

**GOLD STANDARD  
PREMIUM PRODUCTS  
(February 2007)**



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**Quality  
Endorsed  
Company**  
ISO 9002 Lic 10551  
Standards Australia  
ABN 58 050 543 194

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## INTRODUCTION

**Geotechnical Services Pty Ltd** is a NATA and ISO accredited, specialised analytical laboratory and consulting service established in 1990. Our Condition Monitoring division analyses lubricating oils, performs fuel quality testing to detect operational problems and to help plan machinery maintenance on equipment used in mining, fishing, agricultural and transport industries.

**Geotech's Condition Monitoring Division** is known for its expertise and state of the art equipment as well as its experience in all aspects of oil analysis and consulting. It is through our laboratory activities that we detect common problems occurring in machinery operation. For many years, we have produced a range of chemical treatments to solve problems relating to contaminated fuel storage systems.

The objective of **Geotechnical Services Pty Ltd** in the manufacture of the **Gold Standard Premium Product** range is to produce products of superior technical standards, capable of meeting the specific requirements of our customers. The current range of products that we manufacture and distribute is **Cladocide Gold and Bio-Kill**. Each of these products is designed for specific applications and is manufactured to a very high technical standard. The effectiveness of the product in solving your problem is our guarantee that you will receive excellent value for money.

The information supplied in this booklet is designed to help make you more familiar with the **Gold Standard Premium Product** range. If you have any additional queries, please call to discuss your requirements with our sales representative or experienced technical advisors.

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## MICROBIOLOGICAL GROWTHS IN DIESEL FUEL

### AN INTRODUCTION TO CLADOCIDE GOLD

**Cladocide Gold** is a liquid chemical treatment designed to prevent or eradicate fungal and bacterial growths in diesel and other fuel storage systems. **Cladocide Gold** contains an antioxidant and an additive to clean, protect and lubricate fuel system components.

**Cladocide Gold** is easy to use and is compatible with a wide variety of fuel systems and associated components. It is soluble in both fuel and water and partitions between the fuel and water layers occurring in most storage tanks, thus preventing any fungal and bacterial infestations.

#### FUNGAL AND BACTERIAL GROWTH

Several forms of fungi can survive and multiply in hydrocarbon products and fuels, occurring in all components of fuel handling systems, storage tanks, fuel delivery trucks, delivery lines and fuel tanks of machines. These fungi grow into long strings and form large mats or globules. The growth appears slimy and usually is black, green or brown, though the colour may vary. It usually commences at the interface between the fuel and the water and in only a short period of time will spread throughout the fuel itself. The growth may spread throughout the storage tank system and can enter the fuel systems of plant and machinery when fuel is dispensed. Pumping the fuel through the machine fuel system completes the spread.

The most common form of fungal growth is *Cladosporium resinae*. *Cladosporium* grows rapidly under varying conditions, needing only trace amounts of water and minerals to sustain it. As it grows, it chemically alters the fuel to produce water, sludge and other by-products, thus enhancing its own environment. *Cladosporium* and its by-products can attack fuel tanks, fuel lines, hoses and other expensive components of the fuel system.

Once contaminated, related problems such as fuel tank gauge damage and premature injector or injector pump failures are commonplace. Premature filter blockage also occurs due to both fungal residue and fuel "dropout". This damage is not only caused by blockage but also by the loss of the lubricating and cooling efficiency of the fuel itself, resulting in partial or total seizure of the components. The by-product of the growth due to the reduction in chemical stability or oxidation causes this.

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## DETECTION AND CONFIRMATION

The growth can be visually detected in the form of mats or slimy masses within the tank, fuel system or in the fuel filters. The fuel may develop a sulfurous odour, similar to that of rotten eggs. The exhaust of machinery using contaminated fuel in some cases will be darker due to the reduced combustion efficiency of the fuel. Where there is no clear evidence but contamination is suspected, fuel samples should be taken and forwarded to Geotech's laboratory for testing.

Microbiological growths such as *Aspergillus flavus*, *Pseudomonas aeruginosa*, oxidising yeast species and sulphate reducing bacteria are the causes of other microbial infections in diesel fuels. These growths do not usually occur until a fungal growth is present, but occasionally have been reported in isolation.

Although premature darkening and oxidation of fuel is one of the symptoms of fungal contamination, it should be remembered that this may also be due to poor refinery production control or mixing of fuels produced by different refining techniques, both of which can, in some instances, result in oxidation stability loss.

Long term storage can also result in oxidation stability loss, the most common indications of which are darkening and development of odours. **Cladocide Gold** contains a powerful antioxidant to increase resistance to oxidative attack and prolong storage stability.

## PREVENTION RATHER THAN CURE

The problem of fungal attack on diesel fuel can be alleviated by a two step procedure:

- i) **regular** use of a biocide such as **Cladocide Gold**.
- ii) proper maintenance of the fuel handling system. This is the key step, because the effectiveness of even the most efficient fungicide (or other biocide) can be reduced if the fuel is allowed to retain fungal debris and high levels of water. Proper maintenance requires regular removal of accumulated bottom sediments, drainage of sump areas and filtering to remove suspended debris.

Filters and screens should be inspected regularly. Storage tanks should be included in regular cleaning and inspection schedules. In some instances, good housekeeping may be all that is needed to prevent fungal growth. However, contamination occurs very easily and even the best maintained system can benefit from the preventative use of **Cladocide Gold**.

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## INSTRUCTION FOR THE USE OF CLADOCIDE GOLD

Before commencing any treatment it is important to remove all water present in the system if possible.

### Infected Systems

- 1) If there is an existing infestation, the system or storage facility should be treated at the rate of 1L per 1000L of fuel for at least 12 hours. This should be followed up by cleaning and external filtering (where required) of the fuel to remove debris and fungal material as water, chemical and physical debris are released as the fungal mats break down.
- 2) When treated, the fungal growth loses its slimy nature and is more easily filtered out. Filtration is better than dispersing the debris into small particles, because of the very abrasive nature of the water and fungal debris, which will affect especially the injector pump. A filtering system capable of removing particles of less than five microns is ideal for this process, due to its ability to remove most of the particles created by the fuel “dropout” whilst also removing other debris.
- 3) The fuel system or storage facility should be checked for damage resulting from the contamination and appropriate repairs should be performed. The breathing system needs to be suited to the operating environment and free from defects or blockage.
- 4) Treatment should continue for a minimum of 6 months to allow all spores to mature and be eradicated.
- 5) The most effective application of **Cladocide Gold** is to administer it to partially filled tanks immediately prior to filling, or to flowing fuel to ensure complete blending. Where this is not possible, **Cladocide Gold** will blend with only slight agitation.
- 6) Tanks should be completely filled during the treatment process to ensure contact of all tank surface areas with **Cladocide Gold**.

Do not add **Cladocide Gold** to empty fuel tanks, as water is usually present at the bottom. If there is a sufficient volume of water, all of the Cladocide will dissolve in the water and this could reduce or negate the effectiveness of the product.

The product will, however, successfully treat small volumes of water bottoms if diesel fuel is present.

### Maintenance Treatment

- 1) In the case of new or uncontaminated tanks, a maintenance dosage rate of 1L per 4000L of fuel will provide the required protection. However, this rate will not be sufficient if previously infected fuel is introduced to the tank or system. In this event, the killer dose must be applied.
- 2) Tanks should be completely filled during the treatment process to ensure contact of all tank surface areas with **Cladocide Gold**.

### Storage and Handling

*For detailed instructions refer to the Material Safety Data Sheet at the back of this booklet or see the label on the container.*

Store **Cladocide Gold** in a cool dry place away from direct sunlight.

Ensure container caps are screwed on tightly when not in use to prevent solid formation caused by prolonged exposure to atmospheric moisture and the associated loss of effectiveness. When using the product, ensure the lid area is free from dust and dirt prior to opening. Apart from preventing contamination of the product, this will ensure that the fuel system is not being contaminated during treatment.

Avoid contact with paintwork, as the strong solvent characteristics of **Cladocide Gold** may cause damage.

### Container Sizes

**Cladocide Gold** is available in four convenient container sizes: 1 litre, 5 litre, 20 litre and 205 litre drums.

### SPECIAL ADDITIONAL ADVANTAGES

**Cladocide Gold** also contains preservatives and compounds, which clean and protect your engine and improve the quality of your diesel fuel. Benefits of improved oxidation stability will, apart from preventing degradation and oxidation as a result of fungal contamination, improve storage life and increase operating efficiency.

## CLADOCIDE GOLD

### SUMMARY

Microbiological contamination of diesel fuel is indicated by the following symptoms:

*Premature oxidation (darkening) of fuel;*

*Excessive sludge build-up in tank;*

*Reduced injector and pump life due to fouling and corrosion from by-products;*

*Power loss;*

*Excessive exhaust smoke;*

*Filter blockage by dark brown or black slimes; and*

*Difficulty in starting engine.*

Should any or all of the above be experienced, it is quite possible that a microbial infection or another problem may exist within the fuel storage facility of the fuel system.

Treatment is a two-stage process:

- 1) Remove water, c
- 2) Clean the fuel tanks, repair any damage and replace the fuel filters.
- 3) Introduce the correct volume of **Cladocide Gold** to the fuel system while the tank is being refilled.

### DOSAGE

- 1) Initial "KILLER" dosage of 1L per 1000L maintained for at least 12 hours.
- 2) Maintenance dosage of 1L per 4000L every fill thereafter.

It is recommended that this maintenance dosage be continued on an indefinite basis to ensure on-going protection. This dosage costs less than **half a cent a litre**. The extra cost is justified by:

- 1) an extended fuel storage life and prevention of re-contamination;
- 2) the prevention of fuel system damage.
- 3) the increase in machine performance;

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## CLADOCIDE GOLD

### BENEFITS OF USE

- 1) Scientifically formulated as a broad-spectrum biocide designed to control microbial growths in diesel fuel.
- 2) Very low cost per litre treated. At less than half a cent per litre, there is no cheaper insurance policy for your fuel storage systems.
- 3) Antioxidant included giving;
  - reduced formation of corrosive products in fuel tanks
  - maintenance of fuel attributes (i.e. reduced oxidation)
  - extended fuel storage life.
- 4) Dead fungal and bacterial debris is trapped in filters and does not continue moving through the fuel system, damaging injectors and injector pumps.
- 5) Reduction in fuel degradation and corrosive by-products means increased life of injector pump and injectors.

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# MATERIAL SAFETY DATA SHEET

## CLADOCIDE

Hazardous according to criteria of Worksafe Australia

GEOTECHNICAL SERVICES PTY LTD  
Telephone 08 9458 8877  
Emergency telephone 08 9359 1003

41-45 Furnace Road  
Welshpool WA 6106

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### IDENTIFICATION

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#### General

Product Name : **CLADOCIDE GOLD**

UN No.:	N/A
Dangerous Goods Class:	N/A
Subsidiary Risk:	None Allocated
Hazchem Code:	N/A
Pack Group:	0
EPG:	N/A
Poisons Schedule:	N/A

#### Uses :

Additive to hydrocarbon fuels as a broad-spectrum biocide and oxidation stabiliser.

#### Physical Description / Properties

Appearance : Colourless transparent liquid with mild characteristic odour.  
Formula : C<sub>5</sub>H<sub>12</sub>O<sub>3</sub>, C<sub>6</sub>H<sub>14</sub>O<sub>3</sub>  
Boiling Point : 234 deg C  
Melting Point : -68 deg C  
Vapour Pressure : 0.01 mm Hg (1 atmosphere)  
Specific Gravity : 0.953 (water = 1)  
Flash Point : Open Cup 91 deg C  
pH : (N/A)  
Solubility in water : Sol. g/l (25 deg C)  
Flammability Limits (as percentage volume in air)  
Lower Explosion Limit : 0.9  
Upper Explosion Limit : 16

#### Other Properties

Vapour density (air = 1) = 5.6 Autoignition temperature = 215 deg C

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## Ingredients

Chemical Entity	CAS No.	Proportions (%)
DIETHYLENE GLYCOL MONOMETHYL ETHER		> 60
DIETHYLENE GLYCOL MONOBUTYL ETHER	[ 112-34-5]	< 30
OTHER/ANTIOXIDANTS	[ 128-37-0]	< 3

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## HEALTH HAZARD INFORMATION

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### Health Effects - Acute

#### Swallowed

Slightly toxic. May produce signs of intoxication characterised by incoordination, dizziness, drowsiness, headache, nausea, mental confusion, possibly slurred speech, and stupor, depending on the quantity of material ingested.

#### Eye

Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, marked excess redness and swelling of the conjunctiva, and chemical burns of the eye.

#### Skin

Brief contact is not irritating. Prolonged contact causes mild to moderate local redness and swelling. Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material.

#### Inhaled

Vapour from heated material may cause headache, nausea, and dizziness.

### Health Effects - Chronic

Prolonged or repeated overexposure to mist or vapour generated at high temperatures may result in the inhalation of harmful amounts of material.

### First Aid

#### Swallowed

If patient is fully conscious, give two glasses of water. Induce vomiting. Obtain medical attention.

#### Eye

Immediately flush eyes with water and continue washing for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist.

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**Skin**

Remove contaminated clothing. Wash skin with soap and water. Obtain medical attention if irritation persists. Wash clothing before re-use.

**Inhaled**

Remove to fresh air. Obtain medical attention if symptoms persist.

**First Aid Facilities**

Ensure an eye bath and safety shower are available and ready for use.

**Advice to Doctor**

There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

**Toxicity Data**

Oral LD50 = 2400 mg/kg (Mouse) ; 2200 mg/kg (Rabbit) ; 5660 mg/kg (Rat)

Dermal LD50 = 2700 mg/kg (Rabbit)

Inhalation LC50 = not available

High risk of teratogenic effects. Pregnant women should not be exposed to the product

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**PRECAUTIONS FOR USE**

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**Exposure Standards**

No exposure limit has been established for this product.

**Engineering Controls**

General (mechanical) room ventilation is expected to be satisfactory. Clean up affected areas with liquid-absorbent material.

**Personal Protection**

Wear appropriate protective eyeglasses or chemical safety goggles. Wear appropriate gloves and protective clothing to minimise contact with skin. Always wear an approved respirator when vapour concentrations are high.

**Flammability**

This material has a relatively low autoignition temperature; 228 degrees C. Combustible liquid.

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## SAFE HANDLING INFORMATION

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### Storage / Transport

Store in a cool, dry area away from direct heat or flames. Store in tightly sealed containers. Use with adequate ventilation. Use spark-proof tools and explosion-proof equipment. Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat, sparks or open flames.

### Packaging / Labeling

UN No. N/A  
Class N/A  
Sub Risk None Allocated  
Hazchem Code N/A  
Pack Group 0  
EPG No. N/A  
Shipping Name CLADOCIDE  
Hazard IRRITANT

#### Risk Phrases

R36 Irritating to eyes.

R61 May cause harm to unborn child.

#### Safety Phrases

S26, S53-24/25-45

In case of contact with eyes, rinse immediately with plenty of water and contact a doctor or Poisons Information Centre.

In case of accident or if you feel unwell, contact a doctor or Poisons Information Centre immediately.

### Spills and Disposal

#### Spills

Clean-up personnel should wear full protective clothing including self-contained breathing apparatus in confined spaces. Remove all sources of ignition - NO SMOKING. Prevent contamination of soil and water. Prevent from spreading into drain, ditches or rivers by using sand, earth, or other appropriate barriers.

#### Disposal

Dispose of in accordance with all Local, State and Federal regulations at an approved waste disposal facility by incineration.

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## FIRE AND EXPLOSION HAZARD

### Fire / Explosion

Do not distill to dryness. Avoid excessive temperature or prolonged reflux, such as in batch distillations. Avoid strong alkalies, high temperatures in the presence of strong bases, acids or strong oxidising agents. Burning can produce the following combustion products : carbon monoxide and/or carbon dioxide. Hazardous polymerisation will not occur.

### Extinguishing Media

Apply alcohol-type or all-purpose-type foam by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires. Fire-fighters should wear full protective clothing including self-contained breathing apparatus.

## OTHER INFORMATION

At very low concentrations in water, this product is biodegradable in a biological wastewater treatment plant. Mobility : dissolves in water.

Product remaining on soil surface will partly evaporate, but a significant proportion will remain after one day. Persistence/degradability : readily biodegradable. Oxidises rapidly by photo-chemical reactions in air.

Bioaccumulation : does not bioaccumulate. Acute toxicity - fish : LC50 : >100 mg/L Acute toxicity - daphnia : EC50 : >100 mg/L Acute toxicity - algae : IC50 : >100 mg/L

### Contact Points

**Organisation**                      **Telephone** 08-9458 8877  
Ask For Operations Manager  
Geotechnical Services Pty Ltd

**Location**                              41 Furnace road  
Welshpool WA

**Poisons Information Centre**                      **131126**

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## BIOKILL

**BIO-KILL** is highly effective at preventing the growth of microorganisms in liquid hydrocarbon fuels, such as aviation and diesel fuel, home heating oil and kerosene as well as petroleum feedstocks. Bio-Kill microbiocide eradicates microbial growth in contaminated fuel systems and also provides long-term protection to these systems. The product is soluble in both the fuel and water phases and thus protects both phases from microbial growth.

### COMPLETE SYSTEM PROTECTION

#### Protection of Both Fuel and Water Phases

Bio-Kill will partition into both fuel and water phases. The two active components in Bio-Kill concentrate at different levels in the fuel phase and in the water phase. The concentration in each phase at recommended use levels effectively prevents the growth of microorganisms in the whole system, especially at the interface, where microbial growth is most likely to occur.

### PERFORMANCE ADVANTAGES

Bio-Kill offers a number of outstanding advantages:

#### Broad Spectrum Activity

Bio-Kill controls the wide variety of bacteria and fungi found in fuel systems.

#### Eradication of Microbial Growth

Bio-Kill quickly kills microorganisms in already contaminated fuel systems.

#### Long Term Preservation

Bio-Kill protects stored fuels for extended periods of time from microbial growth. Systems treated with Bio-Kill resist recontamination upon reinoculation or addition of new fuel.

#### Complete System Protection

Bio-Kill protects both fuel and water phases from microbial contamination.

#### Compatibility with Fuel, Fuel System Components, and Engines

Bio-Kill has no negative effects on fuels, fuel additives, or system components.

#### Effective in Different Fuel Types

Bio-Kill is effective in most fuel types that are susceptible to microbiological contamination.

## BROAD SPECTRUM ACTIVITY OF BIO-KILL

Tables 2 and 3 demonstrate the broad-spectrum activity of Bio-Kill. As the data show, Bio-Kill is effective at low concentrations. The levels shown in the tables are the minimum concentrations of biocide required to inhibit the growth of various microorganisms under ideal laboratory conditions.

TABLE 2

### CONCENTRATIONS OF BIO-KILL REQUIRED TO CONTROL DIFFERENT BACTERIA

<b>Test Bactrium</b>	<b>Bio-Kill (mL/100L)</b>
<b>Gram Positive</b>	
Bacillus cereus var. mycoides	130
Bacillus subtilis	130
Brevibacterium ammoniagenes	130
Cellulomonas sp.	400
Sarcina lutea	330
Staphylococcus aureus	130
Staphylococcus epidermidis	130
Streptomyces albus	70
<b>Gram Negative</b>	
Achromobacter parvulus	130
Alcaligenes faecalis	130
Azotobacter vinelandii	330
Enterobacter aerogenes	330
Escherichia coli	330
Desulfovibrio desulfuricans	170
Flavobacterium suaveolens	600
Proteus vulgaris	330
Pseudomonas aeruginosa	330
Pseudomonas fluorescens	130
Pseudomonas oleoverans	330
Salmonella typhosa	330
Shigella sonnei	130

TABLE 3  
CONCENTRATIONS OF BIO-KILL REQUIRED TO CONTROL DIFFERENT FUNGI

<b>Test Fungus</b>	<b>Bio-Kill (mL/1000L)</b>
Alternaria dianthicola	200
Aspergillus foetidus	530
Aspergillus niger	600
Aspergillus oryzae	330
Aspergillus repens	400
Aureobasidium pullulans	300
Candida albicans (yeast)	330
Chaetomium globosum	600
Cladosporium (Hormonoconis) resiniae	330
Fusarium sp.	130
Gliocladium fimbriatum	600
Lentinus lepidus	270
Gleophyllum trabeum	400
Mucor rouxii	330
Penicillium finculosum	330
Penicillium variabile (glaucum)	130
Phoma glomerata	200
Phoma herbarum (pigmentivora)	130
Rhizopus stolonifer	300
Rhodotorula rubra (yeast)	130
Saccharomyces cerevisiae (yeast)	130
Trichosporon	130

### ERADICATION OF MICROBIAL GROWTH IN CONTAMINATED SYSTEMS

Bio-Kill begins to reduce microbial populations in contaminated fuel systems within 5 hours. Complete control of microbial growth is achieved in 24 to 72 hours.

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## **LONG TERM PRESERVATION OF FUELS**

Bio-Kill effectively preserves fuels for extended periods of time and helps fuel systems resist future microbial contamination. Adding BIO-KILL at levels from 100 to 200 ppm protects fuels from microbial growth for extended periods. Even after reinoculation, fuel systems treated with Bio-Kill remained free of microbial growth provided free water was absent from the system.

Actual field tests have shown Bio-Kill to be effective for periods of four months or more, depending on storage conditions (ie. fuel: water ratio, turnover of the fuel, etc.).

The corrosive components of Bio-Kill preferentially accumulate in the water phase. This could lead to sufficiently high concentrations of corrosive compounds to begin damaging components. Therefore, it is recommended any water be drained from the fuel storage tank after **72 hours** of Bio-Kill treatment.

## **COMPATIBILITY WITH FUELS, FUEL SYSTEM COMPONENTS, AND ENGINES**

Provided Bio-Kill is used as directed, there have been no reported short term negative effect on fuels or on metals, sealants and other materials found in fuel systems and engines (see above).

## **DIRECTIONS FOR USE**

Bio-Kill is recommended for the control of bacteria and fungi in kerosene, heating oils, diesel fuels, residual fuels, coal slurries, liquefied petroleum gases and other petroleum feedstocks (such as crudes).

### **Method of Addition**

Bio-Kill should be dispensed directly into a fuel tank, storage tank or flowing stream of fuel in a manner that ensures uniform distribution in the fuel system.

While any method of addition that insures uniform distribution is preferred, less precise methods, such as dumping, will not generally affect the performance of the biocide. Pre-dilution of Bio-Kill in the fuel is not necessary since the level of biocide in the pre-mix may exceed the solubility level in fuel. Direct contact of Bio-Kill with water will not affect the performance of the product or result in any solids formation.

### **Curative Dose**

When the system is noticeably fouled, levels of 100 mL of Bio-Kill to 1000 L of fuel, will quickly begin to kill microorganisms. Dosage can be repeated periodically to maintain control of these microorganisms. Higher treatment levels may be used in the case of extreme contamination. For recommendations, contact your distributor. Grossly contaminated systems may need to be cleaned physically to remove debris.

### **Maintenance Dose**

Use **Cladocide Gold**.

### **Treatment of Fuel Storage Tank Effluence**

The active components of Bio-Kill will migrate preferably to the water bottoms of fuel storage tanks. Concentrations will depend on several factors - the initial treatment level, the fuel: water ratio, the length of storage time before discharge, and the rate of turnover of fuel.

Most biocides, including Bio-Kill, are toxic to aquatic species. Wildlife and water bottoms containing biocides must not be discharged into public waters until the biocides are deactivated.

## **DEACTIVATION METHODS**

The active ingredients of Bio-Kill are readily degraded to non-toxic components by the addition of sodium metabisulphite. After mixing and allowing time for degradation reaction to occur, the effluent can be discharged in the intended manner.

### **Directions for Deactivation**

- (1) Drain off the water bottoms into a pit or holding tank.
- (2) Add the deactivation solution to the water bottoms and mix completely.
- (3) Allow the mixture to stand for 30 minutes prior to discharge to ensure complete deactivation.

### **Environmental Impact of Deactivated BIO-KILL**

As the deactivated components are non-toxic, the environmental impact is minimal.

**Handling Precautions**

Do not get in eyes, on skin or clothing. Wear goggles or face shield and rubber gloves when handling. Avoid breathing vapour or mist. Avoid contamination of food or public waters. Do not take internally. Wash thoroughly after handling. Avoid repeated dermal contact with water bottoms from treated fuel.

**First Aid Measures**

After contact with eyes: **FLUSH IMMEDIATELY** with copious amounts of water for at least 15 minutes with eyes held open. Get prompt medical attention, but flush first.

After contact with skin: **FLUSH IMMEDIATELY** with plenty of water for at least 15 minutes. Shower with soap and water. Wash contaminated clothing before rewearing.

If inhaled: Remove victim immediately to fresh air. If not breathing, apply artificial respiration. If breathing is difficult, give oxygen. Call a physician.

If swallowed and victim is conscious: Dilute by giving two glasses of water to drink and call a physician. Never give anything by mouth to an unconscious person.

**Note to physician: MUCOSAL DAMAGE MAY CONTRAINDICATE THE USE OF GASTRIC LAVAGE. MEASURES AGAINST CIRCULATORY SHOCK, RESPIRATORY DEPRESSION AND CONVULSIONS MAY BE REQUIRED.**

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## **SPILL DECONTAMINATION PROCEDURE FOR BIO-KILL**

Spills Of Bio-kill can be deactivated using sodium metabisulphite. Personnel cleaning up spills should wear protective clothing consisting of splash goggles or face shield, plastic rain jacket and trousers, rubber boots or impervious shoes, and rubber gloves.

### **To handle a spill:**

1. Absorb as much of the spilled Bio-Kill as possible using spill control pillows or an absorbent material such as sand, diatomaceous earth or Kitty Litter.
2. Place the contaminated absorbent into a container with a polyethylene liner. The contaminated absorbent may be deactivated when the immediate emergency of handling the spill has been resolved.
3. Cover the spill area with sodium metabisulphite. Allow 30 minutes to ensure the biocide is fully neutralised, then flush with water to a chemical or municipal sewer.
4. Treat the contaminated absorbent in the disposal container with at least 500 g deactivator per litre of spilled Bio-Kill.
5. Rinse hands with gloves on. Then carefully peel the gloves off by pulling on the outside of the glove sleeve, turning them inside out as you remove them. Put gloves into the disposal container.
6. Allow disposal container to sit open for 48 hours to avoid pressure build-up, then seal and dispose of it by landfilling in accordance with local, State and Federal regulations.

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# MATERIAL SAFETY DATA SHEET

## BIOKILL

Hazardous according to criteria of Worksafe Australia

GEOTECHNICAL SERVICES PTY LTD  
Telephone 08 9458 8877  
Emergency telephone 08 9359 1003

41-45 Furnace Road  
Welshpool WA 6106

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### IDENTIFICATION

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#### General

Product Name : **BIO-KILL GOLD**

UN No.: 2922  
Dangerous Goods Class: 8  
Subsidiary Risk: S6.1(a)  
Hazchem Code: 2X  
Pack Group: II  
EPG: 8CI  
Poisons Schedule: N/A

#### Uses:

Additive to hydrocarbon fuels as a broad-spectrum biocide.

#### Physical Description / Properties

Appearance: Colorless transparent liquid with mild characteristic odour.  
Formula : C<sub>5</sub>H<sub>12</sub>O<sub>3</sub>, C<sub>6</sub>H<sub>14</sub>O<sub>3</sub>  
Boiling Point: 200 deg C  
Melting Point: NO DATA  
Vapour Pressure: 0.1 mm Hg (1 atmosphere)  
Specific Gravity: 1.044 (water = 1)  
Flash Point: Closed cup 138 deg C  
pH : (4.4)  
Solubility in water: Sol. g/l (25 deg C)  
Flammability Limits (as percentage volume in air)  
Lower Explosion Limit: no data  
Upper Explosion Limit: no data

## Other Properties

Vapour density (air = 1) =0.65 Autoignition temperature = no data

## Ingredients

Chemical Entity	CAS No.	Proportions (%)
DIPROPYLENE GLYCOL	1110-98-5	> 80
KATHON	26172-55-4, 2682-20-4	< 20

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## HEALTH HAZARD INFORMATION

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### Health Effects - Acute

#### Swallowed

Material is harmful if swallowed. May produce uncoordination, dizziness, drowsiness, headache, nausea, mental confusion, stupor and death, depending on the quantity of material ingested.

#### Eye

Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, marked excess redness and swelling of the conjunctiva, and chemical burns of the eye. Can cause permanent irreversible eye injury

#### Skin

This material is harmful absorbed through the skin. Material can cause burns, corrosion to the skin and allergic contact dermatitis. Skin irritation effects can be delayed for hours

#### Inhaled

Vapour from heated material may cause irritation of nose throat and lungs, with headache, nausea, and dizziness.

### Health Effects – Chronic

Prolonged or repeated overexposure to mist or vapour generated at high temperatures may result in the inhalation of harmful amounts of material.

### First Aid

#### Swallowed

If patient is fully conscious, give two glasses of water.  
IMMEDIATELY obtain medical attention.

**Eye**

Immediately flush eyes with water and continue washing for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist.

**Skin**

Remove contaminated clothing. Wash skin with soap and water. Obtain medical attention if irritation persists. Wash clothing before re-use.

**Inhaled**

Remove to fresh air. Obtain medical attention if symptoms persist.

**First Aid Facilities**

Ensure an eye bath and safety shower are available and ready for use.

**Advice to Doctor**

MATERIAL IS CORROSIVE. Possible mucosal damage may contraindicate the use of gastric lavage. Exposure should be directed at the control of symptoms and the clinical condition of the patient.

**Toxicity Data**

Oral LD50 = 457 mg/kg (Rat)

Dermal LD50 = 660 mg/kg (Rabbit)

Inhalation LC50 = 2.6 mg/L for 4 hour (Rat)

Sensitisation data Allergic contact dermatitis observed (Hunan)

High risk of teratogenic effects. Pregnant women should not be exposed to the product.

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**PRECAUTIONS FOR USE**

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**Exposure Standards**

No.	Units	TWA	STEL
1.	mg/m <sup>3</sup>	0.1 a	0.3 a
2.	none	none	none

## Engineering Controls

Use exhaust ventilation with capture velocity of 0.75 m/sec at point of dust or mist evolution. Refer to AS1668.

Clean up affected areas with appropriate absorbent material.

## Personal Protection

Respiratory protection meeting AS1716 and AS1715 must be worn when the exposure standards are exceeded. Above 100 times TWA/TLV or UNKNOWN, wear an Australian Standards approved self-contained breathing apparatus.

Air purifying respirators should be equipped with organic vapour cartridges and dust and mist filters.

Wear appropriate protective eyeglasses or chemical safety goggles. Wear appropriate gloves and protective clothing to minimise contact with skin.

Always wear an approved respirator when vapour concentrations are high.

## Flammability

This material has a relatively low autoignition temperature; 200 degrees C. Combustible liquid.

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## SAFE HANDLING INFORMATION

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### Storage / Transport

Store in a cool, dry area away from direct heat or flames. Store in tightly sealed containers. Use with adequate ventilation. Use spark-proof tools and explosion-proof equipment. Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat, sparks or open flames.

### Packaging / Labeling

UN No.:	2922
Class:	N/A
Sub Risk:	6.1(a)
Hazchem Code:	2X
Pack Group:	II
EPG No.:	8CI
Shipping Name:	BIO-KILL
Hazard:	CORROSIVE, POISONOUS, NOS

## Risk Phrases

R36 Irritating to eyes-CORROSIVE.

## Safety Phrases

S26, S53-24/25-45

In case of contact with eyes, rinse immediately with plenty of water and contact a doctor or Poisons Information Centre.

In case of accident or if you feel unwell, contact a doctor or Poisons Information Centre immediately.

## Spills and Disposal

### Spills

Clean-up personnel should wear full protective clothing including self-contained breathing apparatus in confined spaces. Remove all sources of ignition - NO SMOKING. Prevent contamination of soil and water. Prevent from spreading into drain, ditches or rivers by using sand, earth, or other appropriate barriers.

### Disposal

Dispose of in accordance with all local, State and Federal regulations at an approved waste disposal facility by incineration.

## FIRE AND EXPLOSION HAZARD

### Fire / Explosion

Avoid OXIDISING agents, REDUCING agents, amines, mercaptans and high temperatures. Burning can produce the following combustion products: hydrogen chloride, sulphur dioxide and oxides of nitrogen.

Hazardous polymerisation will not occur.

### Extinguishing Media

Apply alcohol-type or all-purpose-type foam by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires. Fire fighters should wear full protective clothing including self-contained breathing apparatus.

Persistence/degradability: biodegradable. Oxidises by photo-chemical reactions in air.

Bioaccumulation : no data available.

**OTHER INFORMATION**

Mobility: dissolves in water.

This material is considered stable under specified conditions or storage, shipment and/or use.

**Contact Points****Organisation**

**Telephone** 08-9458 8877  
Ask For Operations Manager  
Geotechnical Services Pty Ltd

**Location**

41 Furnace road  
Welshpool WA 6106

**Poisons Information Centre**

**131126**

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## LABORATORY SERVICES

**Geotech** is a NATA registered specialised lubricant and fuel analysis laboratory. We pride ourselves in offering one of the finest machine maintenance monitoring systems available in this country today. The service we offer enables you, the machine operator, to pin point potential problems before they happen, scheduling down time in a cost effective way. Our fully equipped laboratory is specifically geared to analyse new and used engine, transmission and hydraulic oils, greases, coolants and fuels. The tests we are equipped to run include;

Wear metals (21 elements)

Flash point (Fuel dilution)

Total Base Number and Total Acid Number

Viscosity

Oxidation and nitration

Particle counts and sizing

Water content

Microbial Contamination Detection

Ferrography

Oxidation stability (RBOT)

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Oil analysis is an analytical method of knowing what is going on inside your machinery without dismantling it, often pin-pointing problems faster, cheaper and more accurately than a complete component disassembly. When it does come time for repairs it will be corrected completely, first time.

Used oil analysis can also

- tell you whether or not you are using the right oil,
- reduce machinery downtime,
- ensure the correct repairs are made first time,
- match service intervals to application and
- help plan machine maintenance through the detection of;
  - cylinder wall liner wear
  - imminent bearing failure,
  - piston and ring wear,
  - gasket and seal leaks,
  - valve problems,
  - coolant leaks,
  - filter & contamination problems,
  - oil breakdown,
  - fuel dilution and
  - transmission, hydraulic including final drive problems.

**Geotech's** oil analysis is most effective when used as part of an on-going maintenance program. This allows you to develop a 'trend pattern' of the machine's work load, operating conditions and normal levels of wear, contaminants and contaminant burdens.

**Geotech's** oil and fuel analysis program will save you money when used as part of a regular maintenance program by;

- detecting component failure at early stages,
- replacing costly failures during operating periods with a scheduled preventative maintenance approach and
- monitoring lubricant condition to better judge required service intervals.

All samples can be analysed and interpreted within **48 hours** or less.

You will received a detailed report containing;

- analysis results,
- comments and recommendation and
- graphical representation in the form of a trend plot if required.

We will also adapt our service to meet your specific information requirements.

Any abnormalities will be highlighted to enable you to make fast, accurate service decisions which is vital when it comes to the bottom line. We pride ourselves on our technical and service support. If you need any help our experienced technical staff will be very pleased to offer their assistance. Call us today to arrange more effective maintenance for your fleet, big or small.

**NOTICE**

*Our recommendations for use of these products are based upon tests believed to be reliable. Because the use of these products is beyond the control of the manufacturer, no guarantee, expressed or implied, is made to the effects of such or the results to be obtained if not used in accordance with directions or established safe practice.*

*The buyer must assume all responsibility, including injury or damage resulting from its misuse as such, or in combination with other materials.*