

Material Safety Data Sheet: MSDS

ISSUE Date February 2008 Product Name: **mepBLITz Coolant**
Classified as hazardous according to NOHSC

For use in mepBLITz Mobile Electropolisher from Metal Science Technologies Pty Ltd

IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Product Name mepBLITz Coolant

Company Name Metal Science Technologies Pty Ltd

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Telephone Number Tel: 0419 408 797 /02 66878075

Metal Science Technologies Pty Ltd does not warrant that this product is suitable for any other use or purpose than with a mepBLITz machine. Preliminary testing of the product before use or application is recommended. Any reliance or purported reliance upon Metal Science Technologies Pty Ltd with respect to any skill or judgment or advice in relation to the suitability of this product of any other purpose is disclaimed.

Recommended Use: Circulating Coolant in mepBLITz Electropolishing

HAZARD IDENTIFICATION

Product Name: mepBLITz Coolant

Classified as hazardous according to criteria of NOHSC

Classified as Non Dangerous goods according to ADG code

Proper Shipping Name

Ethylene glycol 60% to 90%,denatonium benzoate <1%, corrosion inhibitors <9% ,antifoam <1%

Packing Group Labels Required: COMBUSTIBLE LIQUID, **regulated under AS1940 for Bulk**

Storage purposes only. NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS:UN, IATA,IMDG

Hazchem Code NONE

Poisons Schedule S5

Uses: Engine coolant. Anti-boil, anti-freeze, anti-corrosion

RISK SAFETY

Harmful if swallowed.

HARMFUL - May cause lung damage if swallowed

Wear suitable protective clothing. To clean the floor and all objects contaminated by this material use water and detergent.

Keep away from food drink and animal feeding stuffs.

If swallowed IMMEDIATELY contact Doctor

First Aid

SWALLOWED

- 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.
- Avoid giving milk or oils.
Avoid giving alcohol.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.
- For advice, contact a Poisons Information Centre or a doctor. Phone 13 1126 from anywhere in Australia

EYE

- If in eyes, hold eyelids apart and flush the eye continuously with running water.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor or for at least 15 minutes.
- 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.
- If pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin contact occurs:

- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- 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.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Alcohol stable foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- 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.

FIRE/EXPLOSION HAZARD

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).
- May emit acrid smoke.
- Mists containing combustible materials may be explosive.

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

FIRE INCOMPATIBILITY

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

HAZCHEM: None

Personal Protective Equipment. Gas tight chemical resistant suit.

ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

Slippery when spilt.

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable labelled container for waste disposal.

MAJOR SPILLS

Chemical Class: alcohols and glycols

HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- DO NOT allow clothing wet with material to stay in contact with skin.
- 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.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- 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.

SUITABLE CONTAINER

- DO NOT use aluminium or galvanised containers.
- Metal can or drum

STORAGE INCOMPATIBILITY

- Avoid storage with strong acids, acid chlorides, acid anhydrides, oxidising agents.
- Avoid strong acids, bases.

Incompatible with aluminium. DO NOT heat above 49 deg. C. in aluminium equipment.

STORAGE REQUIREMENTS

Material is hygroscopic, i.e. absorbs moisture from the air. Keep containers well sealed in storage.

- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe storing and handling recommendations.

EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

| Source | Material | TWA ppm | TWA mg/m ³ | STEL ppm | STEL mg/m ³ |
|------------------------------|--|---------|-----------------------|----------|------------------------|
| Australia Exposure Standards | ethylene glycol (Ethylene glycol vapour) | 20 | 52 | 40 | 104 |
| Australia Exposure Standards | ethylene glycol (Ethylene glycol (particulate)) | | | 10 | |

Australia Exposure Standards denatonium benzoate (Inspirable dust (not otherwise classified))

The following materials had no OELs on our records

• water:

CAS:7732- 18- 5

MATERIAL DATA

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal noobservable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In

contrast the MAK Commission (Germany) uses a five category system based on intensive odour, local irritation, and elimination half-life.

However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA. OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

INGREDIENT DATA

ETHYLENE GLYCOL:

Odour Threshold: 25 ppm

NOTE: Detector tubes for ethylene glycol, measuring in excess of 10 mg/m³, are commercially available.

It appears impractical to establish separate TLVs for ethylene glycol vapour and mists. Atmospheric concentration that do not cause discomfort are unlikely to cause adverse effects. The TLV-C is thought to be protective against throat and respiratory irritation and headache reported in exposed humans. NIOSH has not established a limit for this substance due to the potential teratogenicity associated with exposure and because respiratory irritation reported at the TLV justified a lower value.

DENATONIUM BENZOATE:

These "dusts" have little adverse effect on the lungs and do not produce toxic effects or organic disease. Although there is no dust which does not evoke some cellular response at sufficiently high concentrations, the cellular response caused by P.N.O.C.s has the following characteristics:

- the architecture of the air spaces remain intact,
- scar tissue (collagen) is not synthesised to any degree,
- tissue reaction is potentially reversible.

Extensive concentrations of P.N.O.C.s may:

- seriously reduce visibility,
- cause unpleasant deposits in the eyes, ears and nasal passages,
- contribute to skin or mucous membrane injury by chemical or mechanical action, per se, or by the rigorous skin cleansing procedures necessary for their removal. [ACGIH]

This limit does not apply:

- to brief exposures to higher concentrations
- nor does it apply to those substances that may cause physiological impairment at lower concentrations but for which a TLV has as yet to be determined.

This exposure standard applies to particles which

- are insoluble or poorly soluble* in water or, preferably, in aqueous lung fluid (if data is available) and
- have a low toxicity (i.e.. are not cytotoxic, genotoxic, or otherwise chemically reactive with lung tissue, and do not emit ionizing radiation, cause immune sensitization, or cause toxic effects other than by inflammation or by a mechanism of lung overload).

WATER:

No exposure limits set by NOHSC or ACGIH.

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

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber.
- NOTE: The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. Suitability and durability of glove type is dependent on usage. Factors such as:
 - frequency and duration of contact,
 - chemical resistance of glove material,
 - glove thickness and · dexterity, are important in the selection of gloves.

OTHER

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

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 P - | |
| 1000 | 50 - | | A- AUS P |
| 5000 | 50 | Airline * - | |
| 5000 | 100 - | | A- 2 P |
| 10000 | 100 - | | A- 3 P |
| | 100+ | | Airline** |

* - 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 your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator.

Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations.

Provide adequate ventilation in warehouse or closed storage area.

PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Clear red to orange liquid with a mild odour; mixes with water and alcohols.

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Molecular Weight: Not Applicable

Melting Range (°C): Not Available

Solubility in water (g/L): Miscible

pH (1% solution): 8.5 (50%)

Volatile Component (%vol): Not Applicable

Relative Vapour Density (air=1): 2.2 ethyl.
glycol

Lower Explosive Limit (%): 3.2 ethyl glycol

Autoignition Temp (°C): Not Available

State: Liquid

Boiling Range (°C): 183

Specific Gravity (water= 1): 1.114

pH (as supplied): Not Available

Vapour Pressure (kPa): Negligible

Evaporation Rate: Not Available

Flash Point (°C): 116

Upper Explosive Limit (%): 12.8 ethyl.
glycol

Decomposition Temp (°C): Not Available

Viscosity: Not Available

CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

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

Overexposure to non-ring alcohols causes nervous system symptoms. These include headache, muscle weakness and inco-ordination, giddiness, confusion, delirium and coma. Digestive symptoms may include nausea, vomiting and diarrhoea. Aspiration is much more dangerous than ingestion because lung damage can occur and the substance is absorbed into the body. Alcohols with ring structures and secondary and tertiary alcohols cause more severe symptoms, as do heavier alcohols.

If swallowed, the toxic effects of glycols (dihydric alcohols) are similar to those of alcohol, with depression of the central nervous system, nausea, vomiting, and degenerative changes in the liver and kidney.

EYE

There is some 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.

SKIN

Most liquid alcohols appear to act as primary skin irritants in humans. Significant percutaneous absorption occurs in rabbits but not apparently in man.

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.

There is some evidence to suggest that the material may cause mild but significant 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.

INHALED

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

Aliphatic alcohols with more than 3-carbons cause headache, dizziness, drowsiness, muscle weakness and delirium, central depression, coma, seizures and behavioural changes.

Secondary respiratory depression and failure, as well as low blood pressure and irregular heart rhythms, may follow. Nausea and vomiting are seen, and liver and kidney damage is possible as well following massive exposures. Symptoms are more acute the more carbons there are in the alcohol.

CHRONIC HEALTH EFFECTS

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.

There is limited evidence that, skin contact with this product is more likely to cause a sensitisation reaction in some persons compared to the general population.

There is some evidence from animal testing that exposure to this material may result in reduced fertility.

There is some evidence from animal testing that exposure to this material may result in toxic effects to the unborn baby.

Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

TOXICITY AND IRRITATION

Not available. Refer to individual constituents.

ETHYLENE GLYCOL:

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

TOXICITY

Oral (rat) LD50: 4700 mg/kg
Oral (human) LDLo: 398 mg/kg
Oral (child) TDLo: 5500 mg/kg
Inhalation (human) TClO: 10000 mg/m³
Dermal (rabbit) LD50: 9530 mg/kg
Inhalation (rat) LC50: 50100 mg/m³/8 hr
[Estimated Lethal Dose (human) 100 ml;
RTECS quoted by Orica]

Substance is reproductive effector in rats (birth defects).

Mutagenic to rat cells.

IRRITATION

Skin (rabbit): 555 mg(open)- Mild
Eye (rabbit): 100 mg/1h - Mild
Eye (rabbit): 1440mg/6h- Moderate
Eye (rabbit): 500 mg/24h - Mild
Eye (rabbit): 12 mg/m³/3D

DENATONIUM BENZOATE:

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

TOXICITY

Oral (rat) LD50: 584 mg/kg
Oral (rabbit) LD50: 508 mg/kg
Somnolence, tremor, ataxia recorded.

IRRITATION

Nil Reported

WATER:

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

No significant acute toxicological data identified in literature search.

ECOLOGICAL INFORMATION

DO NOT discharge into sewer or waterways.

Refer to data for ingredients, which follows:

ETHYLENE GLYCOL:

Hazardous Air Pollutant: Yes

Fish LC50 (96hr.) (mg/l): 18500- 4100

Algae IC50 (72hr.) (mg/l): 180000

log Kow (Prager 1995): - 1.36

log Kow (Sangster 1997): - 1.36

log Pow (Verschueren 1983): - 1.93

BOD5: 35%

COD: 94%

ThOD: 1.26

Half- life Soil - High (hours): 288

Half- life Soil - Low (hours): 48

Half- life Air - High (hours): 83

Half- life Air - Low (hours): 8.3

Half- life Surface water - High (hours): 288

Half- life Surface water - Low (hours): 48

Half- life Ground water - High (hours): 576

Half- life Ground water - Low (hours): 96

Aqueous biodegradation - Aerobic - High (hours): 288

Aqueous biodegradation - Aerobic - Low (hours): 48

Aqueous biodegradation - Anaerobic - High (hours): 1152

Aqueous biodegradation - Anaerobic - Low (hours): 192

Aqueous biodegradation - Removal secondary treatment - High (hours): 100%

Aqueous biodegradation - Removal secondary treatment - Low (hours): 80%

Photooxidation half- life water - High (hours): 566000

Photooxidation half- life water - Low (hours): 6400

Photooxidation half- life air - High (hours): 83

Photooxidation half- life air - Low (hours): 8.3

DO NOT discharge into sewer or waterways.

log Kow: -1.93- -1.36

Half-life (hr) air: 24

Henry's atm m³ /mol: 6.00E-08

BOD 5 if unstated: 0.15-0.81,12%

COD: 1.21-1.29

ThOD: 1.26

BCF: 10-190

Toxicity Fish: LC50(96)118-550mg/L

Toxicity invertebrate: cell mult. inhib.135-1127mg/L

Bioaccumulation: not sig

Nitrif. inhib.: inhib at 125mg/L

Anaerobic effects: no degrad

Effects on algae and plankton: cell mult. inhib. algae 105-710mg/L

Degradation Biological: little processes Abiotic: photol&hydrol notsig,RxnOH*

In the atmosphere ethylene glycol exists mainly in the vapour phase. It

is degraded in the atmosphere by reaction with photochemically produced

hydroxy radicals (estimated half-life 24-50 hours).

Ethylene glycol does not concentrate in the food chain.

DENATONIUM BENZOATE:

Cationic substances, and their polymers and those polymers that are reasonably anticipated to become cationic in the natural aquatic environment (pH range 4-9) may be environmental hazards. Exempt from this concern are those polymers to be used only in solid phase, such as ion exchange resins, and where the FGEW (Functional Group Equivalent Weight) of cationic groups is not 5000 and above.

Cationic groups such as alkylsulfoniums, alkylphosphoniums and quaternary ammonium polymers are highly toxic to fish and other aquatic organisms. Similarly potentially cationic groups such as amines and isocyanates are of concern. Some cationics, however, may fall into the category of PLCs (polymers of low concern) provided they possess low charge density, and/or are not water-soluble or are not self-dispersing polycarboxylates or poly- (aromatic or aliphatic) sulfonate polymers.

The toxicity of quaternary ammonium compounds is known to be greatly reduced in the environment because of preferential binding to dissolved organics in surface water

DISPOSAL CONSIDERATIONS

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

TRANSPORTATION INFORMATION

Labels Required: COMBUSTIBLE LIQUID, regulated under AS1940 for Bulk Storage purposes only.

HAZCHEM: None

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS:UN, IATA, IMDG

REGULATIONS

mepBLITz Coolant

No regulations applicable

ethylene glycol (CAS: 107-21-1) 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)

Australia National Pollutant Inventory

Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)

Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 5

Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6

IMO IBC Code Chapter 17: Summary of minimum requirements

IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk

IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances

International Council of Chemical Associations (ICCA) - High Production Volume List

OECD Representative List of High Production Volume (HPV) Chemicals

denatonium benzoate (CAS: 3734-33-6) is found on the following regulatory lists;

Australia Exposure Standards

Australia Inventory of Chemical Substances (AICS)

water (CAS: 7732-18-5) is found on the following regulatory lists;

Australia Inventory of Chemical Substances (AICS)

IMO IBC Code Chapter 18: List of products to which the Code does not apply

OECD Representative List of High Production Volume (HPV) Chemicals

END MSDS