

SAFETY DATA SHEET - Red Back Boot Grip

AQUARIUS RUBBER (AUST) PTY LTD

Red Back Boot Grip

Date of issue: 1 November 2016



1. IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identification: Redback Boot Grip 150g
Code: RED407
Proper Shipping Name: Aerosols

Product Use: Used according to manufacturer's directions. Spray adhesive to be applied to the soles of work boots.

Supplier:

Aquarius Rubber (Aust) PTY LTD

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2. HAZARDS IDENTIFICATION

Statement of Hazardous Nature: HAZARDOUS CHEMICAL. DANGEROUS GOODS.
According to the Model WHS Regulations and the ADG Code

Risk:

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Flammability - 3
Toxicity - 3
Body contact - 2
Reactivity - 2
Chronic - 2

Poisons Schedule:

Not Applicable

GHS Classification:

Flammable Aerosol Category 1, Acute Toxicity (Oral) Category 4

Skin Corrosion/Irritation Category 2, Carcinogen Category 2

Reproductive Toxicity Category 2, STOT - SE (Narcosis) Category 3

STOT - RE Category 2, Acute Aquatic Hazard Category 2

Chronic Aquatic Hazard Category 2

GHS Label Elements:



DANGER



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Signal Word:

H222	Extremely flammable aerosol. Harmful if swallowed
H302	Harmful if swallowed
H315	Causes skin irritation
H351	Suspected of causing cancer
H361	Suspected of damaging fertility or the unborn child
H336	May cause drowsiness or dizziness
H373	May cause damage to organs through prolonged or repeated exposure
H401	Toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects
AUH044	Risk of explosion if heated under confinement

Precautionary statement(s) Prevention:

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.

Precautionary statement(s) Response:

P308+P313	IF exposed or concerned: Get medical advice/attention.
P314	Get medical advice/attention if you feel unwell.
P391	Collect spillage.
P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
P304+P340	If inhaled remove person to fresh air and keep comfortable for breathing.
P302+P352	If ON THE SKIN Wash with plenty of water and soap
P330	Rinse mouth.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash before reuse.

Precautionary statement(s) Storage:

P405	Store locked up.
P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal:

P501 Dispose of contents/container to authorised chemical landfill.

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3. COMPOSITION / INFORMATION ON INGREDIENTS

Mixtures

CAS No	%[weight]	Name
75-09-2	30-60	methylene chloride
Not Available	30-60	hydrocarbon solvents
68476-85-7.	10-30	hydrocarbon propellant

4. FIRST AID MEASURES

If Swallowed :	Avoid giving milk or oils or alcohol. If vomiting occurs make sure that no vomit is aspirated.
If contact is made with the eye:	Immediately hold the eyelids apart and flush the eye continuously for at least 15 minutes with fresh running water. Transport to a hospital or Doctor as soon as possible.
If the product comes in contact with the skin:	Flush skin and hair with running water (and soap if available). Remove any solids using an industrial hand cleaner, do NOT use solvents. Seek medical advice if skin irritation persists.
Inhalation:	If aerosols, fumes or combustion products are inhaled; remove the patient to open air, lie him/her down, keep warm and comfortable. If breathing is shallow or stopped, make sure the airway is clear and apply resuscitation mask if available. Commence CPR if needed.

Indication of any immediate medical attention and special treatment needed

For acute or short term repeated exposure 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 checked for respiratory distress (e.g. Cyanosis, tachypnoea, intercostal reaction, 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.

For intoxication due to Freon's/Halons:

A. Emergency and Supportive Measures

Maintain an open airway and assist ventilation if necessary. Treat comas and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increasing myocardial sensitisation may be treated with propranolol, 2 mg IV or esmolol 25-100 micromg/kgmin IV. Monitor ECG for 4-6 hours.

B. Specific drugs and antidotes

There is no specific antidote. Treat symptomatically.

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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 the location and nature of hazard. May be violent or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or water course.

Fire/Explosion Hazard:

Combustion products may produce carbon dioxide (CO₂). Liquid and vapour are highly flammable. Severe fire hazard when exposed to heat or flame. Vapour forms an explosive mixture with air. Severe explosion hazard, in the form of vapour, when exposed to flame or spark, carbon monoxide (CO), hydrogen chloride, phosgene, other pyrolysis products typical of burning organic material. Contains low boiling substance: Closed containers may rupture due to pressure build-up under fire conditions. May emit clouds of acrid smoke.

Fire Incompatibility:

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

6. ACCIDENTAL RELEASE MEASURES

Minor Spills:

Clean up all spills immediately. Avoid breathing vapours, contact with the eyes and skin. Wear protective clothing, impervious gloves and safety glasses. Shut off all possible sources of ignition and increase ventilation.

Major Spills:

Do not exert excessive pressure on valve; DO NOT attempt to operate damaged valve. Clear area of people and move upwind. Alert fire brigade and advise of the location and nature of the hazard. May be violent or explosively reactive. Wear breathing apparatus plus protective gloves. Remove leaking cylinder to a safe place if possible. Release pressure under safe, controlled conditions by opening valve. Prevent, by any means available, spillage from entering drains or water courses.

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

7. HANDLING AND STORAGE

Procedure for Handling:

Do not allow clothing, wet with material to stay in contact with the skin. Avoid all personal contact including inhalation. Wear protective clothing when risk of exposure occurs. Prevent concentration in hollows and sumps.

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Storage Incompatibility:

Segregate from: powdered metals such as aluminium, zinc and alkali metals such as sodium potassium and lithium, and also from strong acids, acid chlorides, acid anhydrides and chloroformates. Avoid reaction with oxidising agents. May attack, soften or dissolve rubber, many plastics, paints and coatings.

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 container 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.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits (OEL)

Methylene Chloride:

Odour Threshold Value: 158 ppm (detection), 227 ppm (recognition) NOTE: Detector tubes for methylene chloride, measuring in excess of 25 ppm are commercially available. Long-term measurements (4hrs) may be conducted to detect concentrations exceeding 13ppm.</>.

LPG

TLV TWA: 1000 ppm, 1800 mg/m³ (as LPG)
ES TWA: 1000 ppm, 1800 mg/m³ (as LPG)
OES TWA: 1000 ppm, 1750 mg/m³; STEL: 1250 ppm, 2180 mg/m³ (as LPG)
IDLH Level: 2000 ppm (lower explosive limit)
No chronic systemic effects have been reported from occupational exposure to LPG. The TLV-TWA is based on good hygiene practices and is thought to minimise the risk of fire or explosion.
Odour Safety Factor(OSF)
OSF=0.16 (hydrocarbon propellant).

Alkenes

for alkanes (C5-C8)

EL TWA: 350 mg/m³ (10 hours); STEL: 1800 mg/m³ (15 minutes) -NIOSH
(EL=Exposure Limit).

Heptanes

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 for octane. The TLV-TWA applies to all isomers. </>.

for hexane, isomers (excluding n-hexane)

The TLV-TWA is thought to be protective against nausea, headache, upper respiratory tract irritation and CNS depression. The STEL is added to prevent objective depression of the CNS. </>.

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N-Hexane

Odour Threshold Value: 65 ppm

NOTE: Detector tubes for n-hexane, measuring in excess of 100 ppm, are available commercially.

Occupational polyneuropathy may result from exposures as low as 500 ppm (as hexane), whilst nearly continuous exposures of 250 have caused neurotoxic effects in animals.

Concurrent exposure to chemicals (including MEK) and drugs which induce hepatic liver oxidative.

Metabolism can reduce the time for neuropathy to appear.

Hydrocarbon Propellant:

For butane:

Odour Threshold Value: 2591 ppm (recognition)

Butane in common with other homologues in the straight chain saturated aliphatic hydrocarbon series is not characterised by its toxicity but by its narcosis-inducing effects at high concentrations.

The TLV is based on analogy with pentane by comparing their lower explosive limits in air.

Odour Safety Factor(OSF)

OSF=0.22 (n-BUTANE).

For propane

Odour Safety Factor(OSF)

OSF=0.16 (PROPANE).

Personal Protection:

Respirator:

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Eye:

No special equipment for minor exposure i.e. when handling small quantities.

OTHERWISE: For potentially moderate or heavy exposures: safety glasses with side shields.

NOTE: Contact lenses pose a special hazard; soft lenses may absorb irritants and ALL lenses concentrate them.

Hands/Feet:

No Special equipment needed when handling small quantities.

Otherwise: For potentially moderate or heavy exposures: wear general protective gloves e.g. Light weight rubber gloves.

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Other:

No special equipment needed when handling small quantities.

Otherwise: For potentially moderate or heavy exposures: overalls, skin cleansing cream and eyewash unit.

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.

Engineering Controls:

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Supplied as an aerosol pack. Contents under PRESSURE.

Clear / white liquid / spray; not miscible with water.

Physical Properties:

Liquid

Gas

Does not mix with water

Floats on water

State

Liquid

Melting Range (°C)

Not Available

Boiling Range (°C)

Not Available

Molecular Weight

Not Applicable

Viscosity

Not Available

Solubility in Water (g/L)

Immiscible

Flash Point (°C)

-30

pH (1% solution)

Not Applicable

Decomposition Temp (°C)

pH (as supplied)

Not Applicable

Auto ignition Temp (°C)

Not Available

Vapour Pressure (kPa)

379

Upper Explosive Limit (%)

7.5

Lower Explosive limit (%)

1.2

Specific gravity(Water =1)

0.85

Volatile component (%vol)

90

Relative Vapour Density (air=1)

Not Available

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Evaporation Rate

Not Available

10. STABILITY AND REACTIVITY

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.

11. TOXICOLOGICAL INFORMATION

Potential Health Effects:

Ingestion:

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. Not normally a hazard due to physical form of product. Considered an unlikely route of entry in commercial/industrial environments.

Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733).

Ingestion of petroleum hydrocarbons can irritate the pharynx, oesophagus, stomach and small intestine, and cause swellings and ulcers of the mucous. Symptoms include a burning mouth and throat; larger amounts can cause nausea and vomiting, narcosis, weakness, dizziness, slow and shallow breathing, abdominal swelling, unconsciousness and convulsions. Damage to the heart muscle can produce heart beat irregularities, ventricular fibrillation (fatal) and ECG changes. The central nervous system can be depressed. Light species can cause a sharp tingling of the tongue and cause loss of sensation there. Aspiration can cause cough, gagging, pneumonia with swelling and bleeding.

Eye:

There is limited evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure.

Not considered to be a risk because of the extreme volatility of the gas.

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:

The material may cause severe inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.

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

Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. Spray mist may produce discomfort.

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.

Aromatic hydrocarbons may produce sensitivity and redness of the skin. They are not likely to be absorbed into the body through the skin but branched species are more likely to.

Inhalation:

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Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, slowing of reflexes, lack of co-ordination, and vertigo.

Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the reduced alertness, loss of health of the individual.

There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.

Inhalation of toxic gases may cause:

Central Nervous System effects including depression, headache, confusion, dizziness, stupor, coma and seizures; respiratory: acute lung swellings, shortness of breath, wheezing, rapid breathing, other other symptoms and respiratory arrest; heart: collapse, irregular heartbeats and cardiac arrest; gastrointestinal: irritation, ulcers and vomiting (may be bloody) and abdominal pain.

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 incoordination.

Central nervous system (CNS) depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal.

Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. The vapour displace and replace air in breathing zone, acting as a simple asphyxiant.

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

Inhaling high concentrations of mixed hydrocarbons can cause narcosis, with nausea, vomiting and light-headedness. Low molecular weight (C2-C12) hydrocarbons can irritate mucous membranes and cause incoordination, giddiness, nausea, vertigo, confusion, headache, appetite loss, drowsiness, tremors and stupor. Massive exposures can lead to severe central nervous system depression, deep coma and death. Convulsions can occur due to brain irritation and/or lack of oxygen.

Permanent scarring may occur, with epileptic seizures and brain bleeds occurring months after exposure. Respiratory system effects include inflammation of the lungs with oedema and bleeding.

Lighter species mainly cause kidney and nerve damage; the heavier paraffin's and olefins are especially irritant to the respiratory system. Alkenes produce pulmonary oedema at high concentrations. Liquid paraffin's may produce sensation loss and depressant actions leading to weakness, dizziness, slow and shallow respiration, unconsciousness, convulsions and death.

C5-7 paraffin's may also produce multiple nerve damage. Aromatic hydrocarbons accumulate in lipid rich tissues (typically the brain, spinal cord and peripheral nerves) and may produce functional impairment manifested by nonspecific symptoms such as nausea, weakness, fatigue, vertigo; severe exposures may produce inebriation or unconsciousness. Many of the petroleum hydrocarbons can sensitise the heart and may cause ventricular fibrillation, leading to death.

Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages.

Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved.

Inhalation exposure may cause susceptible individuals to show change in heart beat rhythm i.e. cardiac arrhythmia. Exposures must be terminated.

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Chronic Health effects:

On the basis, primarily, of animal experiments, concern has been expressed that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment. Exposure to the material may cause concerns for humans owing to possible developmental toxic effects, generally on the basis that results in appropriate animal studies provide strong suspicion of developmental toxicity in the absence of signs of marked toxicity or at around the same dose levels as other toxic effects but which are not a secondary non-specific consequence of other toxic effects. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. There is some evidence to provide a presumption that human exposure to the material may result in impaired fertility on the basis of:

some evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.

Principal route of occupational exposure to the gas is by inhalation.

Repeated or prolonged exposure to mixed hydrocarbons may produce narcosis with dizziness, weakness, irritability, concentration and/or memory loss, tremor in the fingers and tongue, vertigo, olfactory disorders, constriction of visual field, paraesthesias of the extremities, weight loss and anaemia and degenerative changes in the liver and kidney. Chronic exposure by petroleum workers, to the lighter hydrocarbons, has been associated with visual disturbances, damage to the central nervous system, peripheral neuropathies (including numbness and paraesthesias), psychological and neurophysiological deficits, bone marrow toxicities (including hypoplasia possible due to benzene) and hepatic and renal involvement. Chronic dermal exposure to petroleum hydrocarbons may result in defatting which produces localised dermatoses.

Surface cracking and erosion may also increase susceptibility to infection by microorganisms. One epidemiological study of petroleum refinery workers has reported elevations in standard mortality ratios for skin cancer along with a dose-response relationship indicating an association between routine workplace exposure to petroleum or one of its constituents and skin cancer, particularly melanoma. Other studies have been unable to confirm this finding. Methylene chloride exposures cause liver and kidney damage in animals and this justifies consideration before exposing persons with a history of impaired liver function and/or renal disorders. Chronic exposure may produce central nervous system damage including confusion, delusion, slurred speech, memory impairment, anxiety, focal seizures, encephalopathy and visual and auditory hallucinations. These effects are probably due to chronic carbon monoxide poisoning resulting from methylene chloride metabolism. Two epidemiological studies of workers exposed to methylene chloride have been published. An excess in pancreatic tumours was noted in one study. Chronic exposure to methylene chloride (approximately 30-120 ppm TWA) did not appear to increase the risk of deaths arising from lung cancer or cardiovascular disease. A study from Zeneca's Central Toxicology Laboratory added further support to the claim that solvent methylene chloride is not a human carcinogen. This study supported a previous finding by the European Centre of Ecology and Toxicology (ECETOC) that methylene chloride induced cancers, previously identified in mice, were a consequence of a unique metabolic pathway found only in mice.

Toxicity and Irritation:

Red Back Boot Grip:

No significant acute toxicological data identified in literature search.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may conjunctivitis.

The material may cause severe 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. Repeated exposures may produce severe ulceration.

Methylene Chloride:

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The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration. **WARNING:** This substance has been classified by the IARC as Group 2B:

Possible Carcinogenic to Humans Inhalation (human) TCLo: 500 ppm/ 1 y - I Eye(rabbit): 10 mg -mild

Hydrocarbon Propellant:

No significant acute toxicological data identified in literature search for Petroleum Hydrocarbon Gases. In many cases, there is more than one potentially toxic constituent in a refinery gas. In those cases, the constituent that is most toxic for a particular endpoint in an individual refinery stream is used to characterise the endpoint hazard for that stream. The hazard potential for each mammalian endpoint for each of the petroleum hydrocarbon gases is dependent upon each petroleum hydrocarbon gas constituent endpoint toxicity values (LC50, LOAEL, etc.)

and the relative concentration of the constituent present in that gas. It should also be noted that for an individual petroleum hydrocarbon gas, the constituent characterizing toxicity may be different for different mammalian endpoints, again, being dependent upon the concentration of the different constituents in each, distinct petroleum hydrocarbon gas.

All Hydrocarbon Gases Category members contain primarily hydrocarbons (i.e., alkanes and alkenes) and occasionally asphyxiant gases like hydrogen. The inorganic components of the petroleum hydrocarbon gases are less toxic than the C1 - C4 and C5 - C6 hydrocarbon components to both mammalian and aquatic organisms. Unlike other petroleum product categories (e.g. gasoline, diesel fuel, lubricating oils, etc.), inorganic and hydrocarbon constituents of hydrocarbon gases can be evaluated for hazard individually to then predict the screening level hazard of the Category members acute toxicity: No acute toxicity LC50 values have been derived for the C1 -C4 and C5- C6 hydrocarbon (HC) fractions because no mortality was observed at the highest exposure levels tested (~ 5 mg/l) for these petroleum hydrocarbon gas constituents. The order of acute toxicity of petroleum hydrocarbon gas constituents from most to least toxic is:

C5-C6 HCs (LC50 > 1063 ppm) > C1-C4 HCs (LC50 > 10,000 ppm) > benzene

(LC50 = 13,700 ppm) > butadiene (LC50 = 129,000 ppm) > asphyxiant gases

(hydrogen, carbon dioxide, nitrogen). Repeat does toxicity:

With the exception of the asphyxiant gases, repeated dose toxicity has been observed in individual selected petroleum hydrocarbon gas constituents. Based upon LOAEL values, the order of repeated-dose toxicity of these constituents from most toxic to the least toxic is: Benzene

(LOAEL .>= 10 ppm) >C1-C4 HCs (LOAEL = 5,000 ppm; assumed to be 100% 2-butene)

> C5-C6 HCs (LOAEL = 6,625 ppm) > butadiene (LOAEL = 8,000 ppm) > asphyxiant gases

(hydrogen, carbon dioxide, nitrogen). Genotoxicity: In vitro: The majority of the Petroleum Hydrocarbon Gases Category components are negative for in vitro genotoxicity. The exceptions are: benzene and 1,3-butadiene, which are genotoxic in bacterial and mammalian

in vitro test systems. In vivo: The majority of the Petroleum Hydrocarbon Gases Category

components are negative for in vivo genotoxicity. The exceptions are benzene and 1,3-butadiene, which are genotoxic in in vivo test systems.

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Developmental toxicity: Developmental effects were induced by two of the petroleum hydrocarbon gas constituents, benzene and the C5 -C6 hydrocarbon fraction. No developmental toxicity was observed at the highest exposure levels tested for the other petroleum hydrocarbon gas constituents tested for this effect. The asphyxiant gases have not been tested for developmental toxicity. Based on LOAEL and NOAEL values, the values, the order of acute toxicity of these constituents from most to least toxic is: Benzene (LOAEL = 20 ppm) > butadiene (NOAEL \geq 1,000 ppm) > C5-C6 HCs (LOAEL = 3,463 ppm) > C1-C4 HCs (NOAEL \geq 5,000 ppm; assumed to be 100% 2-butene) > asphyxiant gases (hydrogen, carbon dioxide, nitrogen).

Reproductive toxicity: Reproductive effects were induced by only two petroleum hydrocarbon gas constituents tested for benzene and isobutane (a constituent of the the C1-C4 hydrocarbon fraction). No reproductive toxicity was observed at the highest exposure levels tested for the other petroleum hydrocarbon gas constituents tested for this effect. The asphyxiant gases have not been tested for reproductive toxicity. Based on LOAEL and NOAEL values, the order of reproductive toxicity of these constituents from most to least toxic is: Benzene (LOAEL = 300 ppm) > butadiene (NOAEL \geq 6,000 ppm) > C5-C6 HCs (NOAEL \geq 6,521 ppm) > C1-C4 HCs (LOAEL = 9,000 ppm; assumed to be 100% isobutane) > asphyxiant gases (hydrogen, carbon dioxide, nitrogen)

12. ECOLOGICAL INFORMATION

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. 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 for Petroleum Hydrocarbon Gases:

Environmental fate:

The environmental fate characteristics of petroleum hydrocarbon gases are governed by these physical-chemical attributes. All components of these gases will partition to the air where interaction with hydroxyl radicals is an important fate process. Hydrocarbons having molecular weights represented in these streams are inherently biodegradable, but their tendency to partition to the atmosphere would prevent their biotic degradation in water and soils. However, if higher molecular weight fractions of these streams enter the aquatic or terrestrial environment, biodegradation may be an important fate mechanism.

The majority of components making up hydrocarbon gases typically have low melting and boiling points. They also have high vapor pressures and low octanol/water partition coefficients. The aqueous solubilities of these substances vary, and range from approximately 22 parts per million to several hundred parts per million. The environmental fate characteristics of refinery gases are governed by these physical-chemical attributes. Components of the hydrocarbon gas streams will partition to the air, and photodegradation reactions will be an important fate process for many of the hydrocarbon components. The hydrocarbons in these mixtures are inherently biodegradable, but due to their tendency to partition to the atmosphere, biodegradation is not anticipated to be an important fate mechanisms. However, if released to water or soil, some of the higher molecular weight fractions may become available for microbial attack. The inorganic gases are chemically stable and may be lost to the atmosphere or simply become involved in the environmental recycling of their atoms. Some show substantial water solubility, but their volatility eventually causes these gases to enter the atmosphere.

Substances in Refinery Gases that volatilise to air may undergo a gas-phase oxidation reaction with photochemically produced hydroxyl radicals (OH \cdot). Atmospheric oxidation as a result of hydroxyl radical attack is not direct photochemical degradation, but rather indirect degradation. Indirect photodegradation of the hydrocarbon components in Refinery Gases can be an important fate process for these constituents. In general, half lives decrease with increasing carbon chain length. Half lives for this fraction of Refinery Gases ranged from 960 days (methane) to 0.16 days (butadiene). The constituents of the C5- C6 hydrocarbon fraction have photodegradation half-lives of approximately two days.

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The hydrocarbon and non-hydrocarbon constituents in Refinery Gases do not contain the functional groups or chemical linkages known to undergo hydrolysis reactions. Therefore hydrolysis will not play an important role in the environmental fate for the components in Refinery Gas streams.

Biodegradation of the hydrocarbon components in refinery gases may occur in soil and water.

Gaseous hydrocarbons are widespread in nature and numerous types of microbes have evolved which are capable of oxidizing these substances as their sole energy source. Although volatilisation is the predominant behavior for these gases, sufficient aqueous solubility and bioavailability is exhibited by these compounds. The use of gaseous carbon sources for cell growth is common among autotrophic organisms. Higher chain length hydrocarbons typical of naphtha streams also are known to inherently biodegrade in the environment.

Ecotoxicity:

Acute LC/EC50 values for the hydrocarbon components of these gas streams ranged roughly from 1 to 100 mg/L. Although the LC/EC50 data for the individual gases illustrate the potential toxicity to aquatic organisms, aqueous concentrations from releases of these gases would likely not persist in the aquatic environment for a sufficient duration to elicit toxicity. Based on a simple conceptual exposure model analysis, emissions of petroleum hydrocarbon gases to the atmosphere would not likely result in acutely toxic concentrations in adjacent water bodies because such emissions will tend to remain in the atmosphere. Several of the constituents in refinery gases were shown to be highly hazardous to aquatic organisms in laboratory toxicity tests where exposure concentrations can be maintained over time. Hydrogen sulfide was shown to be the most toxic constituent to fish (LC50 ranged 0.007 to 0.2 mg/L) and invertebrates (EC50 ranged 0.022 to 1.07 mg/L), although several LC/EC50 values for ammonia also were below 1 mg/l for these organisms (0.083 to 4.6 mg/L and 0.53 to 22.8 mg/L, respectively).

For methylene chloride:

log Kow: 1.25

log Koc: 1.68

log Kom: 1.44

Henry's atm m³ /mol: 2.68E-03

BCF: 5

Environmental fate:

Methylene chloride is a volatile liquid, and tends to volatilise to the atmosphere from water and soil. Half-life of methylene chloride volatilisation from water has been found to be 21 minutes under experimental conditions but actual volatilisation from natural waters will depend on the rate of mixing, wind speed, temperature, and other factors. The Henry's law constant value (H) of 0.002 atm/m³/mol indicates that methylene chloride will volatilise rapidly from moist soil and water surfaces.

Methylene chloride is not strongly sorbed to soils or sediments. Based on its low soil organic carbon partitioning coefficient (Koc) of 25, methylene chloride is likely to be very highly mobile in soils and may be expected to leach from soils into groundwater. Based on a reported log octanol/water partition coefficient (Kow) of 1.3 an estimated bioconcentration factor (BCF) of 2.3 was derived. There is no evidence of biomagnification, but because the estimated BCF is low, significant biomagnification of methylene chloride in aquatic food chains is not expected.

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Air:

The main degradation pathway for methylene chloride in air is its reaction with photochemically generated radical concentration in air and the rate of reaction. Most reported rates for hydroxyl radical reaction with methylene chloride range from 1.0×10^{-13} to 1.5×10^{-13} cm³/mol/sec, and estimates of average atmospheric hydroxyl radical concentration range from 2.5×10^5 to 1×10^6 mol/cm³. Using this information, an average atmospheric lifetime for methylene chloride may be calculated to be 130 days. Because this degradation pathway is relatively slow, methylene chloride may become widely dispersed but is not likely to accumulate in the atmosphere. The small amount of methylene chloride which reaches the stratosphere (about 1%) may undergo direct photolytic degradation, however, photolysis in the troposphere is not expected. Reactions of methylene chloride with ozone or other common atmospheric species (e.g., oxygen atoms, chlorine atoms, and nitrate radicals) are not believed to contribute to its breakdown.

Water:

Methylene chloride undergoes slow hydrolysis in water. The experimental half-life reported for the hydrolysis reaction, at neutral conditions, is approximately 18 months at 25 C. However, the rate of reaction varies greatly with changes in temperature and pH. A hydrolytic half-life of 14 days was reported for methylene chloride in acidic solutions at 80-150 C. This experimental value, when extrapolated to 25 C, is about 700 years. Different mechanisms of hydrolyses may be responsible for these two widely different values. Both aerobic and anaerobic biodegradation may be an important fate process for methylene chloride in water. Methylene chloride has been observed to undergo degradation at a rapid rate under aerobic conditions. Reported total methylene chloride loss was 100% after 7 days in a static culture flask biodegradability screening test.

Sediment and Soil:

The rate of biodegradation was found to be dependent on soil type, substrate concentration, and redox state of the soil. Methylene chloride biodegradation has been reported to occur under both aerobic and anaerobic conditions. The biodegradation of methylene chloride appears to be accelerated by the presence of elevated levels of organic carbon. Methylene chloride has a low tendency to adsorb to soil, therefore, there is a potential for leaching to groundwater. Also, because of the high vapour pressure, volatilisation to air is also a likely fate process from dry soil. Its high Henry's law constant (0.002 atm/m³/mol) indicates that volatilization from moist soil is also likely.

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 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 absorption) have been estimated to be 2.9 hr and 13

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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

For n-hexane:

log Kow: 3.17-3.94

BOD 5 if unstated: 2.21

COD: 0.04

ThOD: 3.52

Environmental fate:

Transport and Partitioning:

The physical properties of n-hexane that affect its transport and partitioning in the environment are: water solubility of 9.5 mg/L; log[Kow] (octanol/water partition coefficient), estimated as 3.29; Henry's law constant, 1.69 atm-m³ mol; vapor pressure, 150 mm Hg at 25 C; and log[Koc] in the range of 2.90 to 3.61. As with many alkanes, experimental methods for the estimation of the Koc parameter are lacking, so that estimates must be made based on theoretical considerations.

The dominant transport process from water is volatilization. Based on mathematical models the half-life for n-hexane in bodies of water with any degree of turbulent mixing (e.g., rivers) would be less than 3 hours. For standing bodies of water (e.g. small ponds), a half-life no longer than one week (6.8 days) is estimated based on the log octanol/water partition coefficient (i.e. log[Koc]) and the estimated log sorption coefficient (ie log[Koc]) n-hexane is not expected to become concentrated in in biota. A calculated bioconcentration factor (BCF) of 453 for a fathead minnow further suggests a low potential for n-hexane to bioconcentrate or bioaccumulate in trophic food chains.

In soil, the dominant transport mechanism for n-hexane present near the surface probably is volatilisation (based on its Henry's law constant, water solubility, vapor pressure, and Koc). While its estimated Koc values suggest a moderate ability to sorb to soil particles, n-hexane has a density (0.6603 g/mL at 20 C) well below that of water and a very low water solubility of 9.5 mg/L.

n-Hexane would, therefore, be viewed as a light nonaqueous phase liquid (LNAPL), which would suggest a low potential for leaching into the lower soil depths since the n-hexane would tend to float on the top of the saturated zone of the water table. n-Hexane would generally stay near the soil surface and, if not appreciably sorbed into the soil matrix, would be expected eventually to volatilise to the atmosphere. Exceptions would involve locations with shallow groundwater tables where there were large spills of hexane products. In such cases, the n-hexane could spread out to contaminant a large volume of soil materials.

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Air:

n-Hexane does not absorb ultraviolet (UV) light at 290 nm and is thus not expected to undergo direct photolysis reactions. The dominant tropospheric removal mechanism for n-hexane is generally regarded to be decomposition by hydroxyl radicals. Calculations assuming typical hydroxyl radical concentrations suggest a half-life of approximately 2.9 days. While n-hexane can react with nitrogen oxides to produce ozone precursors under controlled laboratory conditions, the smog-producing potential of n-hexane is very low compared to that of other alkanes or chlorinated VOCs. Hydroxyl ion the primary mechanisms for n-hexane degradation in the atmosphere. As with most alkanes, n-hexane is resistant to hydrolysis.

Water:

Although few data are available dealing explicitly with the biodegradation of n-hexane in water, neither hydrolysis nor biodegradation in surface waters appears to be rapid compared with volatilisation. In surface waters, as in the atmosphere, alkanes such as n-hexane would be resistant to hydrolysis. Biodegradation is probably the most significant degradation mechanism in groundwater. The ability of *Pseudomonas mendocina* bacteria to metabolise n-hexane in laboratory microcosms been documented. Mixed bacterial cultures as well as pure cultures are documented as capable of metabolising n-hexane under aerobic conditions. In general, linear alkanes (such as n-hexane) are viewed as the most readily biodegradable fractions in petroleum, particularly when oxygen is present in solution. Once introduced into groundwater, n-hexane may be fairly persistent since its degradation by chemical hydrolysis is slow and opportunities for biodegradation may be limited under anoxic conditions or where nutrients such as nitrogen or phosphorus are in limited supply.

Sediment and Soil:

The most important biodegradation processes involve the conversion of the n-hexane to primary alcohols, aldehydes and, ultimately, into fatty acids. Similar processes are encountered with other light hydrocarbons such as heptane. In general, unless the n-hexane is buried at some depth within a soil or sediment, volatilisation is generally assumed to occur at a much more rapid rate than chemical or biochemical degradation processes. Once introduced into deeper sediments, n-hexane may be fairly persistent.

Ecotoxicity:

Fish LC50 (96 h): *Oncorhynchus mykiss* 4.14 mg/l; *Pimephales promelus* 2.5 mg/l (flow through);
Lepomis macrochirus 4.12 mg/l *Daphnia* EC50 (48 h): 3.87 mg/l
DO NOT discharge into sewer or waterways.

Ingredient Persistence:

methylene chloride

Bioaccumulative potential:

Ingredient

methylene chloride

Mobility in soil:

Ingredient

methylene chloride

Water/Soil Persistence:

LOW (Half-life = 56 days)

Bioaccumulation

LOW (BCF = 40)

Mobility

LOW (KOC = 23.74)

13. DISPOSAL CONSIDERATIONS

Waste treatment methods:

Product / Packaging disposal:

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.

If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. 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 or process equipment to enter drains.

It may be necessary to collect all wash water for treatment before disposal.

In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.

Where in doubt contact the responsible authority.

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.

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14. TRANSPORT INFORMATION

Labels Required :



HAZCHEM 2YE
Land transport (ADG)
UN number 1950
Packing group Not Applicable
UN proper shipping name AEROSOLS
Environmental hazard No relevant data
Transport hazard class(es) Class 2.1 Subrisk 6.1
Special precautions for user 63 190 277 327 344
 Limited quantity See SP 277

Air transport (ICAO-IATA / DGR)
UN number 1950
Packing group Not Applicable
UN proper shipping name Aerosols, flammable
Environmental hazard No relevant data
Transport hazard class(es) ICAO/IATA Class 2.1 I
 CAO / IATA Subrisk 6.1
 ERG Code 10L

Special precautions for user:
Special provisions A145A167A802
Cargo Only Packing Instructions 203
Cargo Only Maximum Qty / Pack 150 kg
Passenger and Cargo Packing Instructions 203
Passenger and Cargo Maximum Qty / Pack 75 kg
Passenger and Cargo Limited Quantity Packi Y203
Passenger and Cargo Limited Maximum Qty / 30 kg G

Sea transport (IMDG-Code / GGVSee)
UN number 1950
Packing group Not Applicable
UN proper shipping name AEROSOLS
Environmental hazard No relevant data
Transport hazard class(es) IMDG Class 2.1 IMDG
 Subrisk 6.1

Special precautions for user:
EMS Number F-D , S-U
Special provisions 63 190 277 327 344 959
Limited Quantities See SP277

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Transport in bulk according to Annex II of
MARPOL 73 / 78 and the IBC code

Source	Ingredient Pollution	Category
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	methylene chloride	Y

15. REGULATORY INFORMATION

**Safety, health and environmental regulations
/ legislation specific for the substance or
mixture:**

methylene chloride(75-09-2) is found on the
following regulatory lists:

"Australia Exposure Standards", "International Agency for
Research on Cancer (IARC) - Agents Classified by the
IARC Monographs", "Australia Inventory of Chemical
Substances (AICS)", "Australia Hazardous Substances
Information System - Consolidated Lists

hydrocarbon propellant(68476-85-7.) is found
on the following regulatory lists

"Australia Exposure Standards", "Australia Inventory of
Chemical Substances (AICS)", "Australia Hazardous
Substances Information System - Consolidated Lists"

16. OTHER INFORMATION

Ingredients with multiple cas numbers

Name	CAS No
hydrocarbon propellant	68476-85-7., 68476-86-8

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