Nulon Radiator Corrosion Protector - Green

Product Identifier

Product name: Nulon Radiator Corrosion Protector - Green
Synonyms: Product Code: RCPG
Other means of identification: Not Available

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

Relevant identified uses: Automotive radiator corrosion inhibitor.

Details of the supplier of the safety data sheet

Registered company name: Nulon Products Australia
Address: 17 Yulong Close Moorebank NSW 2170 Australia
Telephone: +61 2 9608 7800
Fax: +61 2 9601 4700
Website: Not Available
Email: msds@nulon.com.au

Registered company name: Nulon Products NZ (Nulon NZ Ltd.)
Address: 80 Queen Street Auckland Central 1010 New Zealand
Telephone: 0800 454 108
Fax: 0800 547 080
Website: Not Available
Email: Not Available

Emergency telephone number

Association / Organisation: Chemwatch 24hr.
Emergency telephone numbers: 1800 039 008
Other emergency telephone numbers: Not Available

Chemwatch 24hr.: +800 2436 2255
Chemwatch 24hr.: Not Available
Chemwatch EMERGENCY RESPONSE: +61 1800 951 288
Chemwatch EMERGENCY RESPONSE: +61 2 9186 1132

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Poisons Schedule: S5
Classification [1]: Acute Toxicity (Oral) Category 4, Specific target organ toxicity - repeated exposure Category 2

Legend:

Label elements

Hazard pictogram(s)

SIGNAL WORD: WARNING

Hazard statement(s)

H302: Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary statement(s) Prevention

P260 Do not breathe mist/vapours/spray.
P264 Wash all exposed external body areas thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P314 Get medical advice/attention if you feel unwell.
P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330 Rinse mouth.

Precautionary statement(s) Storage

Not Applicable

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>107-21-1</td>
<td>10-30</td>
<td>ethylene glycol</td>
</tr>
<tr>
<td>3734-33-6</td>
<td>&lt;1</td>
<td>denatonium benzoate</td>
</tr>
<tr>
<td>Not Available</td>
<td>balance</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:
- Wash out immediately with fresh 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.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- 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.

Inhalation

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

Ingestion

If poisoning occurs, contact a doctor or Poisons Information Centre.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.
- Avoid giving milk or oils.
- Avoid giving alcohol.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

For acute or short term repeated exposures to ethylene glycol:
- Early treatment of ingestion is important. Ensure emesis is satisfactory.
- Test and correct for metabolic acidosis and hypocalcaemia.
- Apply sustained diuresis when possible with hypertonic mannitol.
- Evaluate renal status and begin haemodialysis if indicated. [I.L.O]
Rapid absorption is an indication that emesis or lavage is effective only in the first few hours. Cathartics and charcoal are generally not effective.

Correct acidosis, fluid/electrolyte balance and respiratory depression in the usual manner. Systemic acidosis (below 7.2) can be treated with intravenous sodium bicarbonate solution.

Ethanol therapy prolongs the half-life of ethylene glycol and reduces the formation of toxic metabolites.

Pyridoxine and thiamine are cofactors for ethylene glycol metabolism and should be given (50 to 100 mg respectively) intramuscularly, four times per day for 2 days.

Magnesium is also a cofactor and should be replenished. The status of 4-methylpyrazole, in the treatment regime, is still uncertain. For clearance of the material and its metabolites, haemodialysis is much superior to peritoneal dialysis.

Ellenhorn and Barceloux: Medical Toxicology

It has been suggested that there is a need for establishing a new biological exposure limit before a workshift that is clearly below 100 mmol ethoxy-acetic acids per mole creatinine in morning urine of people occupationally exposed to ethylene glycol ethers. This arises from the finding that an increase in urinary stones may be associated with such exposures.


SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas.

Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances.

In such an event consider:

- foam.

Special hazards arising from the substrate or mixture

| Fire Incompatibility | Avoid reaction with oxidising agents |

Advice for firefighters

| Fire Fighting | Alert Fire Brigade and tell them location and nature of hazard. |
| | Wear breathing apparatus plus protective gloves in the event of a fire. |
| | Prevent, by any means available, spillage from entering drains or water courses. |
| | Use fire fighting procedures suitable for surrounding area. |

| Fire/Explosion Hazard | The material is not readily combustible under normal conditions. |
| | However, it will break down under fire conditions and the organic component may burn. |
| | Not considered to be a significant fire risk. |
| | Heat may cause expansion or decomposition with violent rupture of containers. |

Decomposes on heating and produces toxic fumes of:
- carbon dioxide (CO2)
- other pyrolysis products typical of burning organic material.
- May emit poisonous fumes.

HAZCHEM

Not Applicable

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

| Minor Spills | Clean up all spills immediately. |
| | Avoid breathing vapours and contact with skin and eyes. |
| | Control personal contact with the substance, by using protective equipment. |
| | Contain and absorb spill with sand, earth, inert material or vermiculite. |

| Major Spills | Moderate hazard. |
| | Clear area of personnel and move upwind. |
| | Alert Fire Brigade and tell them location and nature of hazard. |
| | Wear breathing apparatus plus protective gloves. |

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

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

| 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.

Other information
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

Conditions for safe storage, including any incompatibilities

Suitable container
- Polyethylene or polypropylene container.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

Storage incompatibility
Ethylene glycol:
- Reacts violently with oxidisers and oxidising acids, sulfuric acid, chlorosulfonic acid, chromyl chloride, perchloric acid
- Forms explosive mixtures with sodium perchlorate
- Is incompatible with strong acids, caustics, aliphatic amines, isocyanates, chlorosulfonic acid, oleum, potassium bichromate, phosphorus pentasulfide, sodium chlorite
- Avoid strong acids, bases.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

| INGREDIENT DATA |
| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
| Australia Exposure Standards | ethylene glycol | Ethylene glycol (vapour) | 20 ppm / 52 mg/m³ | 104 mg/m³ / 40 ppm | Not Available | Not Available |
| Australia Exposure Standards | ethylene glycol | Ethylene glycol (particulate) | 10 mg/m³ | Not Available | Not Available | Not Available |

EMERGENCY LIMITS

| Ingredient | Material name | TEEL-1 | TEEL-2 | TEEL-3 |
| ethylene glycol | Ethylene glycol | 30 ppm | 150 ppm | 900 ppm |

Ingredient | Original IDLH | Revised IDLH |
ethylene glycol | Not Available | Not Available |
denatonium benzoate | Not Available | Not Available |

OCCUPATIONAL EXPOSURE BANDING

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
| denatonium benzoate | E | ≤ 0.01 mg/m³ |

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.

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.

Personal protection

Eye and face 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 for each workplace or task.

Skin protection
See Hand protection below

Hands/feet protection
- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber

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 breakthrough 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.

Body protection

See Other protection below

Other protection

- Overalls.
- P.V.C. apron.
- Barrier cream.

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:

Nulon Radiator Corrosion Protector - Green

<table>
<thead>
<tr>
<th>Material</th>
<th>CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NATURAL RUBBER</td>
<td>A</td>
</tr>
<tr>
<td>NATURAL+NEOPRENE</td>
<td>A</td>
</tr>
<tr>
<td>NEOPRENE</td>
<td>A</td>
</tr>
<tr>
<td>NEOPRENE/NATURAL</td>
<td>A</td>
</tr>
<tr>
<td>NITRILE</td>
<td>A</td>
</tr>
<tr>
<td>NITRILE+PVC</td>
<td>A</td>
</tr>
<tr>
<td>PE/EVAL/PE</td>
<td>A</td>
</tr>
<tr>
<td>PVC</td>
<td>A</td>
</tr>
<tr>
<td>TEFLOON</td>
<td>A</td>
</tr>
<tr>
<td>PVA</td>
<td>B</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.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties


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 10 x ES</td>
<td>A-AUS P2</td>
<td>-</td>
<td>A-PAPR-AUS / Class 1 P2</td>
</tr>
<tr>
<td>up to 50 x ES</td>
<td>-</td>
<td>A-AUS / Class 1 P2</td>
<td>-</td>
</tr>
<tr>
<td>up to 100 x ES</td>
<td>-</td>
<td>A-2 P2</td>
<td>A-PAPR-2 P2 ^</td>
</tr>
</tbody>
</table>

^ - Full-face
A (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.

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Appearancc</th>
<th>Clear green liquid; mixes with water.</th>
<th>Liquid</th>
<th>Relative density (Water = 1)</th>
<th>1.12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odour</td>
<td>Not Available</td>
<td></td>
<td>Partition coefficient n-octanol / water</td>
<td>Not Available</td>
</tr>
<tr>
<td>Odour threshold</td>
<td>Not Available</td>
<td></td>
<td>Auto-ignition temperature (°C)</td>
<td>Not Available</td>
</tr>
<tr>
<td>pH (as supplied)</td>
<td>Not Available</td>
<td></td>
<td>Decomposition temperature</td>
<td>Not Available</td>
</tr>
<tr>
<td>Melting point / freezing point (°C)</td>
<td>Not Available</td>
<td></td>
<td>Viscosity (cSt)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Initial boiling point and boiling range (°C)</td>
<td>Not Available</td>
<td></td>
<td>Molecular weight (g/mol)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Flash point (°C)</td>
<td>Not Applicable</td>
<td></td>
<td>Taste</td>
<td>Not Available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not Available</td>
<td></td>
<td>Explosive properties</td>
<td>Not Available</td>
</tr>
<tr>
<td>Flammability</td>
<td>Not Applicable</td>
<td></td>
<td>Oxidising properties</td>
<td>Not Available</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not Applicable</td>
<td></td>
<td>Surface Tension (dyn/cm or mN/m)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not Applicable</td>
<td></td>
<td>Volatile Component (%vol)</td>
<td>Not Available</td>
</tr>
<tr>
<td>Vapour pressure (kPa)</td>
<td>Not Available</td>
<td></td>
<td>Gas group</td>
<td>Not Available</td>
</tr>
</tbody>
</table>
SECTION 10 STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solubility in water</strong></td>
<td>Miscible</td>
</tr>
<tr>
<td><strong>Vapour density (Air = 1)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>pH as a solution (1%)</strong></td>
<td>Not Available</td>
</tr>
<tr>
<td><strong>VOC g/L</strong></td>
<td>Not Available</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Route of Exposure</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inhaled</strong></td>
<td>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. For ethylene glycol: Symptoms following swallowing ethylene glycol include failure of breathing, central nervous system depression, cardiovascular collapse, lung swelling, acute kidney failure, and even brain damage. Swallowing 100 millilitres has caused death. There are three stages of ethylene glycol poisoning. The severity of each stage depends upon the amount of ethylene glycol swallowed.</td>
</tr>
<tr>
<td><strong>Ingestion</strong></td>
<td>There is some evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Moderate inflammation may be expected with redness, swelling and blistering.</td>
</tr>
<tr>
<td><strong>Skin Contact</strong></td>
<td>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. Exposure to ethylene glycol over a period of several weeks may cause throat irritation, mild headache and low backache. These may worsen with increasing concentration of the substance. They may progress to a burning sensation in the throat, a burning cough, and drowsiness. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).</td>
</tr>
<tr>
<td><strong>Eye</strong></td>
<td>There is some evidence that material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.</td>
</tr>
<tr>
<td><strong>Chronic</strong></td>
<td>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. Exposure to ethylene glycol over a period of several weeks may cause throat irritation, mild headache and low backache. These may worsen with increasing concentration of the substance. They may progress to a burning sensation in the throat, a burning cough, and drowsiness. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).</td>
</tr>
</tbody>
</table>

### Nulon Radiator Corrosion Protector - Green

<table>
<thead>
<tr>
<th>Substance</th>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ethylene glycol</strong></td>
<td>Dermal (rabbit) LD50: 9530 mg/kg[^2]</td>
<td>Eye (rabbit): 100 mg/1h - mild</td>
</tr>
<tr>
<td></td>
<td>Inhalation (rat) LC50: 100.2 mg/l/hr[^2]</td>
<td>Eye (rabbit): 12 mg/m3/3D</td>
</tr>
<tr>
<td></td>
<td>Oral (rat) LD50: &gt;3.58-12.7 mg/kg[^2]</td>
<td>Eye (rabbit): 1440mg/6h-moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eye (rabbit): 500 mg/24h - mild</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eye: no adverse effect observed (not irritating)[^1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin (rabbit): 555 mg(open)-mild</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skin: no adverse effect observed (not irritating)[^1]</td>
</tr>
</tbody>
</table>

### Denatonium Benzoate

<table>
<thead>
<tr>
<th>Substance</th>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>denatonium benzoate</strong></td>
<td>dermal (rat) LD50: &gt;2000 mg/kg[^1]</td>
<td>Eye: adverse effect observed (irreversible damage)[^1]</td>
</tr>
<tr>
<td></td>
<td>Inhalation (rat) LC50: 0.2 mg/l/4H[^2]</td>
<td>Skin: adverse effect observed (irritating)[^1]</td>
</tr>
<tr>
<td></td>
<td>Oral (rat) LD50: 584 mg/kg[^2]</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

**ETHYLENE GLYCOL**

[Estimated Lethal Dose (human) 100 ml; RTECS quoted by Orica] Substance is reproductive effector in rats (birth defects).
Mutagenic to rat cells.
For ethylene glycol: Ethylene glycol is quickly and extensively absorbed throughout the gastrointestinal tract. Limited information suggests that it is also absorbed through the airways; absorption through skin is apparently slow. Following absorption, it is distributed throughout the body. In humans, it is initially metabolized by alcohol dehydrogenase to form glycoaldehyde, which is rapidly converted to glycolic acid and glyoxal.

Sommolence, tremor, ataxia recorded. Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-asthmatic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.

For quaternary ammonium compounds (QACs): Quaternary ammonium compounds are synthetically made surfactants. Studies show that its solubility, toxicity and irritation depend on chain length and bond type while effect on histamine depends on concentration. QACs may cause muscle paralysis with no brain involvement. There is a significant association between the development of asthma symptoms and the use of QACs as disinfectant.

Acute Toxicity ✓
Skin Irritation/Corrosion ❌
Serious Eye Damage/Irritation ❌
Respiratory or Skin sensitisation ❌
Mutagenicity ❌

SECTION 12 ECOLOGICAL INFORMATION

**Toxicity**

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Nulon Radiator Corrosion Protector - Green</th>
<th>Ethylene glycol</th>
<th>Denatonium Benzoate</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50</td>
<td>Not Available</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>EC50</td>
<td>Not Available</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>NOEC</td>
<td>Not Available</td>
<td>552</td>
<td>48</td>
</tr>
<tr>
<td>LC50</td>
<td>Not Available</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>EC50</td>
<td>Not Available</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>NOEC</td>
<td>Not Available</td>
<td>552</td>
<td>48</td>
</tr>
</tbody>
</table>

**Legend:**
- ✗ — Data either not available or does not fill the criteria for classification
- ✓ — Data available to make classification

**DO NOT** discharge into sewer or waterways.

**Persistence and degradability**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>LOW (Half-life ~ 24 days)</td>
<td>LOW (Half-life ~ 3.46 days)</td>
</tr>
</tbody>
</table>

**Bioaccumulative potential**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Bioaccumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>LOW (BCF = 200)</td>
</tr>
</tbody>
</table>
Mobility in soil

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethylene glycol</td>
<td>HIGH (KOC = 1)</td>
</tr>
</tbody>
</table>

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

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.
- 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.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material).
- Decontaminate empty containers.

SECTION 14 TRANSPORT INFORMATION

Labels Required

<table>
<thead>
<tr>
<th>Marine Pollutant</th>
<th>HAZCHEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

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

**ETHYLENE GLYCOL IS FOUND ON THE FOLLOWING REGULATORY LISTS**

- Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
- Australia Inventory of Chemical Substances (AICS)

**DENATONIUM BENZOATE IS FOUND ON THE FOLLOWING REGULATORY LISTS**

- Australia Inventory of Chemical Substances (AICS)
- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5

National Inventory Status

<table>
<thead>
<tr>
<th>National Inventory</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia - AICS</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada - DSL</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada - NDSL</td>
<td>No (ethylene glycol; denatonium benzoate)</td>
</tr>
<tr>
<td>China - IECSC</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe - EINEC / ELINCS / NLP</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Japan - ENCS  No (denatonium benzoate)
Korea - KECI  Yes
New Zealand - NZIoC  Yes
Philippines - PICCS  Yes
USA - TSCA  Yes
Taiwan - TCSI  Yes
Mexico - INSQ  Yes
Vietnam - NCI  Yes
Russia - ARIPS  Yes

Legend:  Yes = All CAS declared ingredients are on the inventory
         No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

| Revision Date | 07/03/2020 |
| Initial Date  | 25/01/2016 |

SDS Version Summary

<table>
<thead>
<tr>
<th>Version</th>
<th>Issue Date</th>
<th>Sections Updated</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1.1</td>
<td>01/11/2019</td>
<td>One-off system update. NOTE: This may or may not change the GHS classification</td>
</tr>
<tr>
<td>4.1.1.1</td>
<td>07/03/2020</td>
<td>Classification change due to full database hazard calculation/update.</td>
</tr>
</tbody>
</table>

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: Immediately 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

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