake Cleaner 500ml		No data		

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naphtha petroleum, light, hydrotreated carbon dioxide	LOW	No data	LOW	HIGH
		No data		

Section 13 - DISPOSAL CONSIDERATIONS

- Consult State Land Waste Management Authority for disposal.
- Discharge contents of damaged aerosol cans at an approved site.
- Allow small quantities to evaporate.
- DO NOT incinerate or puncture aerosol cans.
- Bury residues and emptied aerosol cans at an approved site.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: FLAMMABLE GAS

HAZCHEM: 2YE (ADG7)

ADG7:

Class or division:	2	Subsidiary risk:	None
UN No.:	1950	UN packing group:	None
Special provisions:	63, 190, 277, 327	Packing Instructions:	None
Notes:	None	Limited quantities:	See SP 277
Portable tanks and bulk containers - Instructions:	None	Portable tanks and bulk containers - Special provisions:	None
Packagings and IBCs - Packing instruction:	P003, LP02	Packagings and IBCs - Special packing provisions:	PP17, PP87, L2

Shipping Name:AEROSOLS

Land Transport UDG:

Class or division:	2	Subsidiary risk:	None
UN No.:	1950	UN packing group:	None

Shipping Name:AEROSOLS

Air Transport IATA:

ICAO/IATA Class:	2.1	ICAO/IATA Subrisk:	None
UN/ID Number:	1950	Packing Group:	-
Special provisions:	A145		

Shipping Name: AEROSOLS, FLAMMABLE

Maritime Transport IMDG:

IMDG Class:	2.1	IMDG Subrisk:	SP63
UN Number:	1950	Packing Group:	None
EMS Number:	F- D, S- U	Special provisions:	63 190 277 327 959
Limited Quantities:	See SP277	Marine Pollutant:	Not Determined

Shipping Name: AEROSOLS

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Section 14 - TRANSPORTATION INFORMATION

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE: None

REGULATIONS

Regulations for ingredients

naphtha petroleum, light, hydrotreated (CAS: 64742-49-0) is found on the following regulatory lists;

"Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals"

carbon dioxide (CAS: 124-38-9) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP", "OECD Representative List of High Production Volume (HPV) Chemicals"

No data for Atorn Brake Cleaner 500ml (CW: 4744-44)

Section 16 - OTHER INFORMATION

REPRODUCTIVE HEALTH GUIDELINES

■ Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
carbon dioxide	1800 mg/m ³	10	D/R	NA	-

■ These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.

CR = Cancer Risk/10000; UF = Uncertainty factor:

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

D = Developmental; R = Reproductive; TC = Transplacental carcinogen

Jankovic J., Drake F.: A Screening Method for Occupational Reproductive

American Industrial Hygiene Association Journal 57: 641-649 (1996).

■ 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.

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Print Date: 17-Nov-2009

This is the end of the MSDS.