



# Nulon E10 Worn Engine Treatment

## Nulon Products

Chemwatch: 328616

Version No: 5.1.1.1

Safety Data Sheet according to WHS and ADG requirements

Chemwatch Hazard Alert Code: 1

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Initial Date: Not Available

L.GHS.AUS.EN

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

### Product Identifier

|                               |                                 |
|-------------------------------|---------------------------------|
| Product name                  | Nulon E10 Worn Engine Treatment |
| Synonyms                      | lubricant                       |
| Other means of identification | Not Available                   |

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

|                          |            |
|--------------------------|------------|
| Relevant identified uses | Lubricant. |
|--------------------------|------------|

### Details of the manufacturer/importer

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

### Emergency telephone number

|                                   |               |
|-----------------------------------|---------------|
| Association / Organisation        | Not Available |
| Emergency telephone numbers       | Not Available |
| Other emergency telephone numbers | Not Available |

## SECTION 2 HAZARDS IDENTIFICATION

### Classification of the substance or mixture

**NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS.** According to the Model WHS Regulations and the ADG Code.

#### CHEMWATCH HAZARD RATINGS

|              | Min | Max |
|--------------|-----|-----|
| Flammability | 1   | 1   |
| Toxicity     | 0   | 0   |
| Body Contact | 0   | 0   |
| Reactivity   | 1   | 1   |
| Chronic      | 1   | 1   |

0 = Minimum  
1 = Low  
2 = Moderate  
3 = High  
4 = Extreme

|                    |                |
|--------------------|----------------|
| Poisons Schedule   | Not Applicable |
| GHS Classification | Not Applicable |

### Label elements

|                    |                |
|--------------------|----------------|
| GHS label elements | Not Applicable |
|--------------------|----------------|

|             |                       |
|-------------|-----------------------|
| SIGNAL WORD | <b>NOT APPLICABLE</b> |
|-------------|-----------------------|

### Hazard statement(s)

Not Applicable

#### Precautionary statement(s) Prevention

#### Precautionary statement(s) Response

#### Precautionary statement(s) Storage

#### Precautionary statement(s) Disposal

### SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

#### Substances

See section below for composition of Mixtures

#### Mixtures

| CAS No        | %[weight] | Name                                            |
|---------------|-----------|-------------------------------------------------|
| Not avail.    | 30-60     | <u>mineral oil</u>                              |
| Not Available | NotSpec.  | (solvent refined)                               |
| Not Available | 30-60     | additives, unregulated                          |
| 9002-84-0     | 1-10      | <u>polytetrafluoroethylene</u>                  |
| Not Available | 1-10      | performance additives                           |
| Not Available | 1         | dye                                             |
| Not Available | NotSpec.  | NOTE: Manufacturer has supplied full ingredient |
| Not Available | NotSpec.  | information to allow CHEMWATCH assessment.      |

(solvent refined) NOTE: Manufacturer has supplied full ingredient information to allow CHEMWATCH assessment.

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

### SECTION 4 FIRST AID MEASURES

#### Description of first aid measures

|                     |                                                                                                                                                                                                                                                                                                   |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Eye Contact</b>  | If this product comes in contact with eyes: <ul style="list-style-type: none"><li>▶ Wash out immediately with water.</li><li>▶ If irritation continues, seek medical attention.</li><li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li></ul> |
| <b>Skin Contact</b> | If skin or hair contact occurs: <ul style="list-style-type: none"><li>▶ Flush skin and hair with running water (and soap if available).</li><li>▶ Seek medical attention in event of irritation.</li></ul>                                                                                        |
| <b>Inhalation</b>   | <ul style="list-style-type: none"><li>▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area.</li><li>▶ Other measures are usually unnecessary.</li></ul>                                                                                                          |
| <b>Ingestion</b>    | <ul style="list-style-type: none"><li>▶ Immediately give a glass of water.</li><li>▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.</li></ul>                                                                                                |

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

Treat symptomatically.

- ▶ Heavy and persistent skin contamination over many years may lead to dysplastic changes. Pre-existing skin disorders may be aggravated by exposure to this product.
- ▶ In general, emesis induction is unnecessary with high viscosity, low volatility products, i.e. most oils and greases.
- ▶ High pressure accidental injection through the skin should be assessed for possible incision, irrigation and/or debridement.

**NOTE:** Injuries may not seem serious at first, but within a few hours tissue may become swollen, discoloured and extremely painful with extensive subcutaneous necrosis. Product may be forced through considerable distances along tissue planes.

### SECTION 5 FIREFIGHTING MEASURES

#### Extinguishing media

|  |                                                                                                                                                                                                                   |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"><li>▶ Water spray or fog.</li><li>▶ Alcohol stable foam.</li><li>▶ Dry chemical powder.</li><li>▶ Carbon dioxide.</li></ul> <p><b>Do not</b> use a water jet to fight fire.</p> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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

|                             |                                                                                                                                                                                          |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fire Incompatibility</b> | <ul style="list-style-type: none"><li>▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result</li></ul> |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Advice for firefighters

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Fire Fighting</b>         | <ul style="list-style-type: none"> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ Wear full body protective clothing with breathing apparatus.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water course.</li> <li>▶ Use water delivered as a fine spray to control fire and cool adjacent area.</li> <li>▶ Avoid spraying water onto liquid pools.</li> <li>▶ <b>DO NOT</b> approach containers suspected to be hot.</li> <li>▶ Cool fire exposed containers with water spray from a protected location.</li> <li>▶ If safe to do so, remove containers from path of fire.</li> </ul>                                                                                                                                                                      |
| <b>Fire/Explosion Hazard</b> | <ul style="list-style-type: none"> <li>▶ Combustible.</li> <li>▶ Slight fire hazard when exposed to heat or flame.</li> <li>▶ Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>▶ On combustion, may emit toxic fumes of carbon monoxide (CO).</li> <li>▶ May emit acrid smoke.</li> <li>▶ Mists containing combustible materials may be explosive.</li> </ul> <p>Combustion products include; carbon dioxide (CO<sub>2</sub>) hydrogen chloride phosgene other pyrolysis products typical of burning organic material May emit poisonous fumes. <b>CARE:</b> Water in contact with hot liquid may cause foaming and a steam explosion with wide scattering of hot oil and possible severe burns. Foaming may cause overflow of containers and may result in possible fire.</p> |

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Minor Spills</b> | <p>Slippery when spilt.</p> <ul style="list-style-type: none"> <li>▶ Remove all ignition sources.</li> <li>▶ Clean up all spills immediately.</li> <li>▶ Avoid breathing vapours and contact with skin and eyes.</li> <li>▶ Control personal contact with the substance, by using protective equipment.</li> <li>▶ Contain and absorb spill with sand, earth, inert material or vermiculite.</li> <li>▶ Wipe up.</li> <li>▶ Place in a suitable, labelled container for waste disposal.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Major Spills</b> | <p>Slippery when spilt.<br/>Moderate hazard.</p> <ul style="list-style-type: none"> <li>▶ Clear area of personnel and move upwind.</li> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ Wear breathing apparatus plus protective gloves.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water course.</li> <li>▶ No smoking, naked lights or ignition sources.</li> <li>▶ Increase ventilation.</li> <li>▶ Stop leak if safe to do so.</li> <li>▶ Contain spill with sand, earth or vermiculite.</li> <li>▶ Collect recoverable product into labelled containers for recycling.</li> <li>▶ Absorb remaining product with sand, earth or vermiculite.</li> <li>▶ Collect solid residues and seal in labelled drums for disposal.</li> <li>▶ Wash area and prevent runoff into drains.</li> <li>▶ If contamination of drains or waterways occurs, advise emergency services.</li> </ul> |
|                     | <p>Personal Protective Equipment advice is contained in Section 8 of the MSDS.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## SECTION 7 HANDLING AND STORAGE

### Precautions for safe handling

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Safe handling</b>     | <ul style="list-style-type: none"> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Wear protective clothing when risk of exposure occurs.</li> <li>▶ Use in a well-ventilated area.</li> <li>▶ Prevent concentration in hollows and sumps.</li> <li>▶ <b>DO NOT enter confined spaces until atmosphere has been checked.</b></li> <li>▶ <b>DO NOT allow material to contact humans, exposed food or food utensils.</b></li> <li>▶ Avoid contact with incompatible materials.</li> <li>▶ <b>When handling, DO NOT eat, drink or smoke.</b></li> <li>▶ Keep containers securely sealed when not in use.</li> <li>▶ Avoid physical damage to containers.</li> <li>▶ Always wash hands with soap and water after handling.</li> <li>▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use.</li> <li>▶ Use good occupational work practice.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this MSDS.</li> <li>▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.</li> </ul> |
| <b>Other information</b> | <ul style="list-style-type: none"> <li>▶ Store in original containers.</li> <li>▶ Keep containers securely sealed.</li> <li>▶ No smoking, naked lights or ignition sources.</li> <li>▶ Store in a cool, dry, well-ventilated area.</li> <li>▶ Store away from incompatible materials and foodstuff containers.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storage and handling recommendations contained within this MSDS.

## Conditions for safe storage, including any incompatibilities

|                                |                                                                                                                                                                                                                 |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Suitable container</b>      | <ul style="list-style-type: none"> <li>▸ Metal can or drum</li> <li>▸ Packaging as recommended by manufacturer.</li> <li>▸ Check all containers are clearly labelled and free from leaks.</li> </ul>            |
| <b>Storage incompatibility</b> | <b>CARE:</b> Water in contact with heated material may cause foaming or a steam explosion with possible severe burns from wide scattering of hot material. Resultant overflow of containers may result in fire. |

## 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 | mineral oil | Oil mist, refined mineral | 5 mg/m3 | Not Available | Not Available | Not Available |

#### EMERGENCY LIMITS

| Ingredient              | Material name                     | TEEL-1    | TEEL-2    | TEEL-3   |
|-------------------------|-----------------------------------|-----------|-----------|----------|
| polytetrafluoroethylene | Polytetrafluoroethylene; (Teflon) | 0.3 mg/m3 | 3.3 mg/m3 | 20 mg/m3 |

| Ingredient                                      | Original IDLH | Revised IDLH  |
|-------------------------------------------------|---------------|---------------|
| mineral oil                                     | Not Available | Not Available |
| (solvent refined)                               | Not Available | Not Available |
| additives, unregulated                          | Not Available | Not Available |
| polytetrafluoroethylene                         | Not Available | Not Available |
| performance additives                           | Not Available | Not Available |
| dye                                             | Not Available | Not Available |
| NOTE: Manufacturer has supplied full ingredient | Not Available | Not Available |
| information to allow CHEMWATCH assessment.      | Not Available | Not Available |

#### MATERIAL DATA

All perfluorinated carbons (PFCs) that have undergone evaluation by the ACGIH or WEEL committees in the US have been granted an exposure guideline of 1000 ppm 8-hour Time Weighted Average (8-hr TWA). NASA has evaluated the toxicity information associated with PFCs including those that can be used as heat transfer agents and fire extinguishing agents in spacecraft and has established a Space Maximum Allowable Concentration (SMAC) of 11,000 ppm for up to 180 days (24 hours/day).

Toxicity and Irritation data for petroleum-based mineral oils are related to chemical components and vary as does the composition and source of the original crude.

A small but definite risk of occupational skin cancer occurs in workers exposed to persistent skin contamination by oils over a period of years. This risk has been attributed to the presence of certain polycyclic aromatic hydrocarbons (PAH) (typified by benz[a]pyrene).

Petroleum oils which are solvent refined/extracted or severely hydrotreated, contain very low concentrations of both.

### Exposure controls

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |            |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|
| <b>Appropriate engineering controls</b> | <p>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.</p> <p>The basic types of engineering controls are:</p> <ul style="list-style-type: none"> <li>Process controls which involve changing the way a job activity or process is done to reduce the risk.</li> <li>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.</li> </ul> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <p>General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances. If risk of overexposure exists, wear approved respirator. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. Provide adequate ventilation in warehouses and enclosed storage areas. 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.</p> |                      |            |
|                                         | <table border="1" style="width: 100%;"> <tr> <td style="width: 80%;">Type of Contaminant:</td> <td style="width: 20%;">Air Speed:</td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Type of Contaminant: | Air Speed: |
| Type of Contaminant:                    | Air Speed:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |            |

|                                                            | solvent, vapours, degreasing etc., evaporating from tank (in still air).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.25-0.5 m/s<br>(50-100 f/min)  |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------|-------------------------------------------------------|---------------------------------|------------------------------------------------------------|----------------------------------|----------------------------------|-------------------------------|-------------------------------------------|----------------------------------|--|
|                                                            | aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.5-1 m/s<br>(100-200 f/min.)   |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
|                                                            | direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1-2.5 m/s<br>(200-500 f/min.)   |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
|                                                            | 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<br>(500-2000 f/min.) |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
|                                                            | Within each range the appropriate value depends on:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
|                                                            | <table border="1"> <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>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Lower end of the range          | Upper end of the range | 1: Room air currents minimal or favourable to capture | 1: Disturbing room air currents | 2: Contaminants of low toxicity or of nuisance value only. | 2: Contaminants of high toxicity | 3: Intermittent, low production. | 3: High production, heavy use | 4: Large hood or large air mass in motion | 4: Small hood-local control only |  |
| Lower end of the range                                     | Upper end of the range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| 1: Room air currents minimal or favourable to capture      | 1: Disturbing room air currents                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| 2: Contaminants of low toxicity or of nuisance value only. | 2: Contaminants of high toxicity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| 3: Intermittent, low production.                           | 3: High production, heavy use                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| 4: Large hood or large air mass in motion                  | 4: Small hood-local control only                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
|                                                            | 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/min) 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| <b>Personal protection</b>                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| <b>Eye and face protection</b>                             | <ul style="list-style-type: none"> <li>▶ Safety glasses with side shields</li> <li>▶ Chemical goggles.</li> <li>▶ 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. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| <b>Skin protection</b>                                     | See Hand protection below                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| <b>Hands/feet protection</b>                               | <p>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.</p> <p>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.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"> <li>▶ frequency and duration of contact,</li> <li>▶ chemical resistance of glove material,</li> <li>▶ glove thickness and</li> <li>▶ dexterity</li> </ul> <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none"> <li>▶ 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.</li> <li>▶ When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.</li> <li>▶ Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.</li> <li>▶ Contaminated gloves should be replaced.</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>▶ Wear chemical protective gloves, e.g. PVC.</li> <li>▶ Wear safety footwear or safety gumboots, e.g. Rubber</li> </ul> |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| <b>Body protection</b>                                     | See Other protection below                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| <b>Other protection</b>                                    | <ul style="list-style-type: none"> <li>▶ Overalls.</li> <li>▶ P.V.C. apron.</li> <li>▶ Barrier cream.</li> <li>▶ Skin cleansing cream.</li> <li>▶ Eye wash unit.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |
| <b>Thermal hazards</b>                                     | Not Available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                 |                        |                                                       |                                 |                                                            |                                  |                                  |                               |                                           |                                  |  |

**Recommended material(s)**

**Respiratory protection**

## GLOVE SELECTION INDEX

Not Available

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:

Not Available

Nulon E10 Worn Engine Treatment Not Available

| Material | CPI |
|----------|-----|
|----------|-----|

\* 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

| Appearance                                   | Opaque viscous liquid; not miscible with water. |                                         |                |
|----------------------------------------------|-------------------------------------------------|-----------------------------------------|----------------|
| Physical state                               | Liquid                                          | Relative density (Water = 1)            | Not Available  |
| Odour                                        | Not Available                                   | Partition coefficient n-octanol / water | Not Available  |
| Odour threshold                              | Not Available                                   | Auto-ignition temperature (°C)          | Not Available  |
| pH (as supplied)                             | Not Applicable                                  | Decomposition temperature               | Not Available  |
| Melting point / freezing point (°C)          | Not Available                                   | Viscosity (cSt)                         | Not Available  |
| Initial boiling point and boiling range (°C) | Not Available                                   | Molecular weight (g/mol)                | Not Applicable |
| Flash point (°C)                             | Not Available                                   | Taste                                   | Not Available  |
| Evaporation rate                             | Not Available                                   | Explosive properties                    | Not Available  |
| Flammability                                 | Not Available                                   | Oxidising properties                    | Not Available  |
| Upper Explosive Limit (%)                    | Not Available                                   | Surface Tension (dyn/cm or mN/m)        | Not Available  |
| Lower Explosive Limit (%)                    | Not Available                                   | Volatile Component (%vol)               | Not Available  |
| Vapour pressure (kPa)                        | Not Available                                   | Gas group                               | Not Available  |
| Solubility in water (g/L)                    | Immiscible                                      | pH as a solution (1%)                   | Not Applicable |
| Vapour density (Air = 1)                     | Not Available                                   | VOC g/L                                 | Not Available  |

## SECTION 10 STABILITY AND REACTIVITY

|                                    |                                                                                                                                                                                                  |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reactivity                         | See section 7                                                                                                                                                                                    |
| Chemical stability                 | <ul style="list-style-type: none"><li>▶ Unstable in the presence of incompatible materials.</li><li>▶ Product is considered stable.</li><li>▶ Hazardous polymerisation will not occur.</li></ul> |
| 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

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Inhaled</b>      | <p>The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>Inhalation hazard is increased at higher temperatures.</p> <p>Inhalation of oil droplets/ aerosols may cause discomfort and may produce chemical pneumonitis.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Ingestion</b>    | <p>The material has <b>NOT</b> been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Skin Contact</b> | <p>The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives .</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>The material may accentuate any pre-existing dermatitis condition</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Eye</b>          | <p>Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Chronic</b>      | <p>On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body 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.</p> <p>Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.</p> <p>Principal route of exposure is by skin contact; lesser exposures include inhalation of fumes from hot oils, oil mists or droplets. Prolonged contact with mineral oils carries with it the risk of skin conditions such as oil folliculitis, eczematous dermatitis, pigmentation of the face (melanosis) and warts on the sole of the foot (plantar warts). With highly refined mineral oils no appreciable systemic effects appear to result through skin absorption.</p> <p>Exposure to oil mists frequently elicits respiratory conditions, such as asthma; the provoking agent is probably an additive. High oil mist concentrations may produce lipoid pneumonia although clinical evidence is equivocal. In animals exposed to concentrations of 100 mg/m<sup>3</sup> oil mist, for periods of 12 to 26 months, the activity of lung and serum alkaline phosphatase enzyme was raised; 5 mg/m<sup>3</sup> oil mist did not produce this response. These enzyme changes are sensitive early indicators of lung damage. Workers exposed to vapours of mineral oil and kerosene for 5 to 35 years showed an increased prevalence of slight basal lung fibrosis.</p> <p>Many studies have linked cancers of the skin and scrotum with mineral oil exposure. Contaminants in the form of additives and the polycyclic aromatic hydrocarbons (PAHs - as in the crude base stock) are probably responsible. PAH levels are higher in aromatic process oils/used/reclaimed motor oils. Subchronic 90-day feeding studies conducted on male and female rats on highly refined white mineral oils and waxes found that higher molecular-weight hydrocarbons (microcrystalline waxes and the higher viscosity oils) were without biological effects. Paraffin waxes and low- to mid viscosity oils produced biological effects that were inversely proportional to molecular weight, viscosity and melting point: oil-type and processing did not appear to be determinants. Biological effects were more pronounced in females than in males. Effects occurred mainly in the liver and mesenteric lymph nodes and included increased organ weights, microscopic inflammatory changes, and evidence for the presence of saturated mineral hydrocarbons in affected tissues. Inflammation of the cardiac mitral valve was also observed at high doses in rats treated with paraffin waxes.</p> <p>Smith J.H., et al: Toxicologic Pathology: 24, 2, 214-230, 1996</p> |

|                                        |                                                                                                                                                                                                                                |                               |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Nulon E10 Worn Engine Treatment</b> | <b>TOXICITY</b>                                                                                                                                                                                                                | <b>IRRITATION</b>             |
|                                        | Not Available                                                                                                                                                                                                                  | Not Available                 |
| <b>mineral oil</b>                     | <b>TOXICITY</b>                                                                                                                                                                                                                | <b>IRRITATION</b>             |
|                                        | Not Available                                                                                                                                                                                                                  | Not Available                 |
| <b>polytetrafluoroethylene</b>         | <b>TOXICITY</b>                                                                                                                                                                                                                | <b>IRRITATION</b>             |
|                                        | Oral (rat) LD50: 1250 mg/kg*[2]                                                                                                                                                                                                | Nil reported * [Manufacturer] |
| <b>Legend:</b>                         | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's msds. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances |                               |

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Nulon E10 Worn Engine Treatment</b> | <p>The materials included in the Lubricating Base Oils category are related from both process and physical-chemical perspectives;</p> <p>The potential toxicity of a specific distillate base oil is inversely related to the severity or extent of processing the oil has undergone, since:</p> <ul style="list-style-type: none"> <li>▶ The adverse effects of these materials are associated with undesirable components, and</li> <li>▶ The levels of the undesirable components are inversely related to the degree of processing;</li> <li>▶ Distillate base oils receiving the same degree or extent of processing will have similar toxicities;</li> <li>▶ The potential toxicity of <i>residual base oils</i> is independent of the degree of processing the oil receives.</li> <li>▶ The reproductive and developmental toxicity of the distillate base oils is inversely related to the degree of processing.</li> </ul> <p>Unrefined &amp; mildly refined distillate base oils contain the highest levels of undesirable components, have the largest variation of hydrocarbon molecules and have shown the highest potential carcinogenic and mutagenic activities. Highly and severely refined distillate base oils are produced from unrefined and mildly refined oils by</p> |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

removing or transforming undesirable components. In comparison to unrefined and mildly refined base oils, the highly and severely refined distillate base oils have a smaller range of hydrocarbon molecules and have demonstrated very low mammalian toxicity. Mutagenicity and carcinogenicity testing of residual oils has been negative, supporting the belief that these materials lack biologically active components or the components are largely non-bioavailable due to their molecular size.

Toxicity testing has consistently shown that lubricating base oils have low acute toxicities. Numerous tests have shown that a lubricating base oil's mutagenic and carcinogenic potential correlates with its 3-7 ring polycyclic aromatic compound (PAC) content, and the level of DMSO extractables (e.g. IP346 assay), both characteristics that are directly related to the degree/conditions of processing

Highly and Severely Refined Distillate Base Oils

**Acute toxicity:** Multiple studies of the acute toxicity of highly & severely refined base oils have been reported. Irrespective of the crude source or the method or extent of processing, the oral LD50s have been observed to be >5 g/kg (bw) and the dermal LD50s have ranged from >2 to >5g/kg (bw). The LC50 for inhalation toxicity ranged from 2.18 mg/l to > 4 mg/l.

When tested for skin and eye irritation, the materials have been reported as "non-irritating" to "moderately irritating"

Testing in guinea pigs for sensitization has been negative

**Repeat dose toxicity:** . Several studies have been conducted with these oils. The weight of evidence from all available data on highly & severely refined base oils support the presumption that a distillate base oil's toxicity is inversely related to the degree of processing it receives. Adverse effects have been reported with even the most severely refined white oils - these appear to depend on animal species and/ or the peculiarities of the study.

- ▶ The granulomatous lesions induced by the oral administration of white oils are essentially foreign body responses. The lesions occur only in rats, of which the Fischer 344 strain is particularly sensitive,
- ▶ The testicular effects seen in rabbits after dermal administration of a highly to severely refined base oil were unique to a single study and may have been related to stress induced by skin irritation, and
- ▶ The accumulation of foamy macrophages in the alveolar spaces of rats exposed repeatedly via inhalation to high levels of highly to severely refined base oils is not unique to these oils, but would be seen after exposure to many water insoluble materials.

**Reproductive and developmental toxicity:** A highly refined base oil was used as the vehicle control in a one-generation reproduction study. The study was conducted according to the OECD Test Guideline 421. There was no effect on fertility and mating indices in either males or females. At necropsy, there were no consistent findings and organ weights and histopathology were considered normal by the study's authors.

A single generation study in which a white mineral oil (a food/ drug grade severely refined base oil) was used as a vehicle control is reported. Two separate groups of pregnant rats were administered 5 ml/kg (bw)/day of the base oil via gavage, on days 6 through 19 of gestation. In one of the two base oil dose groups, three malformed foetuses were found among three litters The study authors considered these malformations to be minor and within the normal ranges for the strain of rat.

**Genotoxicity:**

*In vitro* (mutagenicity): Several studies have reported the results of testing different base oils for mutagenicity using a modified Ames assay Base oils with no or low concentrations of 3-7 ring PACs had low mutagenicity indices.

*In vivo* (chromosomal aberrations): A total of seven base stocks were tested in male and female Sprague-Dawley rats using a bone marrow cytogenetics assay. The test materials were administered via gavage at dose levels ranging from 500 to 5000 mg/kg (bw). Dosing occurred for either a single day or for five consecutive days. None of the base oils produced a significant increase in aberrant cells.

**Carcinogenicity:** Highly & severely refined base oils are not carcinogens, when given either orally or dermally.

## MINERAL OIL

Toxicity and Irritation data for petroleum-based mineral oils are related to chemical components and vary as does the composition and source of the original crude.

A small but definite risk of occupational skin cancer occurs in workers exposed to persistent skin contamination by oils over a period of years. This risk has been attributed to the presence of certain polycyclic aromatic hydrocarbons (PAH) (typified by benz[a]pyrene).

Petroleum oils which are solvent refined/extracted or severely hydrotreated, contain very low concentrations of both.

## POLYTETRAFLUOROETHYLENE

For perfluorinated carbons (PFCs):

PFCs are inert fluids composed of a complex combination of organic compounds resulting from the distillation of electrochemically fluorinated (ECF) compounds. This class consists of branched, linear and cyclic perfluorinated hydrocarbons having carbon numbers predominantly in the range of C5-C18 and boiling in the range of approximately 25 C-255 C (77 F-491 F). Perfluorinated amine and ether compounds may also be present

Acute oral and inhalation toxicity tests with perfluoroalkanes show no toxicity at any dose tested, and even extremely high-dose intraperitoneal injection resulted in no lethality. In contrast, perfluoroalkenes (such as octafluorocyclopentene, perfluoroisobutylene, hexafluoropropene) have shown evidence of inhalation toxicity, in some cases, extreme.

PFCs are among the least toxic of all known organic chemicals. PFCs don't oxidise or hydrolyse. They have no functional reactive groups. PFCs owe their low toxicity to the combination of the following properties:

- ▶ Chemical inertness
- ▶ Low solubility in biological media (blood, cell membranes, etc.)
- ▶ High volatility
- ▶ Resistance to biological activation (reductive and oxidative metabolism)

Because PFCs are chemically inert, if inhaled and absorbed they do not react chemically with any biological molecules; they simply partition between blood and various organs and tissues.

As PFCs have limited ability to dissolve in biological media, they do not reach appreciable concentrations in the



When spilled this product may act as a typical oil, causing a film, sheen, emulsion or sludge at or beneath the surface of the body of water. The oil film on water surface may physically affect the aquatic organisms, due to the interruption of the oxygen transfer between the air and the water

Oils of any kind can cause:

- ▶ drowning of water-fowl due to lack of buoyancy, loss of insulating capacity of feathers, starvation and vulnerability to predators due to lack of mobility
- ▶ lethal effects on fish by coating gill surfaces, preventing respiration
- ▶ asphyxiation of benthic life forms when floating masses become engaged with surface debris and settle on the bottom and
- ▶ adverse aesthetic effects of fouled shoreline and beaches

In case of accidental releases on the soil, a fine film is formed on the soil, which prevents the plant respiration process and the soil particle saturation. It may cause deep water infestation.

#### for lubricating oil base stocks:

**Vapor Pressure** Vapor pressures of lubricating base oils are reported to be negligible. In one study, the experimentally measured vapour pressure of a solvent-dewaxed heavy paraffinic distillate base oil was  $1.7 \times 10^{\text{exp-4}}$  Pa. Since base oils are mixtures of C15 to C50 paraffinic, naphthenic, and aromatic hydrocarbon isomers, representative components of those structures were selected to calculate a range of vapor pressures. The estimated vapor pressure values for these selected components of base oils ranged from  $4.5 \times 10^{\text{exp-1}}$  Pa to  $2 \times 10^{\text{exp-13}}$  Pa. Based on Dalton's Law the expected total vapour pressure for base oils would fall well below minimum levels ( $10^{\text{exp-5}}$  Pa) of recommended experimental procedures.

**Partition Coefficient (log Kow):** In mixtures such as the base oils, the percent distribution of the hydrocarbon groups (i.e., paraffins, naphthenes, and aromatics) and the carbon chain lengths determines in-part the partitioning characteristics of the mixture. Generally, hydrocarbon chains with fewer carbon atoms tend to have lower partition coefficients than those with higher carbon numbers. However, due to their complex composition, unequivocal determination of the log Kow of these hydrocarbon mixtures cannot be made. Rather, partition coefficients of selected C15 chain-length hydrocarbon structures representing paraffinic, naphthenic, and aromatic constituents in base oil lubricants were modelled. Results showed typical log Kow values from 4.9 to 7.7, which were consistent with values of >4 for lubricating oil basestocks

**Water Solubility:** When released to water, base oils will float and spread at a rate that is viscosity dependent. While water solubility of base oils is typically very low, individual hydrocarbons exhibit a wide range of solubility depending on molecular weight and degree of unsaturation. Decreasing molecular weight (i.e., carbon number) and increasing levels of unsaturation increases the water solubility of these materials. As noted for partition coefficient, the water solubility of lubricating base oils cannot be determined due to their complex mixture characteristics. Therefore, the water solubility of individual C15 hydrocarbons representing the different groups making up base oils (i.e., linear and branched paraffins, naphthenes, and aromatics) was modelled. Based on water solubility modelling of those groups, aqueous solubilities are typically much less than 1 ppm. (0.003-0.63 mg/l)

#### Environmental Fate:

**Photodegradation:** Chemicals having potential to photolyse have UV/visible absorption maxima in the range of 290 to 800 nm. Some chemicals have absorption maxima significantly below 290 nm and consequently cannot undergo direct photolysis in sunlight (e.g. chemicals such as alkanes, alkenes, alkynes, saturated alcohols, and saturated acids). Most hydrocarbon constituents of the materials in this category are not expected to photolyse since they do not show absorbance within the 290-800 nm range. However, photodegradation of polyaromatic hydrocarbons (PAHs) can occur and may be a significant degradation pathway for these constituents of lubricating base oils. The degree and rate at which PAHs may photodegrade depend upon whether conditions allow penetration of light with sufficient energy to effect a change. For example, polycyclic aromatic compounds (PAC) compounds bound to sediments may persist due to a lack of sufficient light penetration

Atmospheric gas-phase reactions can occur between organic chemicals and reactive molecules such as photochemically produced hydroxyl radicals, ozone and nitrogen oxides. Atmospheric oxidation as a result of radical attack is not direct photochemical degradation, but indirect degradation. In general, lubricating base oils have low vapour pressures and volatilisation is not expected to be a significant removal mechanism for the majority of the hydrocarbon components. However, some components (e.g., C15 branched paraffins and naphthenes) appear to have the potential to volatilise. Atmospheric half-lives of 0.10 to 0.66 days have been calculated for representative C15 hydrocarbon components of lubricating base oils

**Stability in Water:** Chemicals that have a potential to hydrolyze include alkyl halides, amides, carbamates, carboxylic acid esters and lactones, epoxides, phosphate esters, and sulfonic acid esters. Because lubricating base oils do not contain significant levels of these functional groups, materials in the lubricating base oils category are not subject to hydrolysis

**Chemical Transport and Distribution in the Environment :** Based on the physical-chemical characteristics of component hydrocarbons in lubricating base oils, the lower molecular weight components are expected to have the highest vapour pressures and water solubilities, and the lowest partition coefficients. These factors enhance the potential for widespread distribution in the environment. To gain an understanding of the potential transport and distribution of lubricating base oil components, the EQC (Equilibrium Criterion) model was used to characterize the environmental distribution of different C15 compounds representing different structures found in lube oils (e.g., paraffins, naphthenes, and aromatics). The modelling found partitioning to soil or air is the ultimate fate of these C15 compounds. Aromatic compounds partition principally to soil. Linear paraffins partition mostly to soil, while branching appears to allow greater distribution to air. Naphthenes distribute to both soil and air, with increasing proportions in soil for components with the greater number of ring structures. Because the modelling does not take into account degradation factors, levels modelled in the atmosphere are likely overstated in light of the tendency for indirect photodegradation to occur.

**Biodegradation:** The extent of biodegradation measured for a particular lubricating oil basestock is dependent not only on the procedure used but also on how the sample is presented in the biodegradation test. Lubricant base oils typically are not readily biodegradable in standard 28-day tests. However, since the oils consist primarily of hydrocarbons that are ultimately assimilated by microorganisms, and therefore inherently biodegradable. Twenty-eight biodegradability studies have been reported for a variety of lubricating base oils. Based on the results of ultimate biodegradability tests using modified Sturm and manometric respirometry testing the base oils are expected to be, for the most part, inherently biodegradable. Biodegradation rates found using the modified Sturm procedure ranged from 1.5 to 29%. Results from the manometric respirometry tests on similar materials showed biodegradation rates from 31 to 50%. Biodegradation rates measured in 21-day CEC tests for similar materials ranged from 13 to 79%.

#### Ecotoxicity:

Numerous acute studies covering fish, invertebrates, and algae have been conducted to assess the ecotoxicity of various lubricating base oils. None of these studies have shown evidence of acute toxicity to aquatic organisms. Eight, 7-day exposure studies using rainbow trout failed to demonstrate toxicity when tested up to the maximum concentration of 1000 mg/L applied as dispersions. Three, 96-hour tests with rainbow trout also failed to show any toxic effects when tested up to 1000 mg/L applied as dispersions. Similarly, three 96-hour tests with fathead minnows at a maximum test concentration of 100 mg/L water accommodated fractions (WAF) showed no adverse effects. Two species of aquatic invertebrates (*Daphnia magna* and *Gammarus* sp.) were exposed to WAF solutions up to 10,000 mg/L for 48 and 96-hours, respectively, with no adverse effects being observed. Four-day exposures of the freshwater green alga (*Scenedesmus subspicatus*) to 500 mg/L WAF solutions failed to show adverse effects on growth rate and algal cell densities in four studies

Multiple chronic ecotoxicity studies have shown no adverse effects to daphnid survival or reproduction. In 10 of 11 chronic studies, daphnids were exposed for 21 days to WAF preparations of lubricating base oils with no ill effects on survival or reproduction at the maximum concentration of 1000 mg/L. One test detected a reduction in reproduction at 1000 mg/L. Additional data support findings of no chronic toxicity to aquatic invertebrates and fish. No observed effect levels ranged from 550 to 5,000 mg/L when tested as either dispersions or WAFs.

The data described above are supported by studies on a homologous series of alkanes. The author concluded that the water solubility of carbon chains .C10 is too limited to elicit acute toxicity. This also was shown for alkylbenzene compounds having carbon numbers .C15. Since base oils consist of carbon compounds of C15 to C50, component hydrocarbons that are of acute toxicological concern are, for the most part, absent in these materials. Similarly, due to their low solubility, the alkylated two to three ring polyaromatic components in base oils are not expected to cause acute or chronic

toxicity. This lack of toxicity is borne out in the results of the reported studies.

The effects of crude and refined oils on organisms found in fresh and sea water have been extensively reviewed.

sea water. Where spillages occur the non-mobile species suffer the greatest mortality, whereas fish species can often escape from the affected region. The extent of the initial mortality depends on the chemical nature of the oil, the location, and the physical conditions, particularly the temperature and wind velocity. Most affected freshwater and marine communities recover from the effects of an oil spill within a year. The occurrence of biogenic hydrocarbons in the world's oceans is well recorded. They have the characteristic isoprenoid structure, and measurements made in water columns indicate a background concentration of 1.0 to 10 µl/l. The higher molecular weight materials are dispersed as particles, with the highest concentrations of about 20 µl/l occurring in the top 3 mm layer of water.

A wide variation in the response of organisms to oil exposures has been noted. The larvae of fish and crustaceans appear to be most susceptible to the water-soluble fraction of crude oil. Exposures of plankton and algae have indicated that certain species of diatoms and green algae are inhibited, whereas microflagellates are not.

For the most part, molluscs and most intertidal worm species appear to be tolerant of oil contamination.

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

## Persistence and degradability

| Ingredient              | Persistence: Water/Soil | Persistence: Air |
|-------------------------|-------------------------|------------------|
| polytetrafluoroethylene | HIGH                    | HIGH             |

## Bioaccumulative potential

| Ingredient              | Bioaccumulation       |
|-------------------------|-----------------------|
| polytetrafluoroethylene | LOW (LogKOW = 1.2142) |

## Mobility in soil

| Ingredient              | Mobility          |
|-------------------------|-------------------|
| polytetrafluoroethylene | LOW (KOC = 106.8) |

## SECTION 13 DISPOSAL CONSIDERATIONS

### Waste treatment methods

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Product / Packaging disposal</b> | <p>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.</p> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none"><li>▶ Reduction</li><li>▶ Reuse</li><li>▶ Recycling</li><li>▶ Disposal (if all else fails)</li></ul> <p>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.</p> <ul style="list-style-type: none"><li>▶ <b>DO NOT allow wash water from cleaning or process equipment to enter drains.</b></li><li>▶ It may be necessary to collect all wash water for treatment before disposal.</li><li>▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.</li><li>▶ Where in doubt contact the responsible authority.</li><li>▶ Recycle wherever possible or consult manufacturer for recycling options.</li><li>▶ Consult State Land Waste Authority for disposal.</li><li>▶ Bury or incinerate residue at an approved site.</li><li>▶ Recycle containers if possible, or dispose of in an authorised landfill.</li></ul> |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## SECTION 14 TRANSPORT INFORMATION

### Labels Required

|                         |                |
|-------------------------|----------------|
| <b>Marine Pollutant</b> | NO             |
| <b>HAZCHEM</b>          | Not Applicable |

**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**

## SECTION 15 REGULATORY INFORMATION

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

#### MINERAL OIL(NOT AVAIL.) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards

Australia Hazardous Substances Information System - Consolidated Lists

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

#### POLYTETRAFLUOROETHYLENE(9002-84-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

| National Inventory            | Status                                                                                                                                                                                       |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Australia - AICS              | N (mineral oil)                                                                                                                                                                              |
| Canada - DSL                  | N (mineral oil)                                                                                                                                                                              |
| Canada - NDSL                 | N (polytetrafluoroethylene; mineral oil)                                                                                                                                                     |
| China - IECSC                 | N (mineral oil)                                                                                                                                                                              |
| Europe - EINEC / ELINCS / NLP | N (polytetrafluoroethylene; mineral oil)                                                                                                                                                     |
| Japan - ENCS                  | N (mineral oil)                                                                                                                                                                              |
| Korea - KECI                  | N (mineral oil)                                                                                                                                                                              |
| New Zealand - NZIoC           | N (mineral oil)                                                                                                                                                                              |
| Philippines - PICCS           | N (mineral oil)                                                                                                                                                                              |
| USA - TSCA                    | N (mineral oil)                                                                                                                                                                              |
| <b>Legend:</b>                | <i>Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)</i> |

## SECTION 16 OTHER INFORMATION

### 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.

A list of reference resources used to assist the committee may be found at:

[www.chemwatch.net](http://www.chemwatch.net)

The (M)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.

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