ETHANOL MATERIAL SAFETY DATA SHEET

Product: Ethanol

SECTION 1: IDENTIFICATION OF SUBSTANCE/MIXTURE & SUPPLIER

Product Name: Fuel Ethanol

Other Names: Ethyl Alcohol, Absolute alcohol, Industrial Ethanol, Ethanol 96%

Recommended Use: Fuel blending, General solvent

Important Notice: This Material Safety Data Sheet (MSDS) is issued by the Supplier in accordance with National Occupational Health & Safety Commission (NOHSC) guidelines. As such, the information in it must not be altered, deleted or added to. The Supplier will issue a new MSDS when there is a change in product specifications and/or NOHSC guidelines/regulations. The Supplier will not accept any responsibility for any changes made to its MSDS by any other person or organization.

SECTION 2: HAZARDS INFORMATION

HAZARDOUS SUBSTANCE – DANGEROUS GOOD
DG Class 3
Subsidiary Risk 1: None Allocated
Packaging Group II
Poison Schedule None Scheduled

Risk Phrase(s)
R11 - Highly flammable.
R40 - Possible risks of irreversible effects.
R66 - Repeated exposure may cause skin dryness and cracking.
R20/22 - Harmful by inhalation and if swallowed.
R36/38 - Irritating to eyes and skin.

Safety Phrase(s)
S7 - Keep container tightly closed.
S16 - Keep away from sources of ignition - No smoking.
S23 - Do not breathe vapour.
S29 - Do not empty into drains.
S33 - Take precautionary measures against static discharges.
S45 - In case of accident or if you feel unwell seek medical advice immediately (show the label whenever possible)
S24/25 - Avoid contact with skin and eyes
S36/37/39 - Wear suitable protective clothing/ gloves and eye/face protection

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name: CAS Number: Proportion:
Ethyl alcohol (ethanol) 64-17-5 70 - 100% by volume
Water 7732-18-5 0 - 35% by weight

SECTION 4: FIRST AID MEASURES

If there are signs of drunkenness (intoxication or inebriation) then serious health effects may follow (depending on the amount swallowed or inhaled). Immediate medical attention should be sought and the affected person transferred and accompanied to the care of a doctor or hospital. Treat unconsciousness by placing the person in the coma position. Apply artificial respiration if breathing stops.

Swallowed: See above. If a minor amount has been accidentally swallowed, then, if conscious, give large amounts of water. Do not allow further work until fitness for duties is established. Do not attempt to induce vomiting or give anything by mouth to an unconscious person. Seek medical attention.

Eye: Flush eye with running water for a minimum of 15 minutes,. Seek medical attention promptly if irritation persists or any loss of vision occurs.

Skin: Immediately remove contaminated clothing. Wash skin with water. Launder contaminated clothing before re-use.

Inhaled: Remove promptly to fresh air. If there are signs of drunkenness (intoxication or inebriation) or respiratory irritation, dizziness, nausea or headache occurs, seek immediate medical attention. Treat unconsciousness by placing the person in the coma position. Apply artificial respiration if breathing stops.

Notes to doctor: Treat as for excess consumption of alcoholic drink. Supportive, hospital or even intensive care may be required. Advice on emergency treatment of alcohol poisoning (Ethyl alcohol, ethanol) is to be found in standard texts on Emergency Medicine.

SECTION 5: FIRE FIGHTING MEASURES

Specific Hazards:
Highly flammable liquid. May form flammable mixtures with air. Burns with a colourless flame. The vapour is heavier than air and may travel along the ground; distant ignition and flash back are possible. Run off to sewers and drains may cause explosions. Isolate for at least 800 metres in all directions if tanks or tankers are involved. The use of compressed air for filling, discharging, mixing or handling is prohibited due to the vapour hazard. All vessels must be earthed to avoid generation of static charges when agitating or transferring solvents. Avoid all ignition sources. Intrinsically safe equipment is necessary in areas where this chemical is being used.

Extinguishing Media:
Use water fog (or if unavailable fine water spray), dry chemical, carbon dioxide or alcohol stable foam.

Fire Fighting Procedures:
Highly flammable liquid. Use water to cool exposed containers. Heating can cause expansion or decomposition leading to violent rupture of containers. If safe to do so, remove containers from path of fire. Spills and leaks may be washed away with copious volumes of water, fog or spray. For major fires or where the atmosphere is either oxygen deficient or contains unacceptable levels of combustion products, firefighters must wear self-contained breathing apparatus with full face-mask and protective clothing.

Hazardous Decomposition products:
Burning can produce carbon monoxide and/or carbon dioxide

Hazchem code: 2[Y]E

SECTION 6 : ACCIDENTAL SPILL AND RELEASE MEASURES

Containment Procedures: In the event of a spillage eliminate all sources of ignition and take measures to prevent static discharge – no smoking. Stop and contain the spill for salvage or absorb in inert absorbent material (e.g. soil, sand, vermiculite) for disposal by an approved method. Prevent run-off into drains and waterways. Clear area of all personnel not directly involved in the clean up. All personnel involved in the containment and disposal procedures to wear protective equipment as described in Section 8 to prevent skin and eye contamination and inhalation of vapours. Use water spray to disperse vapour. Wash the cleaned up area with copious volumes of water to remove any traces amounts of product.
Ethanol mixes completely with water. Spills can be converted to non-flammable mixtures by dilution with water. Ventilate area well and ensure the atmosphere is safe before personnel return to the work area. If contamination of sewers or waterways has occurred, advise the local emergency services and waste and environmental authorities.

Disposal: Stop and contain the spill for salvage or absorb in inert absorbent material (e.g. soil, sand, vermiculite) for disposal by an approved method. Prevent run-off into drains and waterways. Dispose of all waste containers and used drums in accordance with local waste and environmental authority guidelines. Non-returnable containers should be degassed prior to disposal.

SECTION 7: HANDLING AND STORAGE

Handling and Storage:

Handling: Use in well ventilated areas away from all ignition sources. Intrinsically safe equipment only must be used in area where this chemical is being used. The use of compressed air for filling, discharging, mixing or handling is prohibited due to the vapour hazard. Containers must be earthed to avoid generation of static charges when agitating or transferring product.

Storage: Store in tightly closed containers in cool, dry, isolated and well ventilated areas away from heat, sources of ignition and incompatibles. Store away from oxidizing agents. Keep containers closed at all times – check regularly for leaks. Do not eat, drink or smoke in areas of use or storage. Observe State Regulations concerning the storage and handling of Dangerous Goods. Store with all precautions required for handling flammable liquids. The requirement of Australian Standard AS 1940 should be observed in addition to AS 1020, AS 1076, AS 2380 and AS 3000. Empty containers retain residue (liquid and/or vapour) and are dangerous. Do not pressure cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.

Incompatibilities
Not to be stored with explosives (Class 1), flammable gases in bulk (Class 2.1), poisonous gases (Class 2.3), spontaneously combustible substances (Class 4.2), oxidizing agents (Class 5.1), organic peroxides (Class 5.2), radioactive substances (Class 7). Exemptions may apply.

SECTION 8: EXPOSURE CONTROL AND PERSONAL PROTECTION

Exposure Standards:
National Occupational Health & Safety Commission NOHSC Worksafe Australia occupational exposure standards
Ethanol TWA - 1000 ppm (1880 mg/m3)
STEL - None Allocated
Carcinogen Category - None Allocated
Notices - None Allocated
Exposure Standard (TWA) is the time-weighted average airborne concentration over an eight-hour working day, for a five day working week over an entire working life. According to current knowledge this concentration should neither impair the health or, cause undue discomfort to, nearly all workers. These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These Exposure Standards should not be

used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Ventilation:
Local exhaust ventilation and/or mechanical (general) exhaust are recommended where vapours are likely to be generated. All such equipment must be intrinsically safe.

Special Considerations for Repair And/Or Maintenance of Contaminated Equipment:
Empty containers retain residue (liquid and/or vapour) and are dangerous. Do not pressure cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. Vapour is heavier than air – prevent concentration in hollows or sumps. Do not enter confined spaces where vapour may have collected. Keep containers closed when not in use.

Personal Hygene:
Protective clothing (gloves, coveralls, boots, etc.) should be worn to prevent skin contact. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storing or re-using.

Eye Protection:
Avoid eye contact by wearing chemical goggles with side shields or face shield (AS/NZS 1336) whenever exposed to vapour or mist or if there is a risk of splashing liquid in the eyes. Safety showers with eye-wash should be provided in all areas where product is handled.

Skin Protection:
Avoid skin contact by the use of approved chemical resistant gloves and aprons – PVC or Neoprene (AS 2161).

Respiratory Protection:
None should be needed under normal circumstances. In high vapour concentrations, or in suspected oxygen deficient atmospheres, such as empty vessels or confined spaces, use air supplied hood. In other instances where ethanol concentrations are likely to exceed 500 ppm, an approved organic vapour respirator (AS/NZS 1715 and 1716) must be worn.

Smoking and Other Dusts:
Smoking must be prohibited in all areas where ethanol is used - see safety information on flammability.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear colourless liquid. 95TG products - clear yellow liquid.
Odour Characteristic alcohol odour detectable at 80 - 100 ppm
pH, at stated concentration Not Available
Boiling Point: (oC) 78°C
Melting Point: (oC) -117°C
Vapour pressure: 44 mm Hg @ 20°C
Specific gravity (H2O = 1) 0.79-0.81 (Water =1)
Solubility in water: Complete
Evaporation Rate: 253 (n-Butyl Acetate = 100)
Vapour Density: 1.59
Per cent volatiles: 100%
Molecular weight: 46.08
Flash Point: 13°C
FP Test Method: Abel Closed Cup
Autoignition Temperature: 392°C
Lower Explosive Limit (LEL): 3.5%
Upper Explosive Limit (UEL): 19%

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability Stable
Hazardous Polymerisation: Will not occur
Incompatible Materials: Will react with strong oxidizing agents
Conditions to avoid: Heat, sparks, flame and build-up of static electricity.
Hazardous Decomposition products: Burning can produce carbon monoxide and/or carbon dioxide

SECTION 11: TOXICOLOGICAL AND EPIDEMIOLOGICAL DATA

Swallowed: Accidental swallowing is unlikely in the industrial setting. Swallowing ethanol can cause drunkenness or harmful central nervous system effects. The deliberate ingestion of ethanol is a known occupational risk, and as little as 50-100ml intake in a shift in a 70kg worker may cause inebriation to the point where safety is impaired. Effects of a small intake may include excitation, euphoria, headache, dizziness, drowsiness, blurred vision, and fatigue. Drinking a large amount may lead to Severe acute intoxication, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death. Aspiration into lungs may cause pneumonitis.

Eye: Vapours may irritate the eyes. Liquid and mists may severely irritate or damage the eyes.

Skin: Contact with skin may result in slight irritation and redness. Prolonged or repeated contact and heavy skin contamination may cause skin drying and cracking and/or dermatitis with redness, itching, and swelling. This may lead to secondary infection.

Inhaled: Vapour is moderately irritating to mucous membranes and respiratory tract. Inhalation of the vapour may result in drunkenness, (see effects of swallowing above) or headache, nausea, incoordination, narcosis (sleepiness) and vomiting. Early signs or symptoms may occur at airborne levels of 1000 to 5000 ppm. Ongoing or repeated exposures at High concentrations may cause central nervous symptoms similar to “swallowed” above. Deliberate inhalation of the vapour is a known occupational risk.

Chronic: Long term exposure by swallowing or repeated inhalation, may cause degenerative changes in the liver, kidneys, gastrointestinal tract and heart muscle.

Note: Nasal and eye irritation may occur at concentrations below the exposure standard.

Special toxic effects: In work areas where exposures in excess of the occupational exposure limits occur, then the following may apply: Persons with pre-existing liver impairment, skin and respiratory disorders may be at an increased risk. Ethanol may cause adverse reproductive effects. Absorption of some drugs may be affected causing adverse health effects. Ingestion by pregnant women may cause serious effects in their newborn babies called “foetal alcohol syndrome”. The National Occupational Health & Safety Commission in Australia (NOHSC) does not classify ethanol as a carcinogen. IARC has evaluated ethanol as a carcinogen on the basis of effects of drinking alcoholic beverages, but there is no known carcinogenic risk from occupational exposures. There is extensive toxicological and epidemiological information on the health effects of ingesting alcoholic drinks containing ethanol. Any occupational exposures will add to overall exposures from ingestion of alcoholic drinks any health effects that result from such exposures.

Acute Effects:
Inhalation at levels at or exceeding the Occupational Exposure limits or any deliberate ingestion is known to lead to health effects which may be evident in themselves, or lead to impaired functioning and consequent safety risks in the industrial setting. A blood alcohol level in excess of 0.05g\100ml is regarded as likely to impair functioning for tasks such as operating machinery.
LD50/oral/rat: 7060 mg/kg (literature data for pure Ethanol)
LC50/inhalation/rat: 38 mg/l/10 h (literature data for pure Ethanol)

Long Term Effects:
Exposure to ethanol in the work setting adds to any intake from alcoholic drinks and any health effects caused by the total intake of alcohol.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity:
Toxicity to fish (acute): LC0/Golden ide/:>1000 mg/l/48h
Toxicity to daphnia: EC50/Daphnia magna/: >1000 mg/l/24 h

Persistence and degradability:
Degree of elimination: 94%
Evaluation: biodegradable

Mobility in soil: No data available

SECTION 13: DISPOSAL CONSIDERATIONS

Dispose of all waste containers and used drums in accordance with local authority guidelines. Non-returnable containers should be de-gassed prior to disposal. Suitable for incineration by approved agent under controlled conditions if permitted by local authorities, otherwise disposal must be in accordance with local waste and environmental authority requirements. Product must be contained and not disposed to sewerage systems, drains or waterways. Advise flammable nature. Empty containers must be decontaminated by rinsing with water.

SECTION 14: TRANSPORTATION INFORMATION

Transport Requirements:

UN number: 1170
Class 3
Subsidiary Risk 1: None Allocated
Packaging Group II
Hazchem code: 2[Y]E
EPG

Incompatibilities:

Not to be stored with explosives (Class 1), flammable gases in bulk (Class 2.1), poisonous gases (Class 2.3), spontaneously combustible substances (Class 4.2), oxidizing agents (Class 5.1), organic peroxides (Class 5.2), radioactive substances (Class 7). Exemptions may apply.

Road and Rail Transport (Australian Dangerous Goods Code):

UN Number: 1170
Proper Shipping Name: ETHANOL
Class: 3 Flammable Liquid
Hazchem Code: 2[Y]E
Packing Group: II

Marine Transport (International Maritime Dangerous Goods Code):

UN Number: 1170
Proper Shipping Name: ETHANOL
Class: 3 Flammable Liquid
Packing Group: II
Marine Pollutant: No

Air Transport (International Air Transport Association Dangerous Goods Regulations):

UN Number: 1170
Proper Shipping Name: ETHANOL
Class: 3 Flammable Liquid

Packing Group: II

SECTION 15: REGULATORY INFORMATION

Regulatory Information:

Classification: Hazardous according to criteria of NOHSC. Dangerous Good according to criteria of the Australian Dangerous Goods Code.

Poisons Schedule: Not Scheduled

SECTION 16: OTHER INFORMATION AND CONTACT POINT

Additional Information

Australian Standards References:
AS 1020 The Control of undesirable static electricity.
AS 1076 Code of Practice for selection, installation and maintenance of electrical apparatus and associated equipment for use in explosive atmospheres (other than mining applications) – Parts 1 to 13.
AS/NZS 1336 Recommended Practices for Occupational Eye Protection.
AS/NZS 1715 Selection, Use and Maintenance of Respiratory Protective Devices.
AS/NZS 1716 Respiratory Protective Devices.
AS 1940 The Storage and Handling of Flammable and Combustible Liquids.
AS 2161 Industrial Safety Gloves and Mittens (excluding electrical and medical gloves).
AS 2380 Electrical equipment for explosive atmospheres – Explosion Protection Techniques (Parts 1 to 9).
AS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules).

FURTHER INFORMATION CAN BE OBTAINED FROM:

Blue Diamond Australia Pty Ltd. ABN 75 003 068 344
A 10, 112 – 124 Cowles Road, Mosman, NSW 2088 Australia
Tel: +61-2-99602511 Fax: +61-2-99695967 Email: bl.diam@bigpond.net.au

DISCLAIMER

All statements, technical information and recommendations contained herein are based on information which we believe to be reliable. The accuracy and completeness of such information are not warranted or guaranteed. We cannot anticipate all conditions under which this information or our products may be used. We assume no liability or responsibility for loss or damage resulting from the improper use of handling of our products, from incompatible product combinations or from the failure to follow instructions, warnings and advisories in the product's label or Material Safety Data Sheet. Users should make their own investigations to determine the suitability of the information for their particular purposes.