



NS-8301-G Syn-Tech Ltd.

Version No: 1.1
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 3

Issue Date: 08/22/2022
Print Date: 08/22/2022
S.GHS.USA.EN

SECTION 1 Identification

Product Identifier

| | |
|-------------------------------|---------------|
| Product name | NS-8301-G |
| Synonyms | Not Available |
| Other means of identification | Not Available |

Recommended use of the chemical and restrictions on use

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

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

| | | |
|-------------------------|--|--|
| Registered company name | Syn-Tech Ltd. | Syn-Tech Ltd. |
| Address | 1550 W Fullerton Ave, Unit F Illinois 60101 United States | 1550 W. Fullerton Ave Illinois United States |
| Telephone | 630-628-7290 | 630-628-7290 |
| Fax | Not Available | Not Available |
| Website | www.syn-techlube.com | www.syn-techlube.com |
| Email | msds@syn-techlube.com | msds@syn-techlube.com |

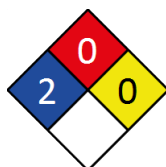
Emergency phone number

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

SECTION 2 Hazard(s) identification

Classification of the substance or mixture



NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

| | |
|----------------|--|
| Classification | Carcinogenicity Category 1B, Sensitisation (Skin) Category 1, Acute Toxicity (Oral) Category 3 |
|----------------|--|

Label elements

| | |
|---------------------|---|
| Hazard pictogram(s) |   |
| Signal word | Danger |

Hazard statement(s)

| | |
|------|--------------------------------------|
| H350 | May cause cancer. |
| H317 | May cause an allergic skin reaction. |
| H301 | Toxic if swallowed. |

Hazard(s) not otherwise classified

Not Applicable

Precautionary statement(s) Prevention

| | |
|------|---|
| P201 | Obtain special instructions before use. |
| P264 | Wash all exposed external body areas thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P280 | Wear protective gloves and protective clothing. |
| P261 | Avoid breathing dust/fumes. |
| P202 | Do not handle until all safety precautions have been read and understood. |
| P272 | Contaminated work clothing must not be allowed out of the workplace. |

Precautionary statement(s) Response

| | |
|-----------|--|
| P301+P310 | IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider. |
| P308+P313 | IF exposed or concerned: Get medical advice/ attention. |
| P330 | Rinse mouth. |
| P302+P352 | IF ON SKIN: Wash with plenty of water and soap. |
| P333+P313 | If skin irritation or rash occurs: Get medical advice/attention. |
| P362+P364 | Take off contaminated clothing and wash it before reuse. |

Precautionary statement(s) Storage

| | |
|------|------------------|
| P405 | Store locked up. |
|------|------------------|

Precautionary statement(s) Disposal

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

Not Applicable

SECTION 3 Composition / information on ingredients**Substances**

See section below for composition of Mixtures

Mixtures

| CAS No | %[weight] | Name |
|------------|-----------|---|
| 71011-25-1 | 12 | <u>tallow alkyldimethylammonium chloride/ bentonite complex</u> |
| 67-56-1 | 2.5 | <u>methanol</u> |
| 68411-46-1 | 1 | <u>octylated diphenylamines</u> |
| 13539-13-4 | 0.2 | <u>2,5-bis(octylidithio)-1,3,4-thiadiazole</u> |
| 64742-52-5 | 60 | <u>naphthenic distillate, heavy, hydrotreated (mild)</u> |

SECTION 4 First-aid measures**Description of first aid measures**

| | |
|---------------------|---|
| Eye Contact | <ul style="list-style-type: none"> Generally not applicable. |
| Skin Contact | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> Immediately remove all contaminated clothing, including footwear. Flush skin and hair with running water (and soap if available). Seek medical attention in event of irritation. Generally not applicable. |
| Inhalation | <ul style="list-style-type: none"> Generally not applicable. |
| Ingestion | <ul style="list-style-type: none"> IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. For advice, contact a Poisons Information Centre or a doctor. Urgent hospital treatment is likely to be needed. In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. Further action will be the responsibility of the medical specialist. If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. <p>Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:</p> |

Continued...

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- ▶ **INDUCE** vomiting with fingers down the back of the throat, **ONLY IF CONSCIOUS**. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- NOTE:** Wear a protective glove when inducing vomiting by mechanical means.
- ▶ Generally not applicable.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

For petroleum distillates

- In case of ingestion, gastric lavage with activated charcoal can be used promptly to prevent absorption - decontamination (induced emesis or lavage) is controversial and should be considered on the merits of each individual case; of course the usual precautions of an endotracheal tube should be considered prior to lavage, to prevent aspiration.
- Individuals intoxicated by petroleum distillates should be hospitalized immediately, with acute and continuing attention to neurologic and cardiopulmonary function.
- Positive pressure ventilation may be necessary.
- Acute central nervous system signs and symptoms may result from large ingestions of aspiration-induced hypoxia.
- After the initial episode, individuals should be followed for changes in blood variables and the delayed appearance of pulmonary oedema and chemical pneumonitis. Such patients should be followed for several days or weeks for delayed effects, including bone marrow toxicity, hepatic and renal impairment. Individuals with chronic pulmonary disease will be more seriously impaired, and recovery from inhalation exposure may be complicated.
- Gastrointestinal symptoms are usually minor and pathological changes of the liver and kidneys are reported to be uncommon in acute intoxications.
- Chlorinated and non-chlorinated hydrocarbons may sensitize the heart to epinephrine and other circulating catecholamines so that arrhythmias may occur. Careful consideration of this potential adverse effect should precede administration of epinephrine or other cardiac stimulants and the selection of bronchodilators.

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- ▶ 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 Fire-fighting measures**Extinguishing media**

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

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

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

Special protective equipment and precautions for fire-fighters**Fire Fighting**

- ▶ When silica dust is dispersed in air, firefighters should wear inhalation protection as hazardous substances from the fire may be adsorbed on the silica particles.
 - ▶ When heated to extreme temperatures, (>1700 deg.C) amorphous silica can fuse.
 - ▶ Alert Fire Brigade and tell them location and nature of hazard.
 - ▶ Wear breathing apparatus plus protective gloves.
 - ▶ Prevent, by any means available, spillage from entering drains or water courses.
 - ▶ Use water delivered as a fine spray to control fire and cool adjacent area.
 - ▶ **DO NOT** approach containers suspected to be hot.
 - ▶ Cool fire exposed containers with water spray from a protected location.
 - ▶ If safe to do so, remove containers from path of fire.
 - ▶ Equipment should be thoroughly decontaminated after use.
- Slight hazard when exposed to heat, flame and oxidisers.

Fire/Explosion Hazard

Combustible. Will burn if ignited.
Combustion products include:
carbon monoxide (CO)
carbon dioxide (CO₂)
hydrogen chloride
phosgene
nitrogen oxides (NO_x)
other pyrolysis products typical of burning organic material.
May emit poisonous fumes.
May emit corrosive fumes.
Articles and manufactured articles may constitute a fire hazard where polymers form their outer layers or where combustible packaging remains in place.
Certain substances, found throughout their construction, may degrade or become volatile when heated to high temperatures. This may create a secondary hazard.
CARE: 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.

SECTION 6 Accidental release measures**Personal precautions, protective equipment and emergency procedures**

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

| | |
|---------------------|---|
| Minor Spills | <ul style="list-style-type: none"> ‣ Clean up all spills immediately. ‣ Secure load if safe to do so. ‣ Bundle/collect recoverable product. ‣ Collect remaining material in containers with covers for disposal. |
| Major Spills | <ul style="list-style-type: none"> ‣ Clear area of personnel and move upwind. ‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear full body protective clothing with breathing apparatus. ‣ Prevent, by all means available, spillage from entering drains or water courses. ‣ Consider evacuation (or protect in place). ‣ No smoking, naked lights or ignition sources. ‣ Increase ventilation. ‣ Stop leak if safe to do so. ‣ Water spray or fog may be used to disperse / absorb vapour. ‣ Contain or absorb spill with sand, earth or vermiculite. ‣ Collect recoverable product into labelled containers for recycling. ‣ Collect solid residues and seal in labelled drums for disposal. ‣ Wash area and prevent runoff into drains. ‣ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ‣ If contamination of drains or waterways occurs, advise emergency services. <p>Minor hazard.</p> <ul style="list-style-type: none"> ‣ Clear area of personnel. ‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Control personal contact with the substance, by using protective equipment as required. ‣ Prevent spillage from entering drains or water ways. ‣ Contain spill with sand, earth or vermiculite. ‣ Collect recoverable product into labelled containers for recycling. ‣ Absorb remaining product with sand, earth or vermiculite and place in appropriate containers for disposal. ‣ Wash area and prevent runoff into drains or waterways. ‣ If contamination of drains or waterways occurs, advise emergency services. ‣ Clean up all spills immediately. ‣ Wear protective clothing, safety glasses, dust mask, gloves. ‣ Secure load if safe to do so. Bundle/collect recoverable product. ‣ Use dry clean up procedures and avoid generating dust. ‣ Vacuum up (consider explosion-proof machines designed to be grounded during storage and use). ‣ Water may be used to prevent dusting. ‣ Collect remaining material in containers with covers for disposal. ‣ Flush spill area with water. |

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

SECTION 7 Handling and storage**Precautions for safe handling**

| | |
|--------------------------|--|
| Safe handling | <p>The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid.</p> <ul style="list-style-type: none"> ‣ Containers, even those that have been emptied, may contain explosive vapours. ‣ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. ‣ Avoid all personal contact, including inhalation. ‣ Wear protective clothing when risk of exposure occurs. ‣ Use in a well-ventilated area. ‣ Prevent concentration in hollows and sumps. ‣ DO NOT enter confined spaces until atmosphere has been checked. ‣ DO NOT allow material to contact humans, exposed food or food utensils. ‣ Avoid contact with incompatible materials. ‣ When handling, DO NOT eat, drink or smoke. ‣ Keep containers securely sealed when not in use. ‣ Avoid physical damage to containers. ‣ Always wash hands with soap and water after handling. ‣ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ‣ Use good occupational work practice. ‣ Observe manufacturer's storage and handling recommendations contained within this SDS. ‣ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. |
| Other information | <ul style="list-style-type: none"> ‣ Store away from incompatible materials. |

Conditions for safe storage, including any incompatibilities

| | |
|---------------------------|--|
| Suitable container | <p>Generally packaging as originally supplied with the article or manufactured item is sufficient to protect against physical hazards.</p> <p>If repackaging is required ensure the article is intact and does not show signs of wear. As far as is practically possible, reuse the original packaging or something providing a similar level of protection to both the article and the handler.</p> |
|---------------------------|--|

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Storage incompatibility

Silicas:

- ▶ react with hydrofluoric acid to produce silicon tetrafluoride gas
 - ▶ react with xenon hexafluoride to produce explosive xenon trioxide
 - ▶ reacts exothermically with oxygen difluoride, and explosively with chlorine trifluoride (these halogenated materials are not commonplace industrial materials) and other fluorine-containing compounds
 - ▶ may react with fluorine, chlorates
 - ▶ are incompatible with strong oxidisers, manganese trioxide, chlorine trioxide, strong alkalis, metal oxides, concentrated orthophosphoric acid, vinyl acetate
 - ▶ may react vigorously when heated with alkali carbonates.
- **CARE:** 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.
- Oil leaks in a pressurized circuit may result in a fine flammable spray (the lower flammability limit for oil mist is reached for a concentration of about 45 g/m³)
- Autoignition temperatures may be significantly lower under particular conditions (slow oxidation on finely divided materials..)
- ▶ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|--|---|--|---------------------------------|---------------------------------|---------------|----------------|
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | methanol | Methyl alcohol | 200 ppm / 260 mg/m ³ | Not Available | Not Available | Not Available |
| US NIOSH Recommended Exposure Limits (RELs) | methanol | Methyl alcohol | 200 ppm / 260 mg/m ³ | 325 mg/m ³ / 250 ppm | Not Available | [skin] |
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | octylated diphenylamines | Particulates Not Otherwise Regulated (PNOR)- Total dust | 15 mg/m ³ | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | octylated diphenylamines | Particulates Not Otherwise Regulated (PNOR)- Respirable fraction | 5 mg/m ³ | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-3 | octylated diphenylamines | Inert or Nuisance Dust: Respirable fraction | 5 mg/m ³ / 15 mppcf | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-3 | octylated diphenylamines | Inert or Nuisance Dust: Total Dust | 15 mg/m ³ / 50 mppcf | Not Available | Not Available | Not Available |
| US NIOSH Recommended Exposure Limits (RELs) | octylated diphenylamines | Particulates not otherwise regulated | Not Available | Not Available | Not Available | See Appendix D |
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | naphthenic distillate, heavy, hydrotreated (mild) | Oil mist, mineral | 5 mg/m ³ | Not Available | Not Available | Not Available |

Emergency Limits

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|---|-----------------------|-------------------------|-------------------------|
| methanol | Not Available | Not Available | Not Available |
| naphthenic distillate, heavy, hydrotreated (mild) | 140 mg/m ³ | 1,500 mg/m ³ | 8,900 mg/m ³ |

| Ingredient | Original IDLH | Revised IDLH |
|--|-------------------------|---------------|
| tallow alkyldimethylammonium chloride/ bentonite complex | Not Available | Not Available |
| methanol | 6,000 ppm | Not Available |
| octylated diphenylamines | Not Available | Not Available |
| 2,5-bis(octylidithio)-1,3,4-thiadiazole | Not Available | Not Available |
| naphthenic distillate, heavy, hydrotreated (mild) | 2,500 mg/m ³ | Not Available |

Occupational Exposure Banding

| Ingredient | Occupational Exposure Band Rating | Occupational Exposure Band Limit |
|--|-----------------------------------|----------------------------------|
| tallow alkyldimethylammonium chloride/ bentonite complex | E | ≤ 0.01 mg/m ³ |
| 2,5-bis(octylidithio)-1,3,4-thiadiazole | E | ≤ 0.1 ppm |

Notes:

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

Exposure controls

Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. 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.

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| | |
|-------------------------|---|
| | <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <ul style="list-style-type: none"> ▶ Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area. ▶ Work should be undertaken in an isolated system such as a "glove-box". Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system. ▶ Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within. ▶ Open-vessel systems are prohibited. ▶ Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation. ▶ Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system. ▶ For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood. ▶ Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas). ▶ Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air. ▶ Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 0.76 m/sec with a minimum of 0.64 m/sec. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed. <p>Articles or manufactured items, in their original condition, generally don't require engineering controls during handling or in normal use. Exceptions may arise following extensive use and subsequent wear, during recycling or disposal operations where substances, found in the article, may be released to the environment.</p> |
| Personal protection |  |
| Eye and face protection | <ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. 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] <p>No special equipment required due to the physical form of the product.</p> |
| Skin protection | See Hand protection below |
| Hands/feet protection | <ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber <p>NOTE:</p> <ul style="list-style-type: none"> ▶ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ▶ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed. <p>No special equipment required due to the physical form of the product.</p> |
| Body protection | See Other protection below |
| Other protection | <ul style="list-style-type: none"> ▶ Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent] ▶ Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent] ▶ Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely. ▶ Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. ▶ Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood. ▶ Overalls. ▶ P.V.C apron. ▶ Barrier cream. ▶ Skin cleansing cream. ▶ Eye wash unit. |

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

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| Material | CPI |
|----------------|-----|
| BUTYL | A |
| BUTYL/NEOPRENE | A |

Respiratory protection

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
| up to 10 x ES | AX-AUS | - | AX-PAPR-AUS / Class 1 |

Continued...

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| | |
|-------------------|---|
| PE/EVAL/PE | A |
| PVDC/PE/PVDC | A |
| SARANEX-23 | A |
| SARANEX-23 2-PLY | A |
| TEFLON | A |
| VITON/NEOPRENE | A |
| NEOPRENE | B |
| NAT+NEOPR+NITRILE | C |
| NATURAL RUBBER | C |
| NATURAL+NEOPRENE | C |
| NEOPRENE/NATURAL | C |
| NITRILE | C |
| PVA | C |
| PVC | C |

* 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.

| | | | |
|----------------|---|------------------|-------------|
| up to 50 x ES | - | AX-AUS / Class 1 | - |
| up to 100 x ES | - | AX-2 | AX-PAPR-2 ^ |

^ - Full-face

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

If inhalation risk above the TLV exists, wear approved dust respirator.

Use respirators with protection factors appropriate for the exposure level.

- ▶ Up to 5 X TLV, use valveless mask type; up to 10 X TLV, use 1/2 mask dust respirator
- ▶ Up to 50 X TLV, use full face dust respirator or demand type C air supplied respirator
- ▶ Up to 500 X TLV, use powered air-purifying dust respirator or a Type C pressure demand supplied-air respirator
- ▶ Over 500 X TLV wear full-face self-contained breathing apparatus with positive pressure mode or a combination respirator with a Type C positive pressure supplied-air full-face respirator and an auxiliary self-contained breathing apparatus operated in pressure demand or other positive pressure mode

Respiratory protection not normally required due to the physical form of the product.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

| | | | |
|---|------------------------------|--|----------------|
| Appearance | Brown grease, petroleum odor | | |
| Physical state | Manufactured | 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 Available | Decomposition temperature (°C) | 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 Available |
| 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 Applicable |
| Lower Explosive Limit (%) | Not Available | Volatile Component (%vol) | Not Available |
| Vapour pressure (kPa) | Not Available | Gas group | Not Available |
| Solubility in water | Immiscible | pH as a solution (Not Available%) | Not Available |
| Vapour density (Air = 1) | Not Available | VOC g/L | Not Available |

SECTION 10 Stability and reactivity

| | |
|---|---|
| Reactivity | See section 7 |
| Chemical stability | Product is considered stable and hazardous polymerisation will not occur. |
| Possibility of hazardous reactions | See section 7 |
| Conditions to avoid | See section 7 |
| Incompatible materials | See section 7 |

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Hazardous decomposition products

See section 5

SECTION 11 Toxicological information

Information on toxicological effects

| | |
|--------------|--|
| Inhaled | <p>The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.</p> <p>Minor but regular methanol exposures may effect the central nervous system, optic nerves and retinae. Symptoms may be delayed, with headache, fatigue, nausea, blurring of vision and double vision. Continued or severe exposures may cause damage to optic nerves, which may become severe with permanent visual impairment even blindness resulting.</p> <p>WARNING: Methanol is only slowly eliminated from the body and should be regarded as a cumulative poison which cannot be made non-harmful [CCINFO]</p> <p>Inhalation hazard is increased at higher temperatures.</p> <p>Inhaling high concentrations of mixed hydrocarbons can cause narcosis, with nausea, vomiting and lightheadedness. Low molecular weight (C2-C12) hydrocarbons can irritate mucous membranes and cause incoordination, giddiness, nausea, vertigo, confusion, headache, appetite loss, drowsiness, tremors and stupor.</p> <p>Central nervous system (CNS) depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal.</p> <p>Inhalation of oil droplets or aerosols may cause discomfort and may produce chemical inflammation of the lungs.</p> |
| Ingestion | <p>Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>Methanol may produce a burning or painful sensation in the mouth, throat, chest, and stomach. This may be accompanied by nausea, vomiting, headache, dizziness, shortness of breath, weakness, fatigue, leg cramps, restlessness, confusion, drunken behaviour, visual disturbance, drowsiness, coma and death.</p> <p>Ingestion of petroleum hydrocarbons can irritate the pharynx, oesophagus, stomach and small intestine, and cause swellings and ulcers of the mucous. Symptoms include a burning mouth and throat; larger amounts can cause nausea and vomiting, narcosis, weakness, dizziness, slow and shallow breathing, abdominal swelling, unconsciousness and convulsions.</p> |
| Skin Contact | <p>The liquid may be able to be mixed 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>The material may accentuate any pre-existing dermatitis condition</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> |
| Eye | <p>This material can cause eye irritation and damage in some persons.</p> <p>Methanol is a mild to moderate eye irritant. High vapor concentration or liquid contact with eyes causes irritation, tearing, and burning.</p> <p>Direct contact of the eye with ethanol may cause immediate stinging and burning with reflex closure of the lid and tearing, transient injury of the corneal epithelium and hyperaemia of the conjunctiva.</p> <p>Direct eye contact with petroleum hydrocarbons can be painful, and the corneal epithelium may be temporarily damaged. Aromatic species can cause irritation and excessive tear secretion.</p> |
| Chronic | <p>Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population. There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information.</p> <p>Oil may contact the skin or be inhaled. Extended exposure can lead to eczema, inflammation of hair follicles, pigmentation of the face and warts on the soles of the feet.</p> <p>Constant or exposure over long periods to mixed hydrocarbons may produce stupor with dizziness, weakness and visual disturbance, weight loss and anaemia, and reduced liver and kidney function. Skin exposure may result in drying and cracking and redness of the skin.</p> <p>Crystalline silicas activate the inflammatory response of white blood cells after they injure the lung epithelium. Chronic exposure to crystalline silicas reduces lung capacity and predisposes to chest infections.</p> <p>Long-term exposure to methanol vapour, at concentrations exceeding 3000 ppm, may produce cumulative effects characterised by gastrointestinal disturbances (nausea, vomiting), headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, conjunctivitis and clouded or double vision. Liver and/or kidney injury may also result.</p> <p>Repeated application of mildly hydrotreated oils (principally paraffinic), to mouse skin, induced skin tumours; no tumours were induced with severely hydrotreated oils.</p> |

| | | |
|--|--|---|
| NS-8301-G | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| tallow alkyldimethylammonium chloride/ bentonite complex | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| methanol | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: 15800 mg/kg ^[2] | Eye (rabbit): 100 mg/24h-moderate |
| | Inhalation(Rat) LC50; 64000 ppm4h ^[2] | Eye (rabbit): 40 mg-moderate |
| | Oral (Rat) LD50; 5628 mg/kg ^[2] | Eye: no adverse effect observed (not irritating) ^[1] |
| | | Skin (rabbit): 20 mg/24 h-moderate |
| | Skin: no adverse effect observed (not irritating) ^[1] | |
| octylated diphenylamines | TOXICITY | IRRITATION |
| | dermal (rat) LD50: >2000 mg/kg ^[1] | Eye (rabbit): Non Irritant |

Continued...

NS-8301-G

| | | |
|---|---|--|
| | Oral (Rat) LD50; >2000 mg/kg ^[2] | Eye: adverse effect observed (irritating) ^[1] |
| | | Skin (rabbit): Non Irritant [Bay] |
| | | Skin: adverse effect observed (irritating) ^[1] |
| 2,5-bis(octyldithio)-1,3,4-thiadiazole | TOXICITY | IRRITATION |
| | Not Available | Not Available |
| naphthenic distillate, heavy, hydrotreated (mild) | TOXICITY | IRRITATION |
| | Dermal (rabbit) LD50: >2000 mg/kg ^[2] | Eye: no adverse effect observed (not irritating) ^[1] |
| | Inhalation(Rat) LC50; 2.18 mg/4h ^[2] | Skin: no adverse effect observed (not irritating) ^[1] |
| | Oral (Rat) LD50; >5000 mg/kg ^[2] | |
| Legend: | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances | |

| | |
|---|--|
| NS-8301-G | As cationic polymers possess unique physical structures and surface properties, various kinds of cationic polymers have been developed over the past few decades for a wide spectrum of nanomedical applications in the central nervous system (CNS). Although cationic polymers could be successfully used for gene transfer, drug delivery, and diagnostic imaging, after entering into the CNS, they may cause neurotoxicity and induce CNS damage, which seriously limits their applications. The neurotoxic effects of cationic polymers on CNS are mostly studied in mice, and have not been examined in detail. While evaluating the neurotoxicity of cationic polymers, the surface charge, surface area, coating, size, shape, and the basic materials that cationic polymers are made up of are expected to show important roles, and should be carefully considered. Apoptosis, necrosis, autophagy, oxidative stress, inflammation, and inflammasome; which are expected to be the most important problems in the evaluation of cationic polymers-induced neurotoxicity. |
| TALLOW ALKYLDIMETHYLAMMONIUM CHLORIDE/ BENTONITE COMPLEX | For organoclay Acute toxicity: Organoclay compounds are not expected to be absorbed significantly by mouth or through the skin. They are not irritating to the skin and cause only minimal eye irritation in humans. Animal testing has suggested low toxicity via inhalation or by mouth. Repeat-dose toxicity: Animal testing showed that repeated exposure to organoclay compounds may cause decreased levels of calcium and chloride in the blood, and increased weight of the adrenal gland. Genetic toxicity: Available results from testing regarding genetic toxicity has been negative. Carcinogenicity: There is no data available regarding the cancer-causing potential of these materials. However, bentonite, which is often present as an impurity, is considered to cause cancer in humans (Group 1 according to IARC). Developmental and reproductive toxicity: The compound was not found to cause birth defects, and there was no reproductive toxicity found at any level. |
| METHANOL | The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. |
| OCTYLATED DIPHENYLAMINES | Heating of substituted diphenylamines may generate vapours which can irritate the eyes and airways. Drying of skin and mucous membranes leading to irritation may occur with prolonged or repeated contact. Overexposure may cause skin and airway irritation with dizziness and flu-like symptoms. All show a slight to very low order of toxicity following oral or topical administration. There is very low potential to cause gene mutations. Potential sensitiser producing contact allergies. |
| NAPHTHENIC DISTILLATE, HEAVY, HYDROTREATED (MILD) | The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS. |
| NS-8301-G & OCTYLATED DIPHENYLAMINES & 2,5-BIS(OCTYLDITHIO)-1,3,4-THIADIAZOLE | The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. |
| NS-8301-G & NAPHTHENIC DISTILLATE, HEAVY, HYDROTREATED (MILD) | The materials included in the Lubricating Base Oils category are related from both process and physical-chemical perspectives; The potential toxicity of a specific distillate base oil is inversely related to the severity or extent of processing the oil has undergone, since: <ul style="list-style-type: none"> • The adverse effects of these materials are associated with undesirable components, and • The levels of the undesirable components are inversely related to the degree of processing; • Distillate base oils receiving the same degree or extent of processing will have similar toxicities; • The potential toxicity of residual base oils is independent of the degree of processing the oil receives. • The reproductive and developmental toxicity of the distillate base oils is inversely related to the degree of processing. Unrefined & 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 cancer-causing and mutation-causing activities. Highly and severely refined distillate base oils are produced from unrefined and mildly refined oils by 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. Testing of residual oils for mutation-causing and cancer-causing potential has shown negative results, 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. For unrefined and mildly refined distillate base oils: Acute toxicity: Animal testing showed high semilethal doses of >5000 mg/kg body weight and >2 g/kg body weight for exposure by swallowing or skin contact, respectively. The same material was also reported to be moderately irritating to skin, while not being sensitizing. Repeat dose toxicity: Animal testing showed that repeat dose toxicity was mild to moderate to the skin. Reproductive / developmental toxicity: No studies on developmental toxicity or reproduction are available. Animal testing shows that high doses may reduce the body weight of both the mother and the foetus, and increase the rate of soft tissue malformations. Genetic toxicity: These oils have been found to cause mutations. Cancer-causing potential: The general conclusion that can be drawn from animal testing is that these oils may potentially cause skin cancer; however, they have not been found to be associated with an increase in tumours elsewhere in the body. Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to |

| | |
|---|--|
| | be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins. The major classes of hydrocarbons are well absorbed into the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with fats in the diet. Some hydrocarbons may appear unchanged as in the lipoprotein particles in the gut lymph, but most hydrocarbons partly separate from fats and undergo metabolism in the gut cell. The gut cell may play a major role in determining the proportion of hydrocarbon that becomes available to be deposited unchanged in peripheral tissues such as in the body fat stores or the liver. |
| TALLOW ALKYLDIMETHYLAMMONIUM CHLORIDE/ BENTONITE COMPLEX & 2,5-BIS(OCTYLDITHIO)-1,3,4- THIADIAZOLE & NAPHTHENIC DISTILLATE, HEAVY, HYDROTREATED (MILD) | No significant acute toxicological data identified in literature search. |

| | | | |
|-----------------------------------|---|--------------------------|---|
| Acute Toxicity | ✓ | Carcinogenicity | ✓ |
| Skin Irritation/Corrosion | ✗ | Reproductivity | ✗ |
| Serious Eye Damage/Irritation | ✗ | STOT - Single Exposure | ✗ |
| Respiratory or Skin sensitisation | ✓ | STOT - Repeated Exposure | ✗ |
| Mutagenicity | ✗ | Aspiration Hazard | ✗ |

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

SECTION 12 Ecological information

Toxicity

| | Endpoint | Test Duration (hr) | Species | Value | Source |
|--|---------------|--------------------|-------------------------------|------------------|---------------|
| | NS-8301-G | Not Available | Not Available | Not Available | Not Available |
| tallow alkyldimethylammonium chloride/ bentonite complex | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| methanol | Endpoint | Test Duration (hr) | Species | Value | Source |
| | NOEC(ECx) | 720h | Fish | 0.007mg/L | 4 |
| | EC50 | 48h | Crustacea | >10000mg/l | 2 |
| | LC50 | 96h | Fish | 290mg/l | 2 |
| | EC50 | 96h | Algae or other aquatic plants | 14.11-20.623mg/l | 4 |
| octylated diphenylamines | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50(ECx) | 24h | Crustacea | 4.2mg/l | Not Available |
| | EC50 | 72h | Algae or other aquatic plants | >100mg/l | 2 |
| | EC50 | 48h | Crustacea | 51mg/l | 2 |
| | LC50 | 96h | Fish | 5.1mg/l | Not Available |
| 2,5-bis(octyldithio)-1,3,4- thiadiazole | Endpoint | Test Duration (hr) | Species | Value | Source |
| | Not Available | Not Available | Not Available | Not Available | Not Available |
| naphthenic distillate, heavy, hydrotreated (mild) | Endpoint | Test Duration (hr) | Species | Value | Source |
| | ErC50 | 72h | Algae or other aquatic plants | >1000mg/l | 1 |
| | NOEC(ECx) | 504h | Crustacea | >1mg/l | 1 |
| | EC50 | 48h | Crustacea | >1000mg/l | 1 |
| | Endpoint | Test Duration (hr) | Species | Value | Source |
| | EC50 | 96h | Algae or other aquatic plants | >1000mg/l | 1 |

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

For Organoclays:

Environmental Fate: Organoclays do not melt or boil; however, some degradation may occur when these substances are subjected to extreme heat beginning at about 180 C up to approximately 600 C. Organoclays are free flowing solid powders that are essentially insoluble in water, in organic solvents and in fats, and are non-volatile under ambient conditions. Partitioning cannot be accurately determined. Organoclays are not inherently explosive, nor are they oxidizers.

Atmospheric Fate: Photodegradation is not an important fate process and organoclays will not hydrolyze.

Terrestrial Fate: Organoclays are expected to be found primarily in soil or sediment, although it is possible that smaller particles will be suspended in water. Biodegradation is expected to be limited for all members; however, it should be noted that biodegradation relates only to the organic component of the organoclays (i.e. the alkyl quaternary ammonium salts).

Ecotoxicity: B(Alk)2M bentonite is slightly to relatively non-toxic to rainbow trout in 96 hours tests but is extremely toxic after 21 days. Bentonite is moderately toxic to Daphnia magna

NS-8301-G

water fleas, mysid shrimp and *Acartia tonsa* copepods. Bentonite is slightly to practically nontoxic to *Skeletonema costatum* algae. B(2Alk)M hectorite may be extremely toxic to *Daphnia magna* water fleas; however, some mortalities were attributed to, in part, the physical effects of the test material. 2M(2Alk) bentonite, 2M(2Alk) hectorite, and B(2Alk)M bentonite are practically non-toxic to mud shrimp. B(Alk)2M bentonite and B(2Alk)M hectorite are slightly to relatively non-toxic to earthworms. B(2Alk)M hectorite can have an extremely negative effect on early growth stages of garden cress seedlings and a moderate effect on the same life stages of wheat and radish.

For Silica:

Environmental Fate: Most documentation on the fate of silica in the environment concerns dissolved silica, in the aquatic environment, regardless of origin, (man-made or natural), or structure, (crystalline or amorphous).

Terrestrial Fate: Silicon makes up 25.7% of the Earth's crust, by weight, and is the second most abundant element, being exceeded only by oxygen. Silicon is not found free in nature, but occurs chiefly as the oxide and as silicates. Once released into the environment, no distinction can be made between the initial forms of silica.

Aquatic Fate: At normal environmental pH, dissolved silica exists exclusively as monosilicic acid. At pH 9.4, amorphous silica is highly soluble in water. Crystalline silica, in the form of quartz, has low solubility in water. Silicic acid plays an important role in the biological/geological/chemical cycle of silicon, especially in the ocean. Marine organisms such as diatoms, silicoflagellates and radiolarians use silicic acid in their skeletal structures and their skeletal remains leave silica in sea sediment

Ecotoxicity: Silicon is important to plant and animal life and is practically non-toxic to fish including zebrafish, and *Daphnia magna* water fleas.

Bentonite and kaolin have low toxicity to aquatic species, a large number of which have been tested

For petroleum distillates:

Environmental fate:

When petroleum substances are released into the environment, four major fate processes will take place: dissolution in water, volatilization, biodegradation and adsorption. These processes will cause changes in the composition of these UVCB substances. In the case of spills on land or water surfaces, photodegradation-another fate process-can also be significant.

As noted previously, the solubility and vapour pressure of components within a mixture will differ from those of the component alone. These interactions are complex for complex UVCBs such as petroleum hydrocarbons.

Each of the fate processes affects hydrocarbon families differently. Aromatics tend to be more water-soluble than aliphatics of the same carbon number, whereas aliphatics tend to be more volatile. Thus, when a petroleum mixture is released into the environment, the principal water contaminants are likely to be aromatics, whereas aliphatics will be the principal air contaminants. The trend in volatility by component class is as follows: alkenes = alkanes > aromatics = cycloalkanes.

The most soluble and volatile components have the lowest molecular weight; thus there is a general shift to higher molecular weight components in residual materials.

Biodegradation:

Biodegradation is almost always operative when petroleum mixtures are released into the environment. It has been widely demonstrated that nearly all soils and sediments have populations of bacteria and other organisms capable of degrading petroleum hydrocarbons. Degradation occurs both in the presence and absence of oxygen. Two key factors that determine degradation rates are oxygen supply and molecular structure. In general, degradation is more rapid under aerobic conditions. Decreasing trends in degradation rates according to structure are as follows:

- (1) n-alkanes, especially in the C10–C25 range, which are degraded readily;
- (2) isoalkanes;
- (3) alkenes;
- (4) benzene, toluene, ethylbenzene, xylenes (BTEX) (when present in concentrations that are not toxic to microorganisms);
- (5) monoaromatics;
- (6) polynuclear (polycyclic) aromatic hydrocarbons (PAHs); and
- (7) higher molecular weight cycloalkanes (which may degrade very slowly).

Three weathering processes-dissolution in water, volatilization and biodegradation-typically result in the depletion of the more readily soluble, volatile and degradable compounds and the accumulation of those most resistant to these processes in residues.

When large quantities of a hydrocarbon mixture enter the soil compartment, soil organic matter and other sorption sites in soil are fully saturated and the hydrocarbons will begin to form a separate phase (a non-aqueous phase liquid, or NAPL) in the soil. At concentrations below the retention capacity for the hydrocarbon in the soil, the NAPL will be immobile this is referred to as residual NAPL. Above the retention capacity, the NAPL becomes mobile and will move within the soil

Bioaccumulation:

Bioaccumulation potential was characterized based on empirical and/or modelled data for a suite of petroleum hydrocarbons expected to occur in petroleum substances.

Bioaccumulation factors (BAFs) are the preferred metric for assessing the bioaccumulation potential of substances, as the bioconcentration factor (BCF) may not adequately account for the bioaccumulation potential of substances via the diet, which predominates for substances with log Kow > ~4.5

In addition to fish BCF and BAF data, bioaccumulation data for aquatic invertebrate species were also considered. Biota-sediment/soil accumulation factors (BSAFs), trophic magnification factors and biomagnification factors were also considered in characterizing bioaccumulation potential.

Overall, there is consistent empirical and predicted evidence to suggest that the following components have the potential for high bioaccumulation, with BAF/BCF values greater than 5000: C13–C15 isoalkanes, C12 alkenes, C12–C15 one-ring cycloalkanes, C12 and C15 two-ring cycloalkanes, C14 polycycloalkanes, C15 one-ring aromatics, C15 and C20 cycloalkane monoaromatics, C12–C13 diaromatics, C20 cycloalkane diaromatics, and C14 and C20 three-ring PAHs

These components are associated with a slow rate of metabolism and are highly lipophilic. Exposures from water and diet, when combined, suggest that the rate of uptake would exceed that of the total elimination rate. Most of these components are not expected to biomagnify in aquatic or terrestrial foodwebs, largely because a combination of metabolism, low dietary assimilation efficiency and growth dilution allows the elimination rate to exceed the uptake rate from the diet; however, one study suggests that some alkyl-PAHs may biomagnify. While only BSAFs were found for some PAHs, it is possible that BSAFs will be > 1 for invertebrates, given that they do not have the same metabolic competency as fish.

In general, fish can efficiently metabolize aromatic compounds. There is some evidence that alkylation increases bioaccumulation of naphthalene but it is not known if this can be generalized to larger PAHs or if any potential increase in bioaccumulation due to alkylation will be sufficient to exceed a BAF/BCF of 5000.

Some lower trophic level organisms (i.e., invertebrates) appear to lack the capacity to efficiently metabolize aromatic compounds, resulting in high bioaccumulation potential for some aromatic components as compared to fish.

This is the case for the C14 three-ring PAH, which was bioconcentrated to a high level (BCF > 5000) by invertebrates but not by fish. There is potential for such bioaccumulative components to reach toxic levels in organisms if exposure is continuous and of sufficient magnitude, though this is unlikely in the water column following a spill scenario due to relatively rapid dispersal

Bioaccumulation of aromatic compounds might be lower in natural environments than what is observed in the laboratory. PAHs may sorb to organic material suspended in the water column (dissolved humic material), which decreases their overall bioavailability primarily due to an increase in size. This has been observed with fish

Ecotoxicity:

Diesel fuel studies in salt water are available. The values varied greatly for aquatic species such as rainbow trout and *Daphnia magna*, demonstrating the inherent variability of diesel fuel compositions and its effects on toxicity. Most experimental acute toxicity values are above 1 mg/L. The lowest 48-hour LC50 for salmonids was 2.4 mg/L. *Daphnia magna* had a 24-hour LC50 of 1.8 mg/L. The values varied greatly for aquatic species such as rainbow trout and *Daphnia magna*, demonstrating the inherent variability of diesel fuel compositions and its effects on toxicity. Most experimental acute toxicity values are above 1 mg/L. The lowest 48-hour LC50 for salmonids was 2.4 mg/L. *Daphnia magna* had a 24-hour LC50 of 1.8 mg/L

The tropical mysid *Metamysidopsis insularis* was shown to be very sensitive to diesel fuel, with a 96-hour LC50 value of 0.22 mg/L this species has been shown to be as sensitive as temperate mysids to toxicants. However, this study used nominal concentrations, and therefore was not considered acceptable. In another study involving diesel fuel, the effect on brown or common shrimp (*Crangon crangon*) a 96-hour LC50 of 22 mg/L was determined. A "gas oil" was also tested and a 96-hour LC50 of 12 mg/L was determined

The steady state cell density of marine phytoplankton decreased with increasing concentrations of diesel fuel, with different sensitivities between species. The diatom *Phaeodactylum tricornutum* showed a 20% decrease in cell density in 24 hours following a 3 mg/L exposure with a 24-hour no-observed effect concentration (NOEC) of 2.5 mg/L. The microalga *Isochrysis galbana* was more tolerant to diesel fuel, with a 24-hour lowest-observed-effect concentration (LOEC) of 26 mg/L (14% decrease in cell density), and a NOEC of 25 mg/L. Finally, the green algae *Chlorella salina* was relatively insensitive to diesel fuel contamination, with a 24-hour LOEC of 170 mg/L (27% decrease in cell density), and a NOEC of 160 mg/L. All populations of phytoplankton returned to a steady state within 5 days of exposure

In sandy soils, earthworm (*Eisenia fetida*) mortality only occurred at diesel fuel concentrations greater than 10 000 mg/kg, which was also the concentration at which sub-lethal weight loss was recorded

Nephrotoxic effects of diesel fuel have been documented in several animal and human studies. Some species of birds (mallard ducks in particular) are generally resistant to the toxic effects of petrochemical ingestion, and large amounts of petrochemicals are needed in order to cause direct mortality

For Organic Cationics:

Environmental Fate: Cationic substances in the environment instantaneously form complexes with naturally occurring negatively charged constituents in sewage, soils, sediments, and with dissolved humic substances in surface waters. This complexation behaviour results in reduced bioavailability in actual environmental conditions.

Aquatic Fate: Cationic substances may be environmental hazards in aquatic environments. The source and composition of water dramatically affects toxicity in aquatic systems.

Exempt from this concern are those polymers to be used only in solid phase, such as ion-exchange resins, and where the FGEW (Functional Group Equivalent Weight) of cationic groups is not 5000 and above.

Ecotoxicity: These chemicals, by the nature of their surfactant properties, are toxic to aquatic organisms at low concentrations. Cationic groups (alkylsulfoniums, alkylphosphoniums and quaternary ammonium polymers) are highly toxic to fish and other aquatic organisms. Similarly, potentially cationic groups such as amines and isocyanates are also of concern. Some cationics, however, may fall into the category of PLCs (polymers of low concern) provided they possess low charge density, and/or are not water-soluble or are not self-dispersing polycarboxylates or poly- (aromatic or aliphatic) sulfonate polymers. The toxicity of quaternary ammonium compounds is known to be greatly reduced in the environment because of preferential binding to dissolved organics in surface water.

DO NOT discharge into sewer or waterways.

Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|--------------------------|-------------------------|------------------|
| methanol | LOW | LOW |
| octylated diphenylamines | HIGH | HIGH |

Bioaccumulative potential

| Ingredient | Bioaccumulation |
|--------------------------|-----------------|
| methanol | LOW (BCF = 10) |
| octylated diphenylamines | LOW (BCF = 5.5) |

Mobility in soil

| Ingredient | Mobility |
|--------------------------|----------------------|
| methanol | HIGH (KOC = 1) |
| octylated diphenylamines | LOW (KOC = 28640000) |

SECTION 13 Disposal considerations**Waste treatment methods**

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

SECTION 14 Transport information**Labels Required**

| | |
|-------------------------|----|
| Marine Pollutant | NO |
|-------------------------|----|

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

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

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

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

| Product name | Group |
|---|---------------|
| tallow alkyltrimethylammonium chloride/ bentonite complex | Not Available |
| methanol | Not Available |
| octylated diphenylamines | Not Available |
| 2,5-bis(octylthio)-1,3,4-thiadiazole | Not Available |
| naphthenic distillate, heavy, hydrotreated (mild) | Not Available |

Transport in bulk in accordance with the ICG Code

| Product name | Ship Type |
|---|---------------|
| tallow alkyltrimethylammonium chloride/ bentonite complex | Not Available |

| Product name | Ship Type |
|---|---------------|
| methanol | Not Available |
| octylated diphenylamines | Not Available |
| 2,5-bis(octyldithio)-1,3,4-thiadiazole | Not Available |
| naphthenic distillate, heavy, hydrotreated (mild) | Not Available |

SECTION 15 Regulatory information

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

tallow alkyldimethylammonium chloride/ bentonite complex is found on the following regulatory lists

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

methanol is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity

US - California Proposition 65 - Reproductive Toxicity

US - California Safe Drinking Water and Toxic Enforcement Act of 1986 - Proposition 65 List

US - Massachusetts - Right To Know Listed Chemicals

US Clean Air Act - Hazardous Air Pollutants

US DOE Temporary Emergency Exposure Limits (TEELs)

US EPA Integrated Risk Information System (IRIS)

US EPCRA Section 313 Chemical List

US NIOSH Recommended Exposure Limits (RELs)

US OSHA Permissible Exposure Limits (PELs) Table Z-1

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

octylated diphenylamines is found on the following regulatory lists

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for Air Pollutants Other Than PM-2.5

US NIOSH Recommended Exposure Limits (RELs)

US OSHA Permissible Exposure Limits (PELs) Table Z-1

US OSHA Permissible Exposure Limits (PELs) Table Z-3

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

2,5-bis(octyldithio)-1,3,4-thiadiazole is found on the following regulatory lists

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

naphthenic distillate, heavy, hydrotreated (mild) is found on the following regulatory lists

Chemical Footprint Project - Chemicals of High Concern List

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

US - California Proposition 65 - Carcinogens

US - California Safe Drinking Water and Toxic Enforcement Act of 1986 - Proposition 65 List

US DOE Temporary Emergency Exposure Limits (TEELs)

US National Toxicology Program (NTP) 15th Report Part A Known to be Human Carcinogens

US OSHA Permissible Exposure Limits (PELs) Table Z-1

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US TSCA Chemical Substance Inventory - Interim List of Active Substances

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories

| | |
|---|-----|
| Flammable (Gases, Aerosols, Liquids, or Solids) | No |
| Gas under pressure | No |
| Explosive | No |
| Self-heating | No |
| Pyrophoric (Liquid or Solid) | No |
| Pyrophoric Gas | No |
| Corrosive to metal | No |
| Oxidizer (Liquid, Solid or Gas) | No |
| Organic Peroxide | No |
| Self-reactive | No |
| In contact with water emits flammable gas | No |
| Combustible Dust | No |
| Carcinogenicity | Yes |
| Acute toxicity (any route of exposure) | Yes |
| Reproductive toxicity | No |
| Skin Corrosion or Irritation | No |
| Respiratory or Skin Sensitization | Yes |
| Serious eye damage or eye irritation | No |

Continued...

| | |
|--|----|
| Specific target organ toxicity (single or repeated exposure) | No |
| Aspiration Hazard | No |
| Germ cell mutagenicity | No |
| Simple Asphyxiant | No |
| Hazards Not Otherwise Classified | No |

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)

| Name | Reportable Quantity in Pounds (lb) | Reportable Quantity in kg |
|----------|------------------------------------|---------------------------|
| methanol | 5000 | 2270 |

State Regulations

US. California Proposition 65

WARNING: This product can expose you to chemicals including **naphthenic distillate, heavy, hydrotreated (mild)**, which are known to the State of California to cause cancer, and **methanol**, which is known to the State of California to cause birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

National Inventory Status

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |
| Canada - NDSL | No (tallow alkyltrimethylammonium chloride/ bentonite complex; methanol; octylated diphenylamines; 2,5-bis(octylidithio)-1,3,4-thiadiazole; naphthenic distillate, heavy, hydrotreated (mild)) |
| China - IECSC | Yes |
| Europe - EINECS / ELINCS / NLP | Yes |
| Japan - ENCS | No (tallow alkyltrimethylammonium chloride/ bentonite complex) |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | Yes |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | No (tallow alkyltrimethylammonium chloride/ bentonite complex; 2,5-bis(octylidithio)-1,3,4-thiadiazole) |
| Vietnam - NCI | No (2,5-bis(octylidithio)-1,3,4-thiadiazole) |
| Russia - FBEPH | No (tallow alkyltrimethylammonium chloride/ bentonite complex; 2,5-bis(octylidithio)-1,3,4-thiadiazole) |
| Legend: | Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

SECTION 16 Other information

| | |
|----------------------|------------|
| Revision Date | 08/22/2022 |
| Initial Date | 08/23/2022 |

Other information

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

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

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
 PC—STEL: Permissible Concentration-Short Term Exposure Limit
 IARC: International Agency for Research on Cancer
 ACGIH: American Conference of Governmental Industrial Hygienists
 STEL: Short Term Exposure Limit
 TEEL: Temporary Emergency Exposure Limit.
 IDLH: Immediately Dangerous to Life or Health Concentrations
 ES: Exposure Standard
 OSF: Odour Safety Factor
 NOAEL :No Observed Adverse Effect Level
 LOAEL: Lowest Observed Adverse Effect Level
 TLV: Threshold Limit Value
 LOD: Limit Of Detection
 OTV: Odour Threshold Value
 BCF: BioConcentration Factors
 BEI: Biological Exposure Index
 AIIC: Australian Inventory of Industrial Chemicals
 DSL: Domestic Substances List
 NDSL: Non-Domestic Substances List
 IECSC: Inventory of Existing Chemical Substance in China
 EINECS: European Inventory of Existing Commercial chemical Substances
 ELINCS: European List of Notified Chemical Substances
 NLP: No-Longer Polymers
 ENCS: Existing and New Chemical Substances Inventory

KECI: Korea Existing Chemicals Inventory
NZIoC: New Zealand Inventory of Chemicals
PICCS: Philippine Inventory of Chemicals and Chemical Substances
TSCA: Toxic Substances Control Act
TCSI: Taiwan Chemical Substance Inventory
INSQ: Inventario Nacional de Sustancias Químicas
NCI: National Chemical Inventory
FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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