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

Product Identifier

<table>
<thead>
<tr>
<th>Product name</th>
<th>Virbac Nitromec Injection Endectocide and Flukicide for Cattle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms</td>
<td>APVMA No: 59844</td>
</tr>
<tr>
<td>Proper shipping name</td>
<td>TOXIC SOLID, ORGANIC, N.O.S. (contains nitroxinil and ivermectin)</td>
</tr>
<tr>
<td>Other means of identification</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses | Use according to manufacturer's directions.

Details of the supplier of the safety data sheet

<table>
<thead>
<tr>
<th>Registered company name</th>
<th>Virbac (Australia) Pty Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>361 Horsley Road Milperra NSW 2214 Australia</td>
</tr>
<tr>
<td>Telephone</td>
<td>1800 242 100</td>
</tr>
<tr>
<td>Fax</td>
<td>+61 2 9772 9773</td>
</tr>
<tr>
<td>Website</td>
<td>au.virbac.com</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:au_customerservice@virbac.com.au">au_customerservice@virbac.com.au</a></td>
</tr>
</tbody>
</table>

Emergency telephone number

<table>
<thead>
<tr>
<th>Association / Organisation</th>
<th>Poisons Information Centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency telephone numbers</td>
<td>13 11 26</td>
</tr>
<tr>
<td>Other emergency telephone numbers</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

<table>
<thead>
<tr>
<th>Poisons Schedule</th>
<th>S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification</td>
<td>Acute Toxicity (Oral) Category 3, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2A, Skin Sensitizer Category 1, Carcinogenicity Category 2, Reproductive Toxicity Category 1B, Lactation Effects, Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation), Acute Aquatic Hazard Category 3, Chronic Aquatic Hazard Category 2</td>
</tr>
</tbody>
</table>


Label elements

<table>
<thead>
<tr>
<th>Hazard pictogram(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Hazard pictogram" /></td>
</tr>
</tbody>
</table>

 SIGNAL WORD | DANGER |

Hazard statement(s)

<table>
<thead>
<tr>
<th>Hazard statement(s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H301</td>
<td>Toxic if swallowed.</td>
</tr>
<tr>
<td>H315</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>H317</td>
<td>May cause an allergic skin reaction.</td>
</tr>
<tr>
<td>H351</td>
<td>Suspected of causing cancer.</td>
</tr>
<tr>
<td>H360D</td>
<td>May damage the unborn child.</td>
</tr>
<tr>
<td>H362</td>
<td>May cause harm to breast-fed children.</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation.</td>
</tr>
<tr>
<td>H402</td>
<td>Harmful to aquatic life.</td>
</tr>
</tbody>
</table>

Continued...
H411 Toxic to aquatic life with long lasting effects.

**Precautionary statement(s) Prevention**

- P201 Obtain special instructions before use.
- P260 Do not breathe mist/vapours/spray.
- P263 Avoid contact during pregnancy/while nursing.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P281 Use personal protective equipment as required.
- P273 Avoid release to the environment.
- P272 Contaminated work clothing should not be allowed out of the workplace.

**Precautionary statement(s) Response**

- P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P308+P313 IF exposed or concerned: Get medical advice/attention.
- P321 Specific treatment (see advice on this label).
- P330 Rinse mouth.
- P362 Take off contaminated clothing and wash before reuse.
- P302+P352 IF ON SKIN: Wash with plenty of water.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P391 Collect spillage.
- P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

**Precautionary statement(s) Storage**

- P405 Store locked up.
- P403+P233 Store in a well-ventilated place. Keep container tightly closed.

**Precautionary statement(s) Disposal**

- P501 Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS**

**Substances**

See section below for composition of Mixtures

**Mixtures**

<table>
<thead>
<tr>
<th>CAS No</th>
<th>%[weight]</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1689-89-0</td>
<td>34</td>
<td>nitroxin</td>
</tr>
<tr>
<td>Not Available</td>
<td>(340g/L)</td>
<td>clorsulon</td>
</tr>
<tr>
<td>60200-06-8</td>
<td>6.7</td>
<td>ivermectin</td>
</tr>
<tr>
<td>Not Available</td>
<td>(67g/L)</td>
<td></td>
</tr>
<tr>
<td>70288-86-7</td>
<td>0.67</td>
<td></td>
</tr>
<tr>
<td>Not Available</td>
<td>(6.7g/L)</td>
<td></td>
</tr>
<tr>
<td>57-55-6</td>
<td>1-10</td>
<td>propylene glycol</td>
</tr>
<tr>
<td>Not Available</td>
<td>30-60</td>
<td>Ingredients determined not to be hazardous</td>
</tr>
</tbody>
</table>

**SECTION 4 FIRST AID MEASURES**

**Description of first aid measures**

**Eye Contact**

If this product comes in contact with the eyes:
- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

**Skin Contact**

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.

Continued...
### Ingestion

- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- 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 casually can comfortably drink.
- Transport to hospital or doctor without delay.

**Indication of any immediate medical attention and special treatment needed**

Treat symptomatically.

To treat poisoning by the higher aliphatic alcohols (up to C7):
- Gastric lavage with copious amounts of water.
- It may be beneficial to instill 60 ml of mineral oil into the stomach.
- Oxygen and artificial respiration as needed.
- Electrolyte balance: it may be useful to start 500 ml M/6 sodium bicarbonate intravenously but maintain a cautious and conservative attitude toward electrolyte replacement unless shock or severe acidosis threatens.
- To protect the liver, maintain carbohydrate intake by intravenous infusions of glucose.
- Haemodialysis if coma is deep and persistent. (GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, Ed 5)

**BASIC TREATMENT**

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for shock.
- Monitor and treat, where necessary, for pulmonary oedema.
- Anticipate and treat, where necessary, for seizures.
- DO NOT use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- Give activated charcoal.

**ADVANCED TREATMENT**

- Consider orotrachéal or nasotrachéal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TK0. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- If the patient is hypoglycaemic (decreased or loss of consciousness, tachycardia, pallor, dilated pupils, diaphoresis and/or dextrose strip or glucometer readings below 50 mg), give 50% dextrose.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

**EMERGENCY DEPARTMENT**

- Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress syndrome.
- Acidosis may respond to hyperventilation and bicarbonate therapy.
- Haemodialysis might be considered in patients with severe intoxication.
- Consult a toxicologist as necessary. BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

For C8 alcohols and above.

Symptomatic and supportive therapy is advised in managing patients.

Toxicity following accidental ingestion of ivermectin can be minimised by inducing vomiting within one half-hour of exposure. Since ivermectin is believed to bind to glutamate-gated chloride ion channels, it is probably wise to avoid drugs that also interact with other ligand-gated chloride channels including those that enhance GABA activity in patients with potentially toxic ivermectin exposure. (Mercke, Sharpe and Dohme)

## SECTION 5 FIREFIGHTING MEASURES

**Extinguishing media**

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

**Special hazards arising from the substrate or mixture**

### Advice for firefighters

- 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 fire fighting procedures suitable for surrounding area.
SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
See section 8

Environmental precautions
See section 12

Methods and material for containment and cleaning up

<table>
<thead>
<tr>
<th>Minor Spills</th>
<th>Major Spills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental hazard - contain spillage.</td>
<td>Environmental hazard - contain spillage.</td>
</tr>
<tr>
<td>Remove all ignition sources.</td>
<td>Clear area of personnel and move upwind.</td>
</tr>
<tr>
<td>Clean up all spills immediately.</td>
<td>Alert Fire Brigade and tell them location and nature of hazard.</td>
</tr>
<tr>
<td>Avoid breathing vapours and contact with skin and eyes.</td>
<td>Wear full body protective clothing with breathing apparatus.</td>
</tr>
<tr>
<td>Control personal contact with the substance, by using protective equipment.</td>
<td>Prevent, by any means available, spillage from entering drains or water course.</td>
</tr>
<tr>
<td>Contain and absorb spill with sand, earth, inert material or vermiculite.</td>
<td>Stop leak if safe to do so.</td>
</tr>
<tr>
<td>Wipe up.</td>
<td>Contain spill with sand, earth or vermiculite.</td>
</tr>
<tr>
<td>Place in a suitable, labelled container for waste disposal.</td>
<td>Collect recoverable product into labelled containers for recycling.</td>
</tr>
</tbody>
</table>

For spills larger than Minor Spills:
- Neutralise/decontaminate residue (see Section 13 for specific agent). |
- Collect solid residues and seal in labelled drums for disposal. |
- Wash area and prevent runoff into drains. |
- Collect recoverable product into labelled containers for recycling.
- Do not approach containers suspected to be hot. |
- Cool fire exposed containers with water spray from a protected location. |
- If safe to do so, remove containers from path of fire. |
- Equipment should be thoroughly decontaminated after use.
- 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 acid smoke. |
- Mists containing combustible materials may be explosive. |
- Combustion products include: carbon dioxide (CO2) hydrogen iodide other pyrolysis products typical of burning organic material. |
- May emit poisonous fumes.

HAZCHEM 2X

SECTION 7 HANDLING AND STORAGE

Precautions for safe 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. |
- DO NOT allow material to contact humans, exposed food or food utensils. |
- 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. Launder contaminated clothing before re-use. |
- Use good occupational work practice. |
- Observe manufacturer’s storage and handling recommendations contained within this SDS. |
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
- 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 foodstuffs. |
- Protect containers against physical damage and check regularly for leaks. |
- Observe manufacturer’s storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

- Lined metal can, lined metal pail/ can. |
- Plastic pail.
Polyliner drum.
Packing as recommended by manufacturer.
Check all containers are clearly labelled and free from leaks.
For low viscosity materials
Drums and jerricans must be of the non-removable head type.
Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):
Removable head packaging;
Cans with friction closures and
low pressure tubes and cartridges
may be used.
Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *.
In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *
* unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.

Storage incompatibility
Avoid reaction with oxidising agents
Avoid strong acids, bases.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

INGREDIENT DATA

<table>
<thead>
<tr>
<th>Source</th>
<th>Ingredient</th>
<th>Material name</th>
<th>TWA</th>
<th>STEL</th>
<th>Peak</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>propylene glycol</td>
<td>Propane-1,2-diol particulates only</td>
<td>10 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td></td>
<td>propylene glycol</td>
<td>Propane-1,2-diol total: (vapour &amp; particulates)</td>
<td>150 ppm / 474 mg/m³</td>
<td>Not Available</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

EMERGENCY LIMITS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Material name</th>
<th>TEEL-1</th>
<th>TEEL-2</th>
<th>TEEL-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>propylene glycol</td>
<td>Polypropylene glycols</td>
<td>30 mg/m³</td>
<td>330 mg/m³</td>
<td>2,000 mg/m³</td>
</tr>
<tr>
<td>propylene glycol</td>
<td>Propylene glycol; (1,2-Propanediol)</td>
<td>30 mg/m³</td>
<td>1,300 mg/m³</td>
<td>7,900 mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Original IDLH</th>
<th>Revised IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>nitroxinil</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>clorsulon</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>ivermectin</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>propylene glycol</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

OCCUPATIONAL EXPOSURE BANDING

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Occupational Exposure Band Rating</th>
<th>Occupational Exposure Band Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>nitroxinil</td>
<td>E</td>
<td>≤ 0.01 mg/m³</td>
</tr>
<tr>
<td>clorsulon</td>
<td>C</td>
<td>&gt; 0.1 to ≤ milligrams per cubic meter of air (mg/m³)</td>
</tr>
<tr>
<td>ivermectin</td>
<td>E</td>
<td>≤ 0.01 mg/m³</td>
</tr>
</tbody>
</table>

Notes: Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

MATERIAL DATA

Exposure controls

Appropriate 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. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.

Employers may need to use multiple types of controls to prevent employee overexposure.

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. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant: Air Speed:

solvent, vapours, degreasing etc., evaporating from tank (in still air): 0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyor transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation): 0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyor loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) | 1-2.5 m/s (200-500 f/mrn.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion). | 2.5-10 m/s (500-2000 f/mrn.)

<p>| Within each range the appropriate value depends on: |</p>
<table>
<thead>
<tr>
<th>Lower end of the range</th>
<th>Upper end of the range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Room air currents minimal or favourable to capture</td>
<td>1: Disturbing room air currents</td>
</tr>
<tr>
<td>2: Contaminants of low toxicity or of nuisance value only.</td>
<td>2: Contaminants of high toxicity</td>
</tr>
<tr>
<td>3: Intermittent, low production.</td>
<td>3: High production, heavy use</td>
</tr>
<tr>
<td>4: Large hood or large air mass in motion</td>
<td>4: Small hood-local control only</td>
</tr>
</tbody>
</table>

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/mrn.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

### Personal protection

- 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 lenses or restrictions on use, should be created by each employer or task. This should include a review of lens absorption and adsorption for the classes 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], [AS/NZS 1336 or national equivalent]).

### Eye and face protection

- Wear chemical protective goggles, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. 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.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.

Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time > 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
- Contaminated gloves should be replaced.

As defined in ASTM F 739-86 in any application, gloves are rated as:
- Excellent when breakthrough time > 480 min
- Good when breakthrough time > 20 min
- Fair when breakthrough time < 20 min
- Poor when glove material degrades

For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.

It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.

Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers’ technical data should always be taken into account to ensure selection of the most appropriate glove for the task.

**Note:** Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:
- Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
- Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the: "Forsberg Clothing Performance Index". The effect(s) of the following substance(s) are taken into account in the computer-generated selection:

<table>
<thead>
<tr>
<th>Material</th>
<th>CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUTYL</td>
<td>C</td>
</tr>
<tr>
<td>NATURAL RUBBER</td>
<td>C</td>
</tr>
<tr>
<td>NEOPRENE</td>
<td>C</td>
</tr>
<tr>
<td>PE/EVAL/PE</td>
<td>C</td>
</tr>
<tr>
<td>PVA</td>
<td>C</td>
</tr>
<tr>
<td>VITON</td>
<td>C</td>
</tr>
</tbody>
</table>

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation.  -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection


Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

<table>
<thead>
<tr>
<th>Required Minimum Protection Factor</th>
<th>Half-Face Respirator</th>
<th>Full-Face Respirator</th>
<th>Powered Air Respirator</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 5 x ES</td>
<td>A-AUS / Class 1 P2</td>
<td>-</td>
<td>A-PAPR-AUS / Class 1 P2</td>
</tr>
<tr>
<td>up to 25 x ES</td>
<td>Air-line*</td>
<td>A-2 P2</td>
<td>A-PAPR-2 P2</td>
</tr>
<tr>
<td>up to 50 x ES</td>
<td>-</td>
<td>A-3 P2</td>
<td>-</td>
</tr>
<tr>
<td>50+ x ES</td>
<td>-</td>
<td>Air-line**</td>
<td>-</td>
</tr>
</tbody>
</table>

* - Continuous-flow, ** - Continuous-flow or positive pressure demand
A - Full-face
(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid; mixes with water.</td>
</tr>
<tr>
<td>Odour</td>
<td>Not Available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>Not Available</td>
</tr>
<tr>
<td>pH (as supplied)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>Not Available</td>
</tr>
<tr>
<td>Initial boiling point and boiling range (°C)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Flash point (°C)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not Available</td>
</tr>
<tr>
<td>Flammability</td>
<td>Not Available</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Vapour pressure (kPa)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Miscible</td>
</tr>
<tr>
<td>Vapour density (Air = 1)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Relative density (Water = 1)</td>
<td>1.1-1.4</td>
</tr>
<tr>
<td>Partition coefficient n-octanol / water</td>
<td>Not Available</td>
</tr>
<tr>
<td>Auto-ignition temperature (°C)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not Available</td>
</tr>
<tr>
<td>Molecular weight (g/mol)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Taste</td>
<td>Not Available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not Available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>Not Available</td>
</tr>
<tr>
<td>Surface Tension (dyn/cm or mN/m)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Gas group</td>
<td>Not Available</td>
</tr>
<tr>
<td>pH as a solution (1%)</td>
<td>Not Available</td>
</tr>
<tr>
<td>VOC g/L</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

SECTION 10 STABILITY AND REACTIVITY

Reactivity

See section 7

Chemical stability

- Unstable in the presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

Possibility of hazardous reactions

See section 7

Conditions to avoid

See section 7

Incompatible materials

See section 7

Hazardous decomposition products

See section 5
SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lungs is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.

Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo. 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.

**Inhaled**

The maximum attainable concentration of 5.11 mg/l ivermectin produced transient irritation of mucous membranes in rats but no deaths or other signs of toxicity after one hour exposure. An acute inhalation study showed a low order of toxicity in animals but this was attributed to the larger particle size of the sample used in the study.

Exposure to aliphatic alcohols may produce central nervous system effects such as headache, dizziness, drowsiness, muscle weakness, delirium, CNS depression, coma, seizure, and neurobehavioural changes. Symptoms are more acute with higher alcohols. Respiratory tract involvement may produce irritation of the mucosa, respiratory insufficiency, respiratory depression secondary to CNS depression, pulmonary oedema, chemical pneumonitis and bronchitis. Cardiovascular involvement may result in arrhythmias and hypotension. Gastrointestinal effects may include nausea and vomiting. Kidney and liver damage may result following massive exposures. The alcohols are potential irritants being, generally, stronger irritants than similar organic structures that lack functional groups (e.g. alkanes) but are much less irritating than the corresponding amines, aldehydes or ketones. Alcohols and glycols (diols) rarely represent serious hazards in the workplace, because their vapour concentrations are usually less than the levels which produce significant irritation which, in turn, produce significant central nervous system effects as well.

Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

Effects on the nervous system characterise over-exposure to higher aliphatic alcohols. These include headache, muscle weakness, giddiness, ataxia, (loss of muscle coordination), confusion, delirium and coma. Gastrointestinal effects may include nausea, vomiting and diarrhoea. In the absence of effective treatment, respiratory arrest is the most common cause of death in animals acutely poisoned by the higher alcohols.

Aspiration of liquid alcohols produces an especially toxic response as they are able to penetrate deeply in the lung where they are absorbed and may produce pulmonary oedema (swelling). Those possessing lower viscosity elicit a greater response which is manifested by a significant level and prompt death at doses otherwise tolerated by ingestion without aspiration. In general the secondary alcohols are less toxic than the corresponding primary alcohols. As a general observation, alcohols are more powerful central nervous system depressants than their aliphatic analogues. In sequence of decreasing depressant potential, tertiary alcohols with multiple substituent OH groups are more potent than secondary alcohols, which, in turn, are more potent than primary alcohols. The potential for overall systemic toxicity increases with molecular weight (up to C7), principally because the water solubility is diminished and lipo-phobicity is increased.

Within the homologous series of aliphatic alcohols, narcotic potency may increase even faster than lethality.

Only scanty toxicity information is available about higher homologues of the aliphatic alcohol series (greater than C7) but animal data establish that lethality does not continue to increase with increasing chain length. Aliphatic alcohols with 8 carbons are less toxic than those immediately preceding them in the series. 10-Carbon n-decyl alcohol has low toxicity as do the solid fatty alcohols (e.g. lauryl, myristyl, cetyl and stearyl). However the rat aspiration test suggests that decyl and dodecyl (lauryl) alcohols are dangerous if they enter the trachea. In the rat even a small quantity (0.2 ml) of these behaves like a hydrocarbon solvent in causing death from pulmonary oedema.

Primary alcohols are metabolised to corresponding aldehydes and acids; a significant metabolic acidosis may occur. Secondary alcohols are converted to ketones, which are also central nervous system depressants and which, in he case of the higher homologues persist in the blood for many hours. Tertiary alcohols are metabolised slowly and incompletely so their significant toxic effects are generally persistent.

Sulfonamides and their derivatives may precipitate in kidney tubules causing extensive damage. Haemocytic anaemia may also result from use or exposure. Overdose may cause acidosis or hypoglycaemia with confusion and coma resulting. Hypersensitivity reactions may occur in predisposed individuals including those who have been sensitised by topical application. Deaths associated with therapies based on sulfonamide appear to be a result of hypersensitivity reaction, agranulocytosis, aplastic anaemia, other blood dyscrasias and renal and hepatic failure. Doses of 2 to 5 gms have produced toxicity and fatalities. Pathological findings include crystalluria, and necrotic or inflammatory lesions of the heart, liver, kidneys, bone marrow or other organs. Sulfonamides may damage the stem cell which acts as the precursor to components of the blood. Loss of the stem cell may result in pancytopenia (a reduction in the number of red and white blood cells and platelets) with a latency period corresponding to the lifetime of the individual blood cells. Granulocytopenia (a reduction in neutrophil and leucocytes) develops within days and thrombocytopenia (a disorder involving platelets), within 1-2 weeks, whilst loss of erythrocytes (red blood cells) need months to become clinically manifest. Aplastic anaemia develops due to complete destruction of the stem cells. Sulfonamides cross the placental barrier, are excreted in the breast milk and may produce adverse effects in the foetus/ embryo and newborn including agranulocytosis, haemolytic anaemia, jaundice and kernicterus.

Ingestion of propylene glycol produced reversible central nervous system depression in humans following ingestion of 60 ml. Symptoms included increased heart-rate (tachycardia), excessive sweating (diaphoresis) and grand mal seizures in a 15 month child who ingested large doses (7.5 ml/day for 8 days) as an ingredient of vitamin preparation. Excessive repeated ingestions may cause hypoglycaemia (low levels of glucose in the blood stream) among susceptible individuals; this may result in muscular weakness, incoordination and mental confusion.

Very high doses given during feeding studies to rats and dogs produce central nervous system depression (although one-third of that produced by ethanol), haemolysis and insignificant kidney changes.

In humans propylene glycol is partly excreted unchanged in the urine and partly metabolised as lactic and pyruvic acid. Lactic acidosis may result

No major toxicity has been observed to date following ivermectin treatment of humans. Systemic reactions include fever, rash and lymph-node pain or swelling. Ocular reactions have been minimal. Acute rodent studies show that ivermectin is highly toxic; rodents may not however be a good model for humans, in this case, as they appear to be more sensitive to the effects of ivermectin. The dose-response curve for primates is relatively flat compared to rodents, suggesting that serious or life-threatening toxicity would only occur at higher multiples of the dose that cause clinical evidence of toxicity. Signs of toxicity reported in acute studies include ataxia (incoordination), bradynea (slowed breathing), emesis (vomiting), mydriasis (dilated pupils), sedation and tremors. Similar signs indicative of central nervous system toxicity, were also observed in repeat dose studies at elevated dosages. Based on studies in animals and case of accidental ingestion in humans, overexposure to ivermectin may produce drowsiness, depressed motor activity, slowed breathing, dilation of the pupils, tremors, vomiting, anoxemia and incoordination.

**Skin Contact**

Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistersing (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.

The material may accentuate any pre-existing dermatitis condition.

Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.
Tests with monkeys show that less than 1% of dermally applied ivermectin was absorbed into the bloodstream through the skin. Ivermectin does not cause allergic reactions.

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

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

Entry into the bloodstream through, for example, cuts, abrasions, puncture wounds 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.

Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after contact.

Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

Ophthalmic solutions containing sulfonamides are reported to produce local irritation, reactive hyperaemia, burning and transient stinging, blurred vision and temporary impairment of depth perception. Hypersensitivity reactions may occur in predisposed individuals. Possible eye changes produced by photoxic agents such as the sulfonamides include kerato-conjunctivitis or corneal and lens opacities.

Eye

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.

There is sufficient evidence to provide a strong presumption that human exposure to the material may result in developmental toxicity, generally on the basis of:

- clear results in appropriate animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the 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.

Repeated ingestion of sulfonamides used for therapeutic purposes has caused nausea, vomiting, abdominal pain, diarrhoea, anorexia, stomatitis, impaired folic acid absorption, exacerbation of porphyria, acidosis, liver injury with jaundice and hypoprothrombinemia, and pancreatitis. Hepatitis has been reported and may be fatal. Renal effects are often prominent and may include frank proteinuria, azotemia and frequent urination, necrosis of the tubules, nephritic syndrome, and toxic necrosis with oliguria or anuria with azotemia. Neurologic effects include headache, drowsiness, insomnia, vertigo, tinnitus, hearing loss, mental depression, hallucinations, ataxia, muscular paralysis, peripheral neuropathy, transient lesions of the posterior spinal column, transverse myelitis, convulsions and unconsciousness. Haematological effects include eosinophilia, thrombocytopenia, leukopenia, neutropenia, agranulocytosis, pancytopenia, megaloblastic anaemia, Heinz body anaemia and aplastic anaemia; petechiae and purpura may result. Acute haemolytic anaemia may also result (possibly as a result of hypersensitivity reactions) with people of African descent apparently more susceptible than Europeans - glucose-6-phosphate deficiency also appears to be a factor.

Methaemoglobinemia, sulfhaemoglobinemia and cyanosis may also occur. Ocular effects may include acute transient myopia, keratitis and corneal haemorrhage with inflammation and chemosis accompanied by swelling of the lids and in more severe cases, photophobia. Cross-sensitivity amongst the sulfonamides is common and allergic reaction may occur following systemic use or topical application. Sensitisation may produce generalised skin eruptions, urticaria and pruritus. Stevens-Johnson syndrome; a severe form of erythema multiforme associated with widespread lesions of the skin, mucous membranes and which may be fatal in about 25% of cases, has also occurred in patients treated with sulfonamides. This syndrome may produce conjunctival and corneal scarring, serum sickness, periorbital oedema, angioedema, arthritis, arthralgia, allergic myocarditis, decreased pulmonary function and eosinophilic pneumonia. Other effects of long-term therapy include fever, chills, alopecia, vascuclitis, lupus erythematosus, oligospermia, infertility, hypothyroidism and on occasion, goiter and diuresis.

More severe responses to treatment include irreversible neuromuscular and central nervous system changes and fibrosing alveolitis. During sulfonamide treatment, direct exposure to sunlight should be avoided as photosensitisation dermatitis may develop. This form of phototoxic dermatitis may be contrasted to phototoxic dermatitis produced by specific sensitising agents through immunological intervention. Phototoxic reactions have been described following contact, ingestion or injection of causal agents. The chemical may reach the skin by the circulatory and respiratory systems. Photosensitisation reactions have been previously allergically sensitised to the chemical agent and appropriate radiation.

Phototoxicity may also manifest itself as the reaction. Photodermatitis of this type requires activation of a chemical substance on the skin surface by UV radiation (290 to 490 nm wavelength) for its clinical expression. In all cases, inflammation develops on the body surfaces normally exposed to sunlight (dorsal hands, arms, neck, face), provided that the responsible photosensitisable agent contacts the anatomic areas. Covered skin, the eyelids, submental chin and upper ears covered by hair, are characteristically spared. Phototoxic reactions, analogous to irritant contact dermatitis, are typically accompanied by immediate burning, stinging or “smarting” of the skin shortly following sun exposure, and clinical inflammation appears more like an acute sunburn than an eczematous dermatitis. Phototoxic dermatis may result from contact with the material; this is characterised by an increased reactivity of the skin to ultra-violet (UV) and/or visible radiation produced by a chemical agent on an immunological basis and occurs after a latent period of days or months. This type of response can be elicited only in individuals who have been previously allergically sensitised to the chemical agent and appropriate radiation.

Phototoxic dermatitis is relatively rare (certainly more so than phototoxic dermatitis produced by non-immunological principals) and presents, clinically, as an eczematous dermatitis in sun-exposed areas (distinguishing it from phototoxic dermatitis which is analogous to irritant contact dermatitis and produces swelling, redness and even blistering); photoxic dermatitis may eventually spread to areas covered by clothes.

Lichenification (thickening with increased skin markings) and chronic pigmented changes may also develop. Phototoxic reactions may sometimes be followed by a persistent state of light reactivity (persistent light reactor) where clinical dermatitis recurs following exposure to sunlight alone, in the absence of the original initiating chemical. Studies in rats have shown that long-term administration of sulfonamides may produce thyroid maladies; rats, however, appear to be more susceptible to the goitergenic effects of sulfonamides than do other animal species. Sulfonamides may cause kernicterus in the neonate and their use is not recommended during pregnancy. Studies in rats and mice given high oral doses have shown that certain sulfonamides cause a significant incidence of cleft palate and other bony abnormalities in the foetus. In dogs treated with ivermectin for 3 months or in monkeys treated for 2-weeks, there were no gross or histological changes. In rats treated for 3 months, there were changes in spleen, bone marrow and kidneys. Signs of toxicity reported in these repeat-dose studies were similar to those following acute over-exposure. The lowest no-effect-level reported was 0.4 mg/kg/day. In animal studies ivermectin was found to be neither teratogenic or foetotoxic in rats and rabbits, but produced cleft palate in the foetuses of mice and occasional unexplained maternal deaths. Suckling neonatal rats exhibited enhanced sensitivity to the toxic effects of ivermectin due to exposure via maternal milk, after birth, when the blood-brain barrier is incomplete. Ivermectin produced developmental toxicity in animals only at or near dose levels that were maternally toxic. No evidence of genotoxicity was found in a battery of assays.

<table>
<thead>
<tr>
<th>Virbac Nitromec Injection Endectocide and Flukicide for Cattle</th>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
<td></td>
</tr>
<tr>
<td><strong>Propylene Glycol</strong></td>
<td><strong>Toxicity</strong></td>
<td><strong>Irritation</strong></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Dermal (rabbit) LD50: 11890 mg/kg</td>
<td>Eye (rabbit): 100 mg - mild</td>
<td></td>
</tr>
<tr>
<td>Inhalation (rat) LC50: &gt;18.9 mg/l/4H</td>
<td>Eye (rabbit): 500 mg/24h - mild</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 20000 mg/kg</td>
<td>Eye: no adverse effect observed (not irritating)</td>
<td>*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Nitrothiazoline</strong></th>
<th><strong>Toxicity</strong></th>
<th><strong>Irritation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (mouse) LD50: &gt;10000 mg/kg</td>
<td>Not Available</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ivermectin</strong></th>
<th><strong>Toxicity</strong></th>
<th><strong>Irritation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermal (rat) LD50: &gt;660 mg/kg</td>
<td>Eye (rabbit): slight **</td>
<td></td>
</tr>
<tr>
<td>Oral (rat) LD50: 2.3 mg/kg</td>
<td>Skin (rabbit): non-irritating **</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Nitroxinil</strong></th>
<th><strong>Toxicity</strong></th>
<th><strong>Irritation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Not Available</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**
1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

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**Nitroxinil**

The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies may involve themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (Th lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

**Ivermectin**

The acute oral toxicity of propylene glycol is very low, and large quantities are required to cause perceptible health damage in humans. Serious teratogenic effects: Ivermectin produced cleft palate in the offspring of treated mice and rabbits, but only at doses that were also toxic to the mothers. There were no birth defects in the offspring of rats given up to 1 mg/kg/day. Ivermectin is unlikely to cause teratogenic effects except at doses toxic to the mother. The targeted clinical dosage of 0.15-0.2 mg/kg and doses in the range of 3 to 12 mg are given according to body weight. Higher dosages (0.4 mg/kg/day) have been given to patients with lymphatic filariasis. For treatment of onchocerciasis caused by Onchocerca volvulus, a leading cause of river blindness in tropical areas), the drug is given only once every six or twelve months. Ivermectin is metabolised in the liver and excreted almost exclusively in the faeces over a period of twelve days. The plasma half-life in man is about 10-12 hours for ivermectin and 3 days for its metabolites. Side-effects are not considered to be due to the toxicity of ivermectin as such, but are attributed to hyposensitivity reactions resulting from the death of the microfilaria. In cases of accidental overdose with ivermectin, there have been no fatalities reported; however symptoms resemble those in animal studies. Mutagenic effects: Ivermectin does not appear to be mutagenic. Mutagenicity tests in live rats and mice were negative. Ivermectin was shown to be nonmutagenic in the Ames test. Carcinogenic effects: Ivermectin is not carcinogenic in rats or mice. The rats were fed dietary doses of up to 2 mg/kg/day for 24 months, and the mice were up to 8 mg/kg/day for 22 months. These represent the maximum tolerated doses.

**Propylene Glycol**

The acute oral toxicity of propylene glycol is very low, and large quantities are required to cause perceptible health damage in humans. Serious toxicity generally occurs only at plasma concentrations over 1 g/l, which requires extremely high intake over a relatively short period of time. It would be nearly impossible to reach toxic levels by consuming foods or supplements, which contain at most 1 g/kg of PG. Cases of propylene glycol poisoning are usually related to either inappropriate intravenous administration or accidental ingestion of large quantities by children. The potential for long-term oral toxicity is also low. Because of its low chronic oral toxicity, propylene glycol was classified by the U. S. Food and Drug Administration as "generally recognized as safe" (GRAS) for use as a direct food additive. Prolonged contact with propylene glycol is essentially non-irritating to the skin. Undiluted propylene glycol is minimally irritating to the eye, and can produce slight transient conjunctivitis (the eye recovers after the exposure is removed). Exposure to mists may cause eye irritation, as well as upper respiratory tract irritation. Inhalation of the propylene glycol vapors appears to present no significant hazard in ordinary applications. However, limited human experience indicates that inhalation of propylene glycol mists could be irritating to some individuals. It is therefore recommended that propylene glycol not be used in applications where inhalation exposure or human eye contact with the spray mists of these materials is likely, such as for theatrical productions or antifreeze solutions for emergency eye wash stations.
Propylene glycol is metabolised in the human body into pyruvic acid (a normal part of the glucose-metabolism process, readily converted to energy), acetic acid (handled by ethanol-metabolism), lactic acid (a normal acid generally abundant during digestion), and propionaldehyde (a potentially hazardous substance).

Propylene glycol shows no evidence of being a carcinogen or of being genotoxic. Research has suggested that individuals who cannot tolerate propylene glycol probably experience a special form of irritation, but that they only rarely develop allergic contact dermatitis. Other investigators believe that the incidence of allergic contact dermatitis to propylene glycol may be greater than 2% in patients with eczema.

One study strongly suggests a connection between airborne concentrations of propylene glycol in houses and development of asthma and allergic reactions, such as rhinitis or hives in children.

Another study suggested that the concentrations of PGEs (counted as the sum of propylene glycol and glycol ethers) in indoor air, particularly bedroom air, is linked to increased risk of developing numerous respiratory and immune disorders in children, including asthma, hay fever, eczema, and allergies, with increased risk ranging from 50% to 180%. This concentration has been linked to use of water-based paints and water-based system cleansers.

Patients with vulvodynia and interstitial cystitis may be especially sensitive to propylene glycol. Women suffering with yeast infections may also notice that some over the counter creams can cause intense burning. Post menopausal women who require the use of an estrogen cream may notice that brand name creams made with propylene glycol often create extreme, uncomfortable burning along the vulva and perianal area. Additionally, some electronic cigarette users will put Vegetable Glycerin in the “e-liquid” for those who are allergic (or have bad reactions) to propylene glycol. Adverse responses to intravenous administration of drugs which use PG as an excipient have been seen in a number of people, particularly with large dosages thereof. Responses may include “hypotension, bradycardia... QRS and T abnormalities on the ECG, arrhythmia, cardiac arrest, serum hyperosmolality, lactic acidosis, and haemolysis”. A high percentage (12% to 42%) of directly-injected propylene glycol is eliminated/secreted in urine unaltered depending on dosage, with the remainder appearing in its glucuronide-form. The speed of renal filtration decreases as dosage increases, which may be due to propylene glycol’s mild anesthetic / CNS-depressant -properties as an alcohol. In one case, intravenous administration of propylene glycol-suspended nitroglycerin to an elderly man may have induced coma and acidosis.

Propylene glycol is an approved food additive for dog food under the category of animal feed and is generally recognized as safe for dogs with an energy, acetic acid (handled by ethanol-metabolism), lactic acid (a normal acid generally abundant during digestion),  and propionaldehyde (a potentially hazardous substance).

NITROXINIL & IVERMECTIN

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic spongy layer (spongiosis) and intracellular oedema of the epidermis. Dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the dermis, lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an ineffruent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

### Toxicity

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Test Duration (HR)</th>
<th>Species</th>
<th>Value</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>45.72mg/L</td>
<td>3</td>
</tr>
<tr>
<td>EC50</td>
<td>96</td>
<td>Algae or other aquatic plants</td>
<td>131.82mg/L</td>
<td>3</td>
</tr>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>146.295mg/L</td>
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<tr>
<td>EC50</td>
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<td>Algae or other aquatic plants</td>
<td>2420.857mg/L</td>
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</tr>
<tr>
<td>BCF</td>
<td>672</td>
<td>Fish</td>
<td>0.00009mg/L</td>
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</tr>
<tr>
<td>NOEC</td>
<td>96</td>
<td>Crustacea</td>
<td>2.6mg/L</td>
<td>4</td>
</tr>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>&gt;10-mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>48</td>
<td>Crustacea</td>
<td>43-500mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>96</td>
<td>Algae or other aquatic plants</td>
<td>19-mg/L</td>
<td>2</td>
</tr>
</tbody>
</table>

### Legend:
- □ – Data available to make classification
- △ – Data either not available or does not fill the criteria for classification

### SECTION 12 ECOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Test Duration (HR)</th>
<th>Species</th>
<th>Value</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>NOEC</td>
<td>2.6mg/L</td>
<td>Crustacea</td>
<td>2.6mg/L</td>
<td>4</td>
</tr>
<tr>
<td>LC50</td>
<td>96</td>
<td>Fish</td>
<td>&gt;10-mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>48</td>
<td>Crustacea</td>
<td>43-500mg/L</td>
<td>2</td>
</tr>
<tr>
<td>EC50</td>
<td>96</td>
<td>Algae or other aquatic plants</td>
<td>19-mg/L</td>
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</tbody>
</table>
NOEC 168 Fish 11-530mg/L 2

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data

Toxic to soil organisms. **DO NOT** discharge into sewer or waterways. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

### Persistence and degradability

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>nitroxinil</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
<tr>
<td>clorsulon</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
<tr>
<td>propylene glycol</td>
<td>LOW</td>
<td>LOW</td>
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### Bioaccumulative potential

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>nitroxinil</td>
<td>LOW (LogKOW = 2.0447)</td>
</tr>
<tr>
<td>clorsulon</td>
<td>LOW (LogKOW = 0.0747)</td>
</tr>
<tr>
<td>propylene glycol</td>
<td>LOW (BCF = 1)</td>
</tr>
</tbody>
</table>

### Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>nitroxinil</td>
<td>LOW (KOC = 309.4)</td>
</tr>
<tr>
<td>clorsulon</td>
<td>LOW (KOC = 567.3)</td>
</tr>
<tr>
<td>propylene glycol</td>
<td>HIGH (KOC = 1)</td>
</tr>
</tbody>
</table>

### SECTION 13 DISPOSAL CONSIDERATIONS

#### Waste treatment methods

- Containers may still present a chemical hazard/danger when empty.
- Return to supplier for reuse/recycling if possible.
- Otherwise:
  - If container cannot 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 SDS and observe all notices pertaining to the product.

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.
- 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.

### SECTION 14 TRANSPORT INFORMATION

#### Labels Required

- **Marine Pollutant**
- **HAZCHEM** 2X
### Land transport (ADG)

<table>
<thead>
<tr>
<th>UN number</th>
<th>2811</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>TOXIC SOLID, ORGANIC, N.O.S. (contains nitroxinil and ivermectin)</td>
</tr>
</tbody>
</table>

#### Transport hazard class(es)
- **Class**: 6.1
- **Subrisk**: Not Applicable

#### Packing group
- **III**

#### Environmental hazard
- Environmentally hazardous

#### Special precautions for user
- Special provisions: 223 274
- Limited quantity: 5 kg

### Air transport (ICAO-IATA / DGR)

<table>
<thead>
<tr>
<th>UN number</th>
<th>2811</th>
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</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>Toxic solid, organic, n.o.s. * (contains nitroxinil and ivermectin)</td>
</tr>
</tbody>
</table>

#### Transport hazard class(es)
- **ICAO/IATA Class**: 6.1
- **ICAO / IATA Subrisk**: Not Applicable
- **ERG Code**: 6L

#### Packing group
- **III**

#### Environmental hazard
- Environmentally hazardous

#### Special precautions for user
- Special provisions: A3 A5
- Cargo Only Packing Instructions: 677
- Cargo Only Maximum Qty / Pack: 200 kg
- Passenger and Cargo Packing Instructions: 670
- Passenger and Cargo Maximum Qty / Pack: 100 kg
- Passenger and Cargo Limited Quantity Packing Instructions: Y645
- Passenger and Cargo Limited Maximum Qty / Pack: 10 kg

### Sea transport (IMDG-Code / GGVSee)

<table>
<thead>
<tr>
<th>UN number</th>
<th>2811</th>
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</thead>
<tbody>
<tr>
<td>UN proper shipping name</td>
<td>TOXIC SOLID, ORGANIC, N.O.S. (contains nitroxinil and ivermectin)</td>
</tr>
</tbody>
</table>

#### Transport hazard class(es)
- **IMDG Class**: 6.1
- **IMDG Subrisk**: Not Applicable

#### Packing group
- **III**

#### Environmental hazard
- Marine Pollutant

#### Special precautions for user
- EMS Number: F-A , S-A
- Special provisions: 223 274
- Limited Quantities: 5 kg

### Transport in bulk according to Annex II of MARPOL and the IBC code

- Not Applicable

### SECTION 15 REGULATORY INFORMATION

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

- **NITROXINIL IS FOUND ON THE FOLLOWING REGULATORY LISTS**
  - Australia Dangerous Goods Code (ADG Code) - Dangerous Goods List
  - Australia Dangerous Goods Code (ADG Code) - List of Emergency Action Codes
  - Australia Inventory of Chemical Substances (AICS)
  - Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
  - International Air Transport Association (IATA) Dangerous Goods Regulations
  - International Maritime Dangerous Goods Requirements (IMDG Code)
  - United Nations Recommendations on the Transport of Dangerous Goods Model Regulations

- **CLORSULON IS FOUND ON THE FOLLOWING REGULATORY LISTS**
  - Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5

- **IVERMECTIN IS FOUND ON THE FOLLOWING REGULATORY LISTS**
  - Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5

Continued...
Section 16 Other Information

Revision Date: 11/01/2019
Initial Date: 05/18/2016

SDS Version Summary

<table>
<thead>
<tr>
<th>Version</th>
<th>Issue Date</th>
<th>Sections Updated</th>
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<tr>
<td>3.1.1.1</td>
<td>05/24/2016</td>
<td>Classification, Ingredients</td>
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<tr>
<td>4.1.1.1</td>
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<td>One-off system update. NOTE: This may or may not change the GHS classification</td>
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Other Information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average
PC – STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit,
IDLH: Immediatly Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL: No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index