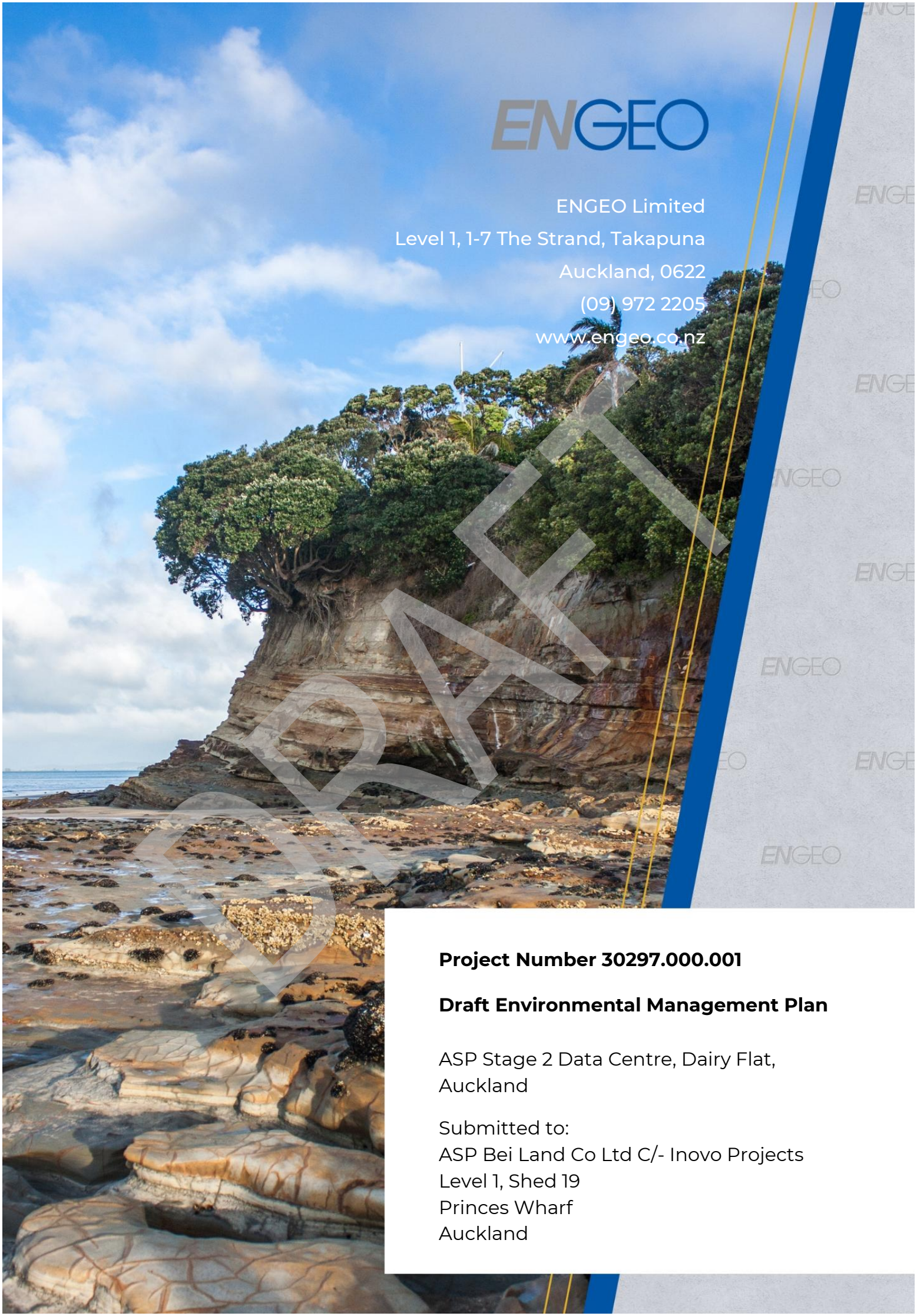

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Project Number 30297.000.001

Draft Environmental Management Plan

ASP Stage 2 Data Centre, Dairy Flat, Auckland

Submitted to:
ASP Bei Land Co Ltd C/- Inovo Projects
Level 1, Shed 19
Princes Wharf
Auckland

ENGEO Document Control:

Report Title	Draft Environmental Management Plan – ASP Stage 2 Data Centre, Dairy Flat			
Project No.	30297.000.001	**Doc ID**	02	
Client	ASP Bei Land Co Ltd C/- Inovo Projects	**Client Contact**	Jody Jubber, Inovo projects	
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20/01/2026	Draft Issued to Client	LL	JR	DF

Document Review and Revision:

Version Number	Date	Prepared/ Reviewed By	Approved By	Comment
Draft	20.01.2026	LL	JR	Draft for Resource Consent Application

To ensure this Environmental Management Plan (EMP) is kept up-to-date and that the most recent version is used by employees and contractors, its distribution and revision will be controlled by the Site Manager, who will:

- Manage the master copy and any other paper or electronic copies of the EMP.
- Keep a summary of updates, versions, dates and distribution lists.
- Ensure EMP updates are distributed to all relevant employees as controlled copies.
- Ensure any uncontrolled copies are marked as uncontrolled copies.
- Ensure any out-of-date copies are discarded when updates are distributed.

A copy of this EMP must be kept on-site and be available to all staff and any authorised inspectors upon request.

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1 Introduction

1.1 Scope

ENGEO Ltd was requested by ASP Bei Land Co Ltd C/- Inovo Projects to prepare this Environmental Management Plan (EMP) for the ASP Stage 2 Data Centre located at 1350 Dairy Flat Highway, Auckland (herein referred to as 'the site'). This work has been carried out in accordance with our signed agreement dated 18 December 2025.

The site is a data centre.

This EMP has been prepared to document the measures that are implemented at the site to meet the requirements of:

- The relevant permitted and controlled activity standards in section E33 of the Auckland Unitary Plan Operational in Part (updated 12 December 2025) (AUP OP); and
- The Health and Safety at Work (Hazardous Substances) Regulations 2017 (HSW(HS)R).

1.2 Document Review

As a minimum, the EMP will be reviewed annually and revised as appropriate. As this EMP is a working document, it will also be reviewed and revised if:

- There are significant changes to the site's activities, facilities or pollution control measures.
- There are significant changes to the type or volume of hazardous substances stored or the control measures implemented to manage risks associated with hazardous substances storage.
- There are changes to the company or contractors used.
- Corrective action is required as a result of an incident (minor spill or emergency) or near miss.
- Public complaints have been received.

Auckland Council should be advised when this EMP is updated and should be provided with an updated copy of the document on request.

1.3 Important Contact Details

Important contact numbers for the site are included in Table 1.

Table 1: Important Contact Phone Numbers

Person/ Organisation	Contact Telephone No.
Site Manager (TBC)	TBC
Auckland Council Pollution Hotline	09 377 3107
Watercare Services	09 442 2222
Environmental contractor for spill response	TBC
Waste Contractor(s):	TBC

2 The Site

2.1 Site Details

The ASP Stage 2 Data Centre forms part of the property at 1350 Dairy Flat Highway (legal description Lot 2 DP 15104, Lot 1 DP 605825, Lot 3 DP607404, Lot 4 DP 607404 and Lot 4 DP 66181) which is zoned 'Future Urban Zone'. The wider property has an area of approximately 52.5 hectares, of which approximately 2.02 hectares is occupied by the ASP Stage 2 Data Centre.

The site is operational 24 hours per day, seven days per week.

A site layout plan is included in Appendix 1.

2.2 Management Structure

The site management structure is illustrated in Figure 1.

Figure 1: Site Management Structure (*to be inserted*)

2.3 Site Operations

2.3.1 Overview

The site is a data centre, i.e., it houses IT equipment (computer, disk and network devices). The physical building provides a secure environment for the IT equipment, and the site also includes cooling, and emergency power systems to ensure continuous operation.

During business hours there are typically around TBC staff members on-site (office staff, operational staff and technicians and contractors) involved in the management of the facility and carrying out maintenance and repair work to the building, mechanical and electrical plant and IT equipment.

Security guards monitor the site 24 hours per day, seven days per week.

The activities on-site that need management to protect the environment (and which this EMP covers) are:

- Fuel Delivery.
- Storage of hazardous substances.
- Waste management.
- Stormwater management.

2.3.2 Fuel Delivery

Diesel is brought to the site in delivery tankers. The underground fuel storage tanks (five 110,000 L tanks) are located in the southern part of the site.

The area used to park tankers whilst the underground fuel storage tanks are filled is segregated from the remainder of the site by kerbs and rollover bunds to segregate any stormwater generated in this area and to provide containment in case of a spill. Runoff generated in this area is discharged via an appropriately sized SPEL Puraceptor Class 1 stormwater treatment separator before being discharged to the on-site piped stormwater system.

Prior to commencing fuel transfer to the underground tanks, the fuel delivery contractor will close a valve on the stormwater system. Closing the valve will trap significant leaks / spills on-site, preventing their discharge to the on-site piped stormwater system and facilitating removal. Once the transfer of fuel is complete and the transfer lines have been disconnected, the valve will be re-opened (assuming no significant leak or spill has occurred).

Tanker drivers are trained in the use of the fittings and pumps on the delivery trucks; however, it is still possible that a spillage could occur during delivery.

Fuel from the underground storage tanks is distributed to the belly tanks in each genset on-site via a pumped pipe system.

2.3.3 Hazardous Substances Use and Storage

The activities involving hazardous substances at the site are:

- Storage of diesel in double-skinned purpose-built belly tanks which form a part of each genset on-site. The diesel is used to power the generators when required (e.g. during a power outage).
- Storage of diesel in double-skinned purpose-built underground fuel storage tanks. The diesel is pumped into tanks forming part of the gensets, when required.
- Storage of diesel in a double-skinned purpose-built tank which powers the fire pump, when required (e.g., during a fire).
- Coolant (Caterpillar Cat ELC) and non-hazardous lubricating oil (Mobile Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40) are present within the generators.
- Use of HFC-32 in the non-critical cooling system. Non-hazardous refrigerant gases, R1234ze(E), and R410A are also used in cooling systems at the site.
- Use of lubricating oils (Emkarate RL 46HB, Daphne Hermetic Oil FW68DA and Daphne Hermetic Oil FCV68D in cooling systems at the site.
- Storage of cleaning products and hand sanitiser in designated locations within the data centre building.

Spills and leaks of hazardous substances have the potential to adversely affect the environment and pose a risk to the health and safety of workers and visitors. In addition, leakages from storage tanks and containers, could, if left unnoticed, have a significant impact on the receiving environment.

2.3.4 Waste Management

Waste generated at the site comprises general office waste (paper, cardboard etc.) and staff welfare waste (packaging, food scraps etc.). Rubbish bins are located throughout the office and welfare areas. These bins are emptied into skip bins located on the ground floor of the administration building. If it is not managed appropriately waste can produce leachate, which may be hazardous to human health and the environment. Consequently, spills and leaking from skips should be avoided.

2.3.5 Wastewater Management

No wastewater (other than that associated with employee welfare facilities (toilets, kitchen etc.)), is generated at the site.

2.4 Site Stormwater and Drainage

Stormwater at the site is generated off the building roofs, outdoor plant yards, parking areas and roadways.

Roof water from the building is collected in downpipes and discharged to the on-site stormwater collection system.

The area used to park tankers whilst the underground fuel storage tanks are filled is segregated from the remainder of the site by kerbs and rollover bunds. Stormwater generated in this area is discharged to an appropriately sized SPEL Puraceptor Class 1 stormwater treatment separator before being discharged to the on-site piped stormwater system.

Prior to commencing fuel transfer to the underground tanks, the fuel delivery contractor closes a valve on the stormwater system. This ensures that if a significant leak / spill occurs during the filling of the fuel tanks, this is trapped on-site and prevented from discharging to the on-site piped stormwater system. Once the transfer of fuel is complete and the transfer lines have been disconnected, the valve is re-opened (assuming no significant leak or spill has occurred).

Surface water runoff from the outdoor plant yards, parking areas and roadways is collected in stormwater catchpits and slot drains and discharged to the on-site piped stormwater system.

The on-site piped stormwater system conveys the stormwater to the northern end of the site, where it is discharged into a concrete channel which flows to the west along the northern site boundary. The stormwater is treated off-site as a part of the Surf Park Stormwater Master Plan.

A stormwater drainage plan for the site is included in Appendix 2.

2.5 Receiving Environment

Stormwater from the site is conveyed westwards via a 1.5 m wide, 0.5 m deep concrete channel. The stormwater is treated as part of the Surf Park Stormwater Master Plan. The stormwater is ultimately discharged to TBC.

2.6 Authorisations, Consents and Permits

Table 2 lists the relevant environmental consents and permits under which the site operates. Copies of the consents and permits are included as Appendix 3 of this EMP.

Table 2: Authorisations, Consents and Permits

Authorisation / Consent / Permit	Authorising Agency	Expiry Date
Permitted Activity Industrial and Trade Activity Site Permit (Consent No: TBC)	Auckland Council	TBC
Controlled Activity Industrial and Trade Activity Discharge Permit (Consent No: TBC)	Auckland Council	TBC
Discretionary Activity Hazardous Substances Consent (Consent No: TBC)	Auckland Council	TBC

3 Pollution Risks

The main pollution risks associated with the site are:

- Spillages of diesel during fuel delivery, which may enter the stormwater system.
- Leaking of hazardous substances from equipment (e.g. cooling system, generators and transformers) or storage tanks at the site, which may enter the stormwater system.
- Spillages of waste materials or leaking of leachate from waste bins which may enter the stormwater system.
- Waste material becoming airborne and being discharged off-site.

4 Pollution Controls

The structural and procedural pollution controls that are implemented at the site to manage these pollution risks are described in the following sections and summarised in Table 3.

Table 3: Summary of Pollution Risks and Controls

Pollution Risk and Contaminants of Concern		Pollution Controls		Improved or New Pollution Controls Required				
Pollution Risk	**Contaminant(s)**	**Structural Controls**	**Procedural Controls**	**Structural**	**Procedural**	**Initiation Date**	**Completion Date**	**Justification for Timing**
Spills during fuel delivery	Diesel	Run-off from the refuelling area and area where delivery trucks park is discharged via a SPEL Puraceptor Class 1 stormwater treatment separator (refer section 2.3.2 2.4 and 4.1.1). Shutoff valve to isolate the refuelling area (refer section 2.3.2, 2.4 and 4.1.1). Spill kits (refer section 4.1.7). Signage (refer section 0).	Hazardous Substances Inventory (refer section 4.2.1 and Appendix 4). Safety Data Sheets (SDS) are easily accessible (refer section 4.2.3 and Appendix 5). Spill procedure (refer section 4.3.1). Emergency response plan (refer section 4.3.2). Routine inspections (refer section 5.1).	NA	NA	NA	NA	NA
Leakage of diesel from the storage tanks	Diesel	Designated storage locations and secondary containment (refer section 4.1.2). Spill kits (refer section 4.1.7). Signage (refer section 0).	Hazardous Substances Inventory (refer section 4.2.1 and Appendix 4). Safety Data Sheets (SDS) are easily accessible (refer section 4.2.3 and Appendix 5). Fuel conciliation procedure (refer section 5.2) Spill procedure (refer Section 4.3.1). Emergency response plan (refer section 4.3.2). Routine inspections (refer section 5.1).					
Spillages or leaking of hazardous substances from gensets	Diesel, lubricating oil, coolant	Designated storage locations and secondary containment (refer section 4.1.2). Spill kits (refer section 4.1.7). Signage (refer section 0).	Hazardous Substances Inventory (refer section 4.2.1 and Appendix 4). Safety Data Sheets (SDS) are easily accessible (refer section 4.2.3 and Appendix 5). Spill procedure (refer section 4.3.1). Emergency response plan (refer section 4.3.2). Routine inspections (refer section 5.1).	NA	NA	NA	NA	NA
Spillages or leaking of hazardous substances from refrigeration system	Lubricating oil	Designated storage locations and secondary containment (refer section 4.1.2). Spill kits (refer section 4.1.7). Signage (refer section 0).	Hazardous Substances Inventory (refer section 4.2.1 and Appendix 4). Safety Data Sheets (SDS) are easily accessible (refer section 4.2.3 and Appendix 5). Spill procedure (refer section 4.3.1). Emergency response plan (refer section 4.3.2). Routine inspections (refer section 5.1).	NA	NA	NA	NA	NA
Spillages or leaking from the transformers	Transformer oils	Designated storage locations and secondary containment (refer section 4.1.2). Spill kits (refer section 4.1.7). Signage (refer section 0).	Hazardous Substances Inventory (refer section 4.2.1 and Appendix 4). Safety Data Sheets (SDS) are easily accessible (refer section 4.2.3 and Appendix 5). Spill procedure (refer section 4.3.1). Emergency response plan (refer section 4.3.2). Routine inspections (refer section 5.1).)	NA	NA	NA	NA	NA

Pollution Risk and Contaminants of Concern		Pollution Controls		Improved or New Pollution Controls Required				
Pollution Risk	**Contaminant(s)**	**Structural Controls**	**Procedural Controls**	**Structural**	**Procedural**	**Initiation Date**	**Completion Date**	**Justification for Timing**
Spillages of waste that may enter the stormwater or become windblown	General refuse, Leachate with unknown contaminants	Designated waste storage area (refer sections 2.3.4 and 4.1.6). Waste stored in the building in water-tight containers with lids (refer sections 2.3.4 and 4.1.6). Signage (refer section 0).	Spill procedure (refer section 4.3.1). Emergency response plan (refer section 4.3.2). Routine inspections (refer section 5.1).)	NA	NA	NA	NA	NA
Stormwater system	Solids, sediment, oils and hydrocarbons	Run-off from tanker bays is discharged via a SPEL Puraceptor Class 1 stormwater treatment separator (refer section 2.4 and 4.1.1). Grated catchpits (refer section 4.1.1).	Monthly inspection of catchpits (refer section 5.2) as part of the site audit (refer section 5.1.2). Removal of sediment when required. Maintenance of the SPEL Puraceptor as recommended by the supplier (refer section 5.2).	NA	NA	NA	NA	NA

4.1 Structural Pollution Controls

4.1.1 Stormwater Treatment Devices

Catchpits

Stormwater is collected in these devices. The catchpits are fitted with grates to trap large solids (windblown litter, leaves etc.). The catchpits also have a sump to trap settleable solids.

SPEL Puraceptor Class 1 Stormwater Treatment Separators

Stormwater generated in the area used to park the tankers during refuelling is discharged via an appropriately sized SPEL Puraceptor Class 1 stormwater treatment separator before being discharged to the on-site piped stormwater system. This is to allow petroleum products to be separated out before being discharged to the stormwater system.

Shut-off Valve

A valve is included in the stormwater system in the area of the site used to park tankers during fuel delivery. This valve is closed prior to commencement of fuel transfer to the tanks to ensure that if a significant leak / spill occurs during the filling of the fuel tanks, this is trapped on-site and prevented from discharging to the on-site piped stormwater system.

4.1.2 Designated Storage Areas for Environmentally Hazardous Substances

In order to assist in appropriate management and control of hazardous substances, these substances are stored in designated locations at the site. The locations where environmentally hazardous substances are present are summarised in Table 4. The table also provides details of the secondary containment provided.

Some of the pooling hazardous substances stored at the site trigger the requirement for secondary containment under the HSW(HS)R. In addition, the permitted activity standards in the AUP OP require that all environmentally hazardous substances stored above ground, in volumes that exceed those used for domestic purposes, must be stored within a secondary containment device or within a containment system that:

- For tanks: has a storage capacity of at least 110 per cent of the capacity of the largest tank taking into account the volume displaced by any equipment and / or materials stored within the bund.
- For drums: the bund has an effective storage height of at least 100 mm, allowing for any sloping ground, and the bund is set back from the drums by a distance equal to half the height of the stacked or stored drums.

If the secondary containment devices / systems are located externally, they must be protected from rainwater or stormwater ingress. It is considered best practice that all pooling hazardous substances are stored within secondary containment.

Table 4: Hazardous Substances Storage Locations

Storage Location	Substances Stored (and trigger HSNO class where relevant)	Secondary Containment
Outdoor Plant Yards (North and South)	Diesel fuel (3.1D, 6.7B, 9.1B)	Above-ground double-skinned tanks forming part of the gensets
	Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50 (6.1D)	Within the generators forming part of the genset
	Mobile Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	
	Emkarate RL 46HB lubricating oil	Within the chillers forming part of the critical cooling system
Non-critical Cooling System	HFC-32 refrigerant gas	Within the SPLIT units
	Daphne Hermetic Oil FW68DA lubricating oil	
	Daphne Hermetic Oil FCV68D lubricating oil	Within the VRV systems
Underground Fuel Storage Tanks	Diesel fuel (3.1D, 6.7B, 9.1B)	Below-ground double-skinned tank
Waste Diesel Tank	Diesel fuel (3.1D, 6.7B, 9.1B)	double-skinned tank
Fire Pump Room	Diesel fuel (3.1D, 6.7B, 9.1B)	Above-ground double-skinned tank
Cleaner's Cupboard	Small volumes of cleaning chemicals (up to 80 L) and hand sanitiser (up to 20 L)	Proprietary self-bunded cabinet or appropriately sized drip trays

4.1.3 Incompatible Substances

Different types of hazardous substances have different requirements for safe storage. Some types of substances are incompatible with others so they must not be stored together. These incompatibilities are listed in the inventory in Appendix 4.

4.1.4 Hazardous Areas

Depending on the volume and type of substances with HSNO classification 2.1.1A, 2.1.1B, 2.1.2A, 3.1A, 3.1B, or 3.1C within a workplace, Hazardous Areas may need to be established around the locations where these substances are stored. If required, the size and extent of the hazardous areas required are defined in AS/NZS 60079.10.1:2022 (Explosive atmospheres, Part 10.1: Classification of areas – Explosive gas atmospheres).

The substances at the site which require a hazardous area to be established are listed in Table 5.

Table 5: Substances Requiring Hazardous Areas

Location	Substances Stored (and relevant trigger HSNO class)	Notes
Non-critical Cooling System	HFC-32 Refrigerant (2.1.1A)[1]	Non-permanent gas

Note: The HFC-32 refrigerant is contained within 50 SPLIT units on-site (4 kg per unit). The need for a hazardous area to be established will depend on the location of, and separation between, these units.

The hazardous areas should only be accessed by those authorised by the Site Manager to do so. No sources of ignition shall be brought into or used in the Hazardous Area. Any electrical equipment required to be in this area must be intrinsically safe.

4.1.5 Stationary Container Systems

A stationary container system is a fixed tank or process container and its associated pipework and fittings. Stationary container system compliance certificates are required for stationary container system containing certain gaseous or liquid hazardous substances at volumes exceeding the relevant thresholds in the HSW(HS)R.

The diesel fuel tanks at the site trigger a requirement for a stationary container system compliance certificate.

Copies of these certificates are included in Appendix 6.

4.1.6 Waste Management

Bins for both general waste and various types of recyclable waste are kept in various locations throughout the facility. These are emptied (as and when required) into bins and waste cages located on the ground floor of the administration building. All bins are watertight and have lids which are kept closed at all times when the bins are not in use. The bins are clearly signposted to ensure that all employees know where they are and the type of waste that should be put in each bin. Waste is segregated and removed from the site as described in Table 6.

Table 6: Waste Management

Waste Stream	Storage Container Type, Location	Removal Contractor	Frequency
Paper / Cardboard	TBC	TBC	TBC
Recycling	TBC	TBC	TBC
General waste	TBC	TBC	TBC
Waste Diesel	TBC	TBC	TBC

4.1.7 Spill Kits

Spill kits are maintained in the outdoor plant yards in locations that can be easily accessed from all areas where spills may occur. In addition, spill kits are located in the vicinity of the area where tankers park to fill the underground storage tanks. The locations of spill kits are marked on the site plan in Appendix 1.

The spill kits are clearly signposted, easily accessible and kept current.

Each spill kit should, as a minimum, contain:

- Absorbent pads;
- Absorbent socks / booms;
- Mineral sponge / peat or similar absorbent material;
- Protective gloves;
- Safety goggles;
- Protective coveralls;
- Dustpan and brush;
- Heavy duty disposal bag and ties; and
- Instructions.

All site personnel should know where the spill kits are located and should be trained in their use.

If the spill kit container itself is not watertight, a watertight disposal bin large enough to hold all the equipment in the spill kit is stored directly next to the spill kits for disposal of materials that become soiled during spill clean-up.

4.1.8 Fire Extinguishers

Fire extinguishers for general firefighting are located in prominent, clearly visible places throughout the site for easy access.

In addition to the fire extinguishers required for general firefighting, fire extinguishers are required in the locations where certain hazardous substances are stored. Table 7 lists these substances and details the appropriate fire extinguisher requirements. The fire extinguishers must be clearly visible at all times and readily accessible in an emergency.

Fire extinguishers are checked and serviced on a TBC basis by TBC.

Table 7: Fire Extinguishers

Storage Location	Substance	No. of Fire Extinguishers	Type of Fire Extinguishers
Outdoor Plant Yard (North)	Diesel	2	TBC
Outdoor Plant Yard (South)	Diesel	2	TBC
Tanker Bay	Diesel	2	TBC
Non-critical Cooling System	HFC-32 Refrigerant (2.1.1A)[1]	1	TBC

Note: The HFC-32 refrigerant is contained within 25 SPLIT units on-site (4 kg per unit). The need for fire extinguishers in the vicinity of the non-critical cooling system will depend on the location of, and separation between, these units.

4.1.9 Signage

Signs on-site must be clearly visible and easily understood. Lettering on signs must be large enough to be legible from at least 10 m under varying conditions (for example, rain or poor light). Signs must also be located so that they can be easily seen from all applicable directions. This may require more than one sign to be posted at a given location.

Signs are needed to show the following locations (of relevance to this EMP):

- Spill kit locations.
- Locations where hazardous substances are present in accordance with the requirements listed in the HSW(HS)R.
- Waste skip and bin locations.

Areas where hazardous substances are present must have the word “HAZCHEM” prominently displayed, as per Regulation 2.6 of the HSW(HS)R. In addition, each location should have the signage listed in Table 8.

The signs should include information regarding any personal protective equipment (PPE) requirements and access restrictions to areas and health warnings, as appropriate. Signs must be prominently displayed at every entrance to an area where hazardous substances are present within a building. For outdoor areas, the signs should be placed immediately next to the area where hazardous substances are present.

Table 8: Hazardous Substances Signage Requirements

Location	Signs required	
Site Entrance, Outdoor Plant Yards and in the area where the tankers park to fill the underground fuel tanks		
	H227 Combustible liquid	H411 - Toxic to aquatic life with long lasting effects

4.2 Procedural Pollution Controls

4.2.1 Fuel Delivery Procedure

Details of the procedures for fuel delivery are included in Appendix 7.

4.2.2 Hazardous Substances Inventory

Regulation 3.1 of the HSW(HS)R requires that a person conducting a business or undertaking (PCBU) with management or control of a workplace must ensure that an inventory of hazardous substances used, handled, manufactured, or stored at the workplace is prepared and kept at the workplace; kept up to date; and includes the following information:

- The product or chemical name and UN number (if available) of each hazardous substance at the workplace.
- The maximum quantity of each hazardous substance likely to be at the workplace.
- The location of those hazardous substances.
- Any specific storage and segregation requirements relating to those hazardous substances.
- The current safety data sheet (SDS) or a condensed version of the key information from the safety data sheet.

The master version of the inventory of the hazardous substances held at the site is included in Appendix 4. A digital copy of inventory, for information only, is named “ASP Stage 2 DC” and is available online at https://hazardoussubstances.govt.nz/calculator#B34BBA.

4.2.3 Safety Data Sheets (SDS)

Regulation 2.11 of the HSW(HS)R requires that the PCBU must have an SDS for all substances listed on the inventory and that these SDS must be readily accessible to workers and emergency workers. The SDS should be less than five years old and should include the name and contact details of the New Zealand importer or manufacturer and New Zealand emergency contact details in Section 1 of the SDS.

Copies of relevant SDS are included in Appendix 5.

4.2.4 Hazardous Substances Labelling, Handling and Management

All hazardous substances should be appropriately packaged and labelled. Containers delivered to site should be labelled in accordance with the Environmental Protection Authority (EPA) Consolidated Hazardous Substances (Labelling) Notice 2017 (EPA Consolidation April 2021), which includes the requirement that labels must be durable, in English, easily read by a person with normal eyesight and readily comprehensible. The labels must, in all cases include:

- A product identifier that clearly identifies the hazardous substance (i.e. its product common name, chemical name, or registered trade name) and is the same as is used on the safety data Sheet (SDS) for the substance.
- The name and telephone number of the New Zealand importer or manufacturer (unless the substance is imported from overseas directly into a workplace for use) and emergency contact details.
- A hazard pictogram, signal word and hazard statement consistent with the correct classification of the substance.
- One or more appropriate and achievable disposal methods for the hazardous substance and disposal methods that must be avoided (if applicable).

Additional information may be required for some substances as listed in the Notice.

If a substance is transferred or decanted from its original container at the workplace into a portable container with a capacity of 40 L or less, and will not be supplied to a person outside the workplace, the label must, as a minimum:

- Be in English.
- Include the product common name or chemical name.
- Include a hazard pictogram and hazard statement consistent with the correct classification of the substance

If a label ceases to be legible the container must be re-labelled (preferably using a copy of the original label).

Where possible, substances should be stored in the containers in which they were supplied, however if decanting or transferred to another container is required, the new container must:

- Be made of material that is compatible with, and will not be adversely affected by, the hazardous substance it will be used for.
- Be in sound condition.
- Not usually contain food or beverages and cannot be mistakenly identified as containing food or beverages.
- Have all the information from the labels on the original container recorded on it (e.g. by affixing a copy of the original label).

Containers must only be used for the use, handling, or storage of the hazardous substance for which it is labelled.

4.2.5 Personal Protective Equipment

Standard safety rules on-site require the following personal protective equipment (PPE) to be used:

- TBC

When additional PPE is needed (e.g. chemical resistant gloves, face shield, hearing protection etc.), this is communicated through employee training and signage, and the additional PPE is either allocated to those employees using it or stored close to where it is needed. The SDS for each substance (Appendix 5) includes the specific PPE required when handling or using that substance.

All employees who may encounter hazardous substances held on-site or who may require additional PPE for any reason should be trained in the use of the relevant PPE (refer Section 5.4).

The use of proper PPE is not a control against risk. No employee should assume that by wearing PPE they are safe from the risks associated with the hazardous substances on-site.

4.3 Emergency Response

4.3.1 Spill Response Procedure

The expectation at the site is that leaks and spills are mitigated and cleaned up immediately and that the incident is reported to the Site Manager as soon as practicable.

A spill response procedure has been developed for the site, a copy of which is included in Appendix 8. A laminated copy of this procedure should be available in, or adjacent to, the spill kits on-site.

All employees on-site are trained in spill identification and response (refer Section 5.4).

4.3.2 Emergency Response Plan

In the event of an emergency, including any spill which may be harmful to human health, or which is large enough to migrate off-site or have an adverse effect on the environment, the emergency response plan (ERP) for the site should be followed. A copy of this plan is available in the Site Manager's office. Additional copies of the ERP are available TBC.

The ERP is tested annually (at minimum) to ensure that all staff understand the actions they are required to take in case of an emergency. Following each test, the Site Manager will revise the ERP to ensure that any issues highlighted by the test are adequately addressed in the ERP. The plan must also be updated if there are any changes to:

- The types or volumes of hazardous substances used and stored on-site.
- Personnel with responsibilities under the ERP or the actions specific personnel are required to take.
- Emergency procedures to be followed or equipment to be used.

If the ERP is updated for any reason, it will be tested within three months of the update. Following any revisions to the ERP all staff will receive training with respect to the new requirements.

Records of tests will be kept for at least two years.

4.3.3 Incident Response

If an incident occurs (minor spills and emergencies) or almost occurs (near miss), an incident response form (Appendix 9) shall be completed as soon as possible after the incident. The purpose of this form is not to allocate blame, but rather to identify measures that could be implemented to help prevent a similar event from occurring in the future. The preventative measures identified in this form should be incorporated into this EMP.

The form should ideally be filled out by someone who witnessed the event (first-hand) and will need to be read and signed off by the Site Manager so they can consider if an update to this EMP is required.

Note: This is an environmental incident form, not a Health and Safety form.

5 Programmes and Systems

5.1 Inspections and Audits

5.1.1 Weekly Inspections of Hazardous Substances Storage Areas

A routine inspection of all the hazardous substances storage areas on site (as listed in Table 4) should be carried out weekly. At each inspection the checklist in Appendix 10 should be completed.

Completed inspection checklists are kept TBC. If any issues of concern are noted during the inspection, they should be immediately raised with the Site Manager, and the incident form in Appendix 9 should also be completed to provide details of the remedial action(s) that have been, and will be, taken. A copy of the completed incident report should be kept with the relevant routine inspection checklist.

5.1.2 Monthly Site Audit

A site audit should be completed and documented on a monthly basis to ensure that all structural and procedural controls are functioning well. The site audit checklist (Appendix 11) should be completed during each audit.

Completed audit checklists, are kept TBC. If any issues of concern are noted during the audit, they should be immediately raised with the Site Manager, and the incident form in Appendix 9 should also be completed to provide details of the remedial action(s) that have been, and will be, taken. A copy of the completed incident report should be kept with the relevant audit checklist.

5.2 Underground Tanks Fuel Reconciliation

A reconciliation of the volume of diesel in each of the five underground storage tanks should be undertaken on a monthly basis. The aim of the reconciliation is to attempt to detect any leaks from the tank or faults in the pumped pipe system. The procedure for reconciliation of the volume of diesel in the underground storage tanks is included in Appendix 12.

5.3 Management of Stormwater System

5.3.1 Maintenance

The Operation and Maintenance Plan (OMP) for the stormwater system at the site is available in Appendix 13 and is summarised in Table 9.

The stormwater treatment devices are maintained by TBC in accordance with their proposal dated TBC; a copy of which is also included in Appendix 13.

Table 9: Stormwater Maintenance Programme

Stormwater Treatment Device	Inspection or Maintenance Task	Person Responsible	Frequency
Catchpits	Grates - Remove any solids trapped by the stormwater grate and dispose as general waste.	TBC	As and when required
	Sump - Measure and record the volume of sediment in the sump. If the volume of sediment is greater than 20% of the sump capacity, arrange for the catchpits to be cleaned.	TBC	Monthly (as a part of the site inspection, refer Section 5.1.2)
	Catchpit cleaning – catchpit drained, and all sediment removed by a vacuum truck for off-site (and suitably licensed) disposal.	TBC	TBC - As per manufacturers specification
SPEL Puraceptors	TBC - As per manufacturers specification	TBC	TBC - As per manufacturers specification

5.4 Training Programme

All employees and contractors (unless accompanied at all times by an employee) should be trained in the aims and requirements of this EMP and should be aware that a reference copy is available TBC. Table 10 lists the training requirements with respect to this EMP for employees and contractors at the site.

Table 10: Training Requirements

Training Topic	Summary of Training Purpose and Content	Recipients	Frequency
Familiar with EMP	Introduction to EMP (overview including site information, pollution risks and controls, programmes and systems).	All employees and contractors	At start of employment / contract
	Refresher (overview of EMP, including recent changes and updates).		At least annually and following any changes to the EMP
Spill Management	Identification of hazardous substances on-site, spill prevention, locations of spill kits, spill kit contents (and use) and spill response procedure (Sections 4.1.7, 4.3.1 and Appendix 4, 5 and 8).	All employees and contractors	At start of employment / contract.
	Refresher / reminder.		At least monthly as a part of toolbox talks or similar.
Familiar with fire extinguishers and usage	Fire extinguisher locations, types and use.	All employees and contractors	At start of employment / contract.
	Refresher / reminder.		Quarterly, or more frequently if required.
	Competent operation of fire extinguishers.	Wardens	Annually.
Familiar with the Emergency Response Plan (ERP)	Overview of the ERP and associated responsibilities (Section 4.3.2).	All employees and contractors	At start of employment / contract.
	Refresher (overview of emergency response plan, including any recent changes and updates).		Quarterly, or more frequently if required.
Hazardous substances management	Detailed understanding of the hazardous substances on-site and their management (Section 4.1 and 4.2 and Appendix 4 and 5).	Site Manager and workers who access the plant yards	At start of employment / contract and if new hazardous substances are introduced at the site.
Stormwater Treatment System Management	Detailed understanding of the stormwater system and associated operation and maintenance requirements (Section 5.3 and Appendix 13).	Site Manager	At start of employment / contract.

Training Topic	Summary of Training Purpose and Content	Recipients	Frequency
Correct use, storage and Maintenance of PPE	Understanding of what the PPE does, why it is needed, how to use, store and maintain it appropriately, the location of task-specific PPE	All staff and contractors	At start of employment / contract.
	Refresher / reminder.		At least monthly as a part of toolbox talks or similar.

Records of all training carried out are kept TBC.

5.5 Record Keeping

Table 11 lists the records that need to be kept to demonstrate adherence to the EMP and the effectiveness of the EMP. The table also lists the person responsible for managing the records and ensuring that they are kept up to date, and their storage location.

Table 11: Environmental Management Records

Record Type	Person Responsible	Storage Location
EMP • Master document • Communications about the EMP • Review records	TBC	This document TBC Document Revision table (page i of this EMP)
Copies of authorisations, consents and permits	TBC	Appendix 3 of this EMP
Hazardous Substances Compliance Documentation • Hazardous Substances Inventory • Safety Data Sheets (SDS) • Stationary Container Compliance Certificates • Fire extinguisher inspection records	TBC	 Appendix 4 Appendix 5 Appendix 6 TBC
ERP • Master Document • Communications about the ERP • Records of tests of the ERP	TBC	 TBC TBC TBC

Record Type	Person Responsible	Storage Location
Inspection / Incident Forms	TBC	
• Completed Incident Response Forms		TBC
• Completed Hazardous Substances Routine Inspection Checklists		TBC
• Completed Monthly Site Audit Checklists		TBC
Stormwater System	TBC	
• Maintenance records		TBC
Training Records and Certificates	TBC	TBC

6 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, ASP Bei Land Co Ltd C/- Inovo Projects, their professional advisers, and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations and control measures in this report are based on the information provided by the client at the time of our engagement. If the processes on site, or the substances stored or used at the site, are changed it will be necessary to review and update this report. No liability is accepted for any changes made to this document after the date of issue of this report unless such changes have been made by ENGEO under a variation to our current brief and the ENGEO Document Control table and Document Revisions table on page iv) has been updated in accordance with the requirements of our quality management system.

iii. This Limitation should be read in conjunction with the Engineering NZ / ACENZ Standard Terms of Engagement.

iv. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (09) 972 2205 if you require any further information.

Report prepared by

Lotta Liddell, CEng CEnv MICE
Associate Environmental Engineer

Report reviewed by

Jamie Rhodes, CEnvP (SC)
Principal Environmental Engineer

Appendix 1:

Site Layout Plan

Auckland Surf Park Community Masterplan

Substantive Fast Track Application Pack

DATA CENTRE

studiopacificarchitecture

AW Holdings 2021 Ltd

10 December 2025 | Reference 4663

NDICATIVELY)
DED BY OTHERS.
TYEARS DRAWINGS

NO CHANGE TO SITE LAYOUT
AND ARCHITECTURE
APPROVED UNDER STAGE 1
BUN60429155

DATA CENTRE

DATA CENTRE

LIGHT INDUSTRIAL

LIGHT INDUSTRIAL

LIGHT INDUSTRIAL

LIGHT INDUSTRIAL

LIGHT INDUSTRIAL

LIGHT INDUSTRIAL

LIGHT INDUSTRIAL

10m Setback

SUBSTATION

REFER TO VECTOR
ELECTRICITY
DRAWINGS

LEGEND:

- Superlot boundary
- Footpath
- Footpath (Flush)
- Cycleway
- Lawn
- Planting
- Concrete surface
- Hoggin surface
- Sand play safety surface
- 10m stream offset riparian planting
- Timber boardwalk
- Site boundary
- NOR boundary (indicative)
- Stream centre line
- 10m stream offset line
- Stormwater ponds/ raingardens
- Stream Park timber buildouts
- Raised vege planters
- Buildings
- Lounge bench seats
- Rocks
- Timber nature trail/ play-along-the-way
- Picnic tables
- BBQ's
- Picnic shelter
- Bench seats
- Trees

Note: Where the masterplan extends beyond the scope of SPA's work, it is shown **indicatively**. For the relevant legend and detailed information, please refer to the respective consultants' drawings.

0 10 30

True North: Original Scale / Print check:

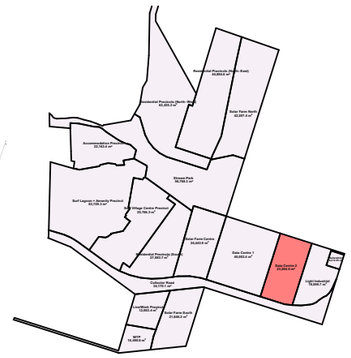
Print in Colour

Notes:

DO NOT SCALE OFF DRAWINGS

All dimensions to be checked on site.

Rev	Description	Date



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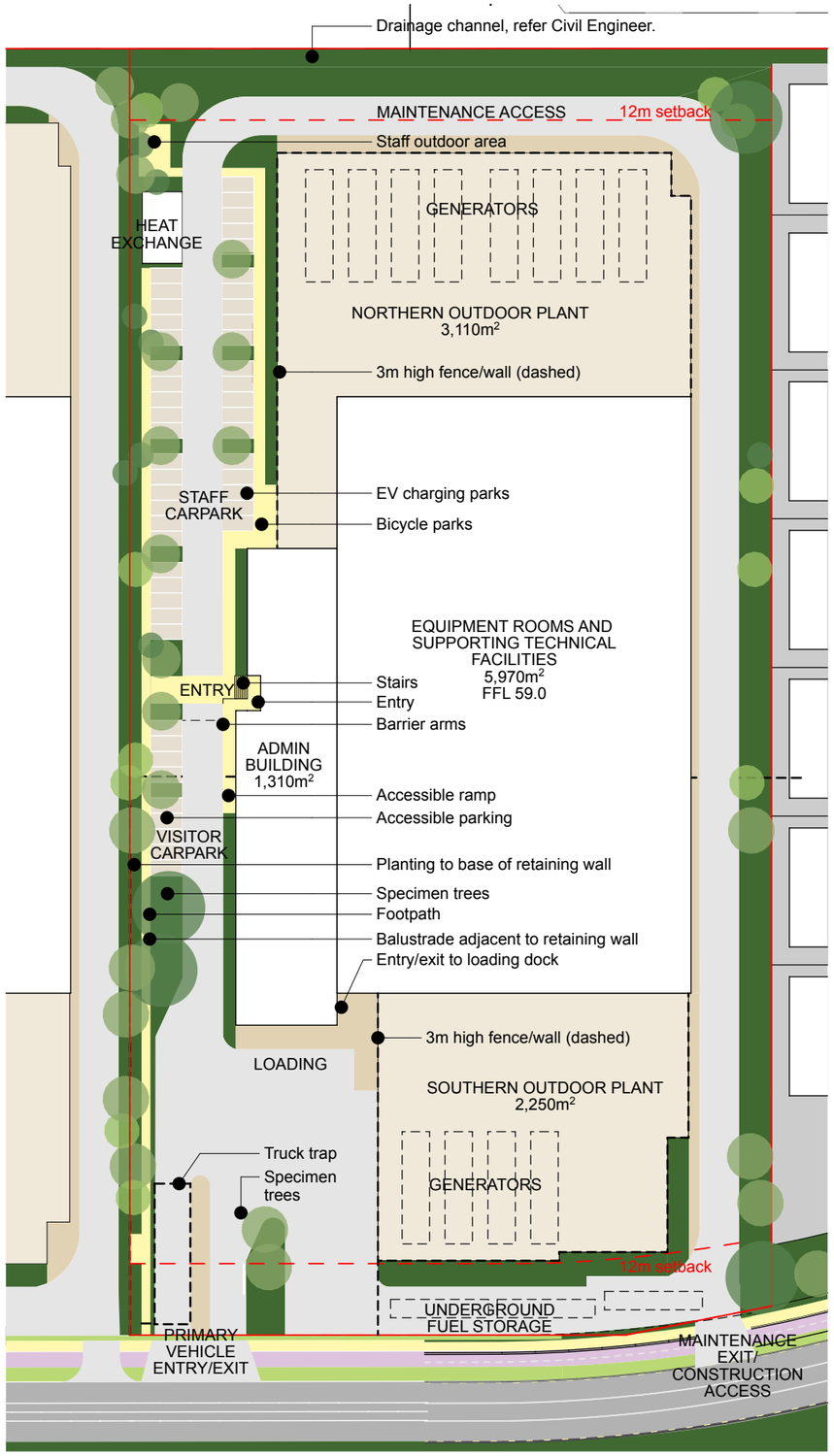
Prepared For:
AW Holdings Ltd

Project Title:
Auckland Surf Park Community
at
Dairy Flat Highway, Auckland
#

Layout Name:
DATA CENTRE
Data Centre

Scale: 1:1500 Original Paper Size: A3

Job No.: **4663** Layout I.D: **RC_8 .2** Revision:



True North:

0 10 30

Original Scale / Print check:

Print in Colour

Notes:

DO NOT SCALE OFF DRAWINGS

All dimensions to be checked on site.

Rev	Description	Date

LEGEND:

- Lawn
- Planting
- Concrete surface
- Hoggin surface
- Sand play safety surface
- 10m stream offset riparian planting
- Timber boardwalk
- Site boundary
- NOR boundary (indicative)
- Stream centre line
- 10m stream offset line
- Stormwater ponds/ raingardens
- Stream Park timber buildouts
- Raised vege planters
- Buildings
- Lounge bench seats
- Rocks
- Timber nature trail/ play-along-the-way
- Picnic tables
- BBQ's
- Picnic shelter
- Bench seats
- Trees

Note: Where the masterplan extends beyond the scope of SPA's work, it is shown **indicatively**. For the relevant legend and detailed information, please refer to the respective consultants' drawings.

GENERAL DESIGN NOTES

Building
Areas are subject to change with structural and service considerations.

Outdoor Plant and Services
Design and size is representational only.

Landscape Design and Tree Location
Location and design is representational. Refer Open Space plan for design intent.

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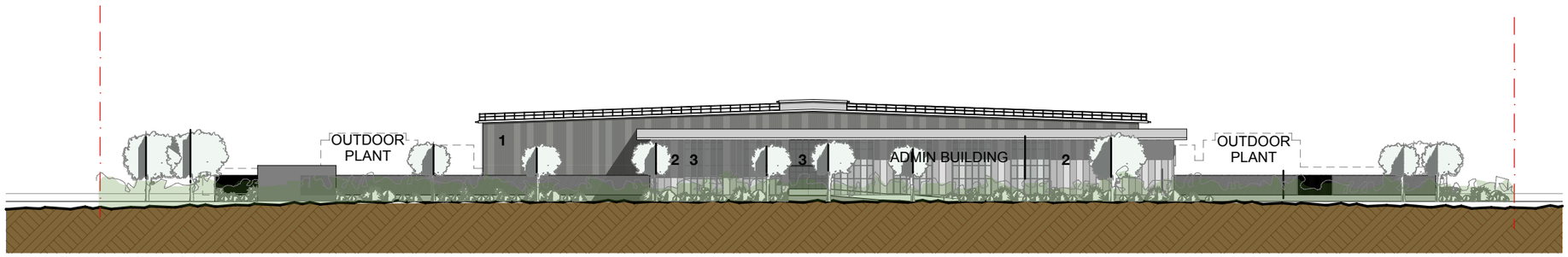
Prepared For:
AW Holdings Ltd

Project Title:
Auckland Surf Park Community
at
Dairy Flat Highway, Auckland
#

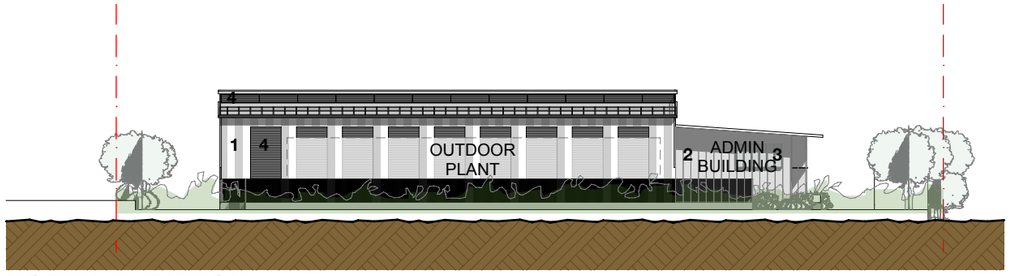
Layout Name:
DATA CENTRE
Data Centre Site and Landscape Plan
Scale: 1:1000
Original Paper Size: A3

Job No.: **4663**
Layout I.D: **RC_8. 3**
Revision:

EAST ELEVATION
1:800



WEST ELEVATION
1:800



NORTH ELEVATION
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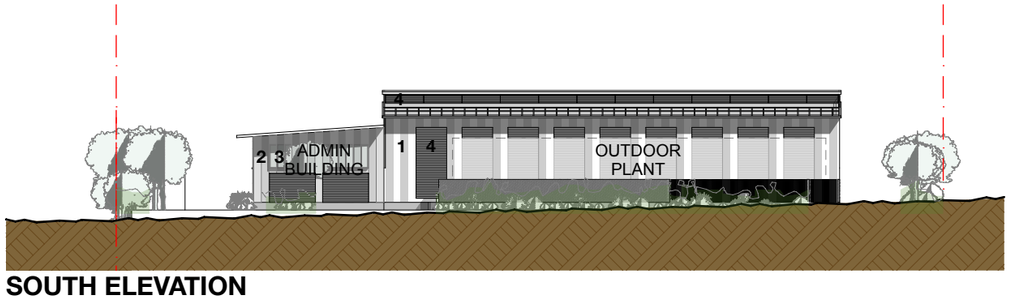

SOUTH ELEVATION
1:800

MATERIAL PALETTE

1 Insulated wall panel- two tone.
2 Aluminium cladding or precast panel- two tone.
3 Glazing, projecting shade fins as appropriate.
4 Mechanical louvres

GENERAL DESIGN NOTES

Building
Areas are subject to change with structural and service considerations.

Site levels
Proposed Site levels are shown indicatively - refer Civils Engineer for detail including extent of retaining.

Material palette
Shown indicatively.

Outdoor Plant and Services
Design and size is representational only.

Landscape Design and Tree Location
Location and design is representational.

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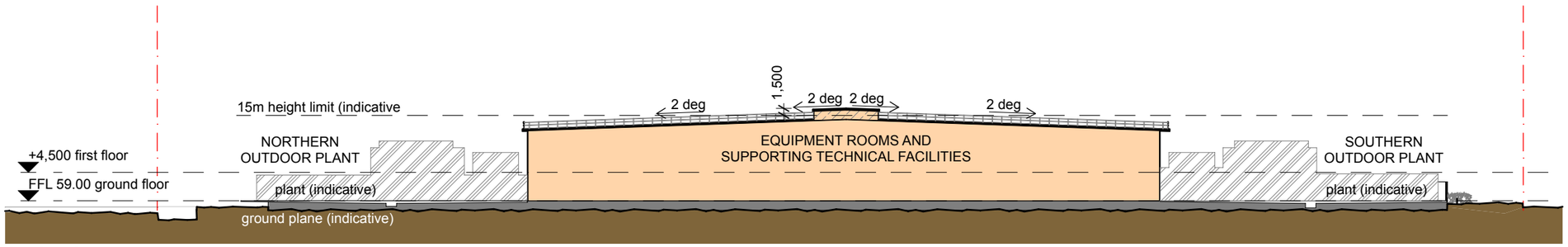

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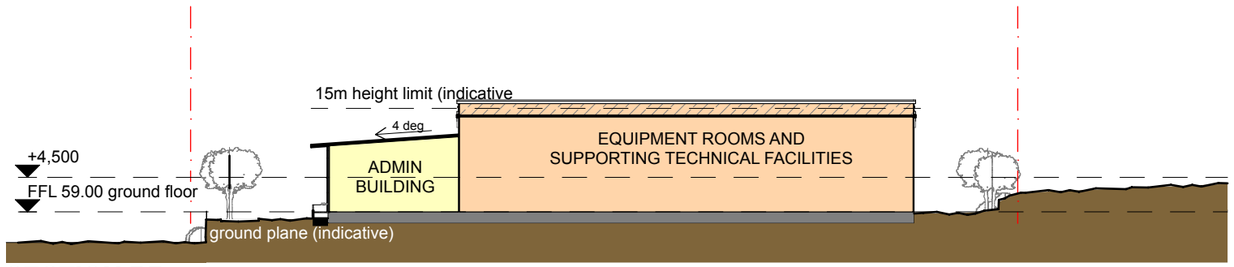

SECTION BB
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GENERAL DESIGN NOTES

Building
Areas are subject to change with structural and service considerations.

Site levels
Proposed Site levels are shown indicatively - refer Civils Engineer for detail including extent of retaining.

Material palette
Shown indicatively.

Outdoor Plant and Services
Design and size is representational only.

Landscape Design and Tree Location
Location and design is representational.

Printed: 10/12/2025,4:33 PM CAD Ref:4663_Auckland Surfpark Housing & Apartment & Street Types

Appendix 2:

Stormwater Drainage Plans (to be inserted)

Appendix 3:

Consents, Authorisations and Permits (to be inserted)

Appendix 4:

Hazardous Substances Inventory

Hazardous Substances Inventory

Substance	Substance UN Number	Location	Maximum Quantity held on site[1]	Substance State	Approval Number	HSNO Classification[1]	Incompatible Items	SDS Expiry Date
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 16	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 15	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 14	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 13	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 12	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 11	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 10	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 09	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 08	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 07	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 06	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 05	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 04	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 03	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 02	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
Caterpillar Cat ELC (Extended Life Coolant) Premix 50/50	NA	Genset 01	488 L	Liquid	HSR002606	6.1D, 6.3B, 6.4A, 6.9A, 9.3C	NA	Mar-28
DAPHNE HERMETIC OIL FVC68D	NA	Within the VRV System	5.1 L	Liquid	HSR002606	6.5B, 6.8B, 9.1C	NA	Out of Date
DAPHNE HERMETIC OIL FW68DA	NA	Within the SPLIT units in the refrigeration system	33.75 L	Liquid	HSR002606	6.5B	NA	Out of Date
Diesel fuel	3082	Waste Diesel Tank	5000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 16	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 15	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 14	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 13	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 12	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 11	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 10	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 09	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 08	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30

Substance	Substance UN Number	Location	Maximum Quantity held on site[1]	Substance State	Approval Number	HSNO Classification[1]	Incompatible Items	SDS Expiry Date
Diesel fuel	3082	Genset 07	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 06	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 05	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 04	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 03	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 02	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Genset 01	25000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Fire Pump Room	600 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Below Ground Tank 05	110000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Below Ground Tank 04	110000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Below Ground Tank 03	110000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Below Ground Tank 02	110000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
Diesel fuel	3082	Below Ground Tank 01	110000 L	Liquid	HSR001441	3.1D, 6.1E, 6.3B, 6.7B, 9.1B	HFC32 Refrigerant	Jul-30
EMKARATE RL 46HB	NA	Chiller 16	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 15	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 14	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 13	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 12	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 11	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 10	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 09	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 08	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 07	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 06	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 05	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 04	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 03	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 02	35 L	Liquid	HSR002606	9.1C	NA	Out of Date
EMKARATE RL 46HB	NA	Chiller 01	35 L	Liquid	HSR002606	9.1C	NA	Out of Date

Substance	Substance UN Number	Location	Maximum Quantity held on site[1]	Substance State	Approval Number	HSNO Classification[1]	Incompatible Items	SDS Expiry Date
Hand Sanitiser	1170	Cleaner's Cupboard	20 L	Liquid	HSR002552	3.1B, 6.4A	HFC32 Refrigerant	Mar-28
HFC32 Refrigerant	3252	Within the SPLIT units in the refrigeration system	100 kg	Gas Non-Permanent	HSR001023	2.1.1A	Diesel fuel, Hand Sanitiser	Mar-28
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 01	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 02	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 03	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 04	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 05	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 06	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 07	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 08	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 09	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 10	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 11	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 12	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 13	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 14	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 15	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	NA	Genset 16	466 L	Liquid	NA	Non-hazardous	NA	Out of Date
R-410A Refrigerant	1078	Within the VRV System	78 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Mar-28
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 01	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 02	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 03	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 04	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 05	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 06	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 07	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 08	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 09	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 10	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30

Substance	Substance UN Number	Location	Maximum Quantity held on site[1]	Substance State	Approval Number	HSNO Classification[1]	Incompatible Items	SDS Expiry Date
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 11	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 12	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 13	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 14	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 15	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30
Solstice ZE Refrigerant (R-1234ze(E))	3163	Chiller 16	86 kg	Gas Non-Permanent	NA	Non-hazardous	NA	Apr-30

Appendix 5:

Safety Data Sheets

CAT ELC (Extended Life Coolant) Premix 50/50 with Embitterment Caterpillar

Chemwatch Hazard Alert Code: **3**

Chemwatch: **4864-37**
Version No: **7.1**
Safety Data Sheet according to WHS Regulations (Hazardous Chemicals) Amendment 2020 and ADG requirements

Issue Date: **10/03/2023**
Print Date: **17/08/2023**
L.GHS.AUS.EN.E

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	CAT ELC (Extended Life Coolant) Premix 50/50 with Embitterment
Chemical Name	Not Applicable
Synonyms	Not Available
Chemical formula	Not Applicable
Other means of identification	Not Available

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

Relevant identified uses	Antifreeze/coolant Use according to manufacturer's directions.

Details of the manufacturer or supplier of the safety data sheet

Registered company name	**Caterpillar**
Address	New Zealand
Telephone	Not Available
Fax	Not Available
Website	Not Available
Email	Not Available

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

Poisons Schedule	S5
Classification [1]	Acute Toxicity (Oral) Category 4, Serious Eye Damage/Eye Irritation Category 2A, Reproductive Toxicity Category 2, Specific Target Organ Toxicity - Repeated Exposure Category 2
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

Label elements

Hazard pictogram(s)	
Signal word	**Warning**

Hazard statement(s)

H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P260	Do not breathe mist/vapours/spray.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P264	Wash all exposed external body areas thoroughly after handling.

Page 1 continued...

P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/ attention.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314	Get medical advice/attention if you feel unwell.
P337+P313	If eye irritation persists: Get medical advice/attention.
P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.
P330	Rinse mouth.

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.

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
107-21-1	30-60	ethylene glycol
111-46-6	1-5	diethylene glycol
19766-89-3	1-5	2-ethylhexanoic acid, sodium salt
Not Available	notspec	bittering agent
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available*	

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice. ▸ Avoid giving milk or oils. ▸ Avoid giving alcohol.

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

- Polyethylene glycols are generally poorly absorbed orally and are mostly unchanged by the kidney.
- Dermal absorption can occur across damaged skin (e.g. through burns) leading to increased osmolality, anion gap metabolic acidosis, elevated calcium, low ionised calcium, CNS depression and renal failure.
- Treatment consists of supportive care.

[Ellenhorn and Barceloux: Medical Toxicology]

To treat poisoning by the higher aliphatic alcohols (up to C7):

- Gastric lavage with copious amounts of water.
- It may be beneficial to instill 60 ml of mineral oil into the stomach.
- Oxygen and artificial respiration as needed.
- Electrolyte balance: it may be useful to start 500 ml. M/6 sodium bicarbonate intravenously but maintain a cautious and conservative attitude toward electrolyte replacement unless shock or severe acidosis threatens.

Continued...

- To protect the liver, maintain carbohydrate intake by intravenous infusions of glucose.
- Haemodialysis if coma is deep and persistent. [GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, Ed 5)

BASIC TREATMENT

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

ADVANCED TREATMENT

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

EMERGENCY DEPARTMENT

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

For C8 alcohols and above.
Symptomatic and supportive therapy is advised in managing patients.

SECTION 5 Firefighting measures

Extinguishing media

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

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area. ▸ Avoid spraying water onto liquid pools. ▸ **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.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). ▸ May emit acrid smoke. ▸ Mists containing combustible materials may be explosive. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. May emit poisonous fumes. May emit corrosive fumes.
HAZCHEM	Not Applicable

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

Continued...

See section 12

Methods and material for containment and cleaning up

Minor Spills	Slippery when spilt. ▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite. ▸ Wipe up. ▸ Place in a suitable, labelled container for waste disposal.
Major Spills	Chemical Class: alcohols and glycols For release onto land: recommended sorbents listed in order of priority.

SORBENT TYPE	RANK	APPLICATION	COLLECTION	LIMITATIONS
LAND SPILL - SMALL				
cross-linked polymer - particulate	1	shovel	shovel	R, W, SS
cross-linked polymer - pillow	1	throw	pitchfork	R, DGC, RT
sorbent clay - particulate	2	shovel	shovel	R,I, P
wood fiber - pillow	3	throw	pitchfork	R, P, DGC, RT
treated wood fiber - pillow	3	throw	pitchfork	DGC, RT
foamed glass - pillow	4	throw	pichfork	R, P, DGC, RT
LAND SPILL - MEDIUM				
cross-linked polymer - particulate	1	blower	skiploader	R,W, SS
polypropylene - particulate	2	blower	skiploader	W, SS, DGC
sorbent clay - particulate	2	blower	skiploader	R, I, W, P, DGC
polypropylene - mat	3	throw	skiploader	DGC, RT
expanded mineral - particulate	3	blower	skiploader	R, I, W, P, DGC
polyurethane - mat	4	throw	skiploader	DGC, RT

Legend
DGC: Not effective where ground cover is dense
R; Not reusable
I: Not incinerable
P: Effectiveness reduced when rainy
RT:Not effective where terrain is rugged
SS: Not for use within environmentally sensitive sites
W: Effectiveness reduced when windy
Reference: Sorbents for Liquid Hazardous Substance Cleanup and Control;
R.W Melvold et al: Pollution Technology Review No. 150: Noyes Data Corporation 1988
Slippery when spilt.
Moderate hazard.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ **DO NOT** allow clothing wet with material to stay in contact with skin ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** enter confined spaces until atmosphere has been checked. ▸ Avoid smoking, naked lights or ignition sources. ▸ 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. ▸ 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.

Continued...

Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ **DO NOT** use aluminium or galvanised containers ▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	Ethylene glycol: ▸ reacts violently with oxidisers and oxidising acids, sulfuric acid, chlorosulfonic acid, chromyl chloride, perchloric acid ▸ forms explosive mixtures with sodium perchlorate ▸ is incompatible with strong acids, caustics, aliphatic amines, isocyanates, chlorosulfonic acid, oleum, potassium bichromate, phosphorus pentasulfide, sodium chlorite ▸ Avoid strong acids, bases.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	ethylene glycol	Ethylene glycol (particulate)	10 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	ethylene glycol	Ethylene glycol (vapour)	20 ppm / 52 mg/m3	104 mg/m3 / 40 ppm	Not Available	Not Available
Australia Exposure Standards	diethylene glycol	2,2'-Oxybis[ethanol]	23 ppm / 100 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
ethylene glycol	30 ppm	150 ppm	900 ppm
diethylene glycol	6.9 ppm	140 ppm	860 ppm

Ingredient	Original IDLH	Revised IDLH
ethylene glycol	Not Available	Not Available
diethylene glycol	Not Available	Not Available
2-ethylhexanoic acid, sodium salt	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
2-ethylhexanoic acid, sodium salt	E	≤ 0.01 mg/m³
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

MATERIAL DATA

for ethylene glycol:
Odour Threshold: 25 ppm
NOTE: Detector tubes for ethylene glycol, measuring in excess of 10 mg/m3, are commercially available.
It appears impractical to establish separate TLVs for ethylene glycol vapour and mists. Atmospheric concentration that do not cause discomfort are unlikely to cause adverse effects. The TLV-C is thought to be protective against throat and respiratory irritation and headache reported in exposed humans. NIOSH has not established a limit for this substance due to the potential teratogenicity associated with exposure and because respiratory irritation reported at the TLV justified a lower value

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure. Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. An approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)

Continued...

	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 (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 (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 (500-2000 f/min.)

Within each range the appropriate value depends on:

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.

Individual protection measures, such as personal protective equipment

Eye and face protection

- Safety glasses with side shields.
- Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent]
- 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].

Skin protection

See Hand protection below

Hands/feet protection

- Wear chemical protective gloves, e.g. PVC.
- Wear safety footwear or safety gumboots, e.g. Rubber

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
· Contaminated gloves should be replaced.
As defined in ASTM F-739-96 in any application, gloves are rated as:
· Excellent when breakthrough time > 480 min
· Good when breakthrough time > 20 min
· Fair when breakthrough time < 20 min
· Poor when glove material degrades
For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.
It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.
Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task.
Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:
· Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
· Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Body protection

See Other protection below

Other protection

- Overalls.
- P.V.C apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

Recommended material(s)

Respiratory protection

Continued...

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:
CAT ELC (Extended Life Coolant) Premix 50/50 with Embitterment

Material	CPI
NITRILE	A
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE+PVC	C
PE/EVAL/PE	C
PVA	C
PVC	C
TEFLON	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.

Type A-P 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	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

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

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Red liquid with faint or mild odour; miscible with water.

Physical state	Liquid	**Relative density (Water = 1)**	1.08
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	8.1-8.5	**Decomposition temperature (°C)**	Not Available
Melting point / freezing point (°C)	-37 (freezing point)	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	108.9	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Applicable	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Applicable	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Applicable	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	0.02 @20C	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	2.1	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

Continued...

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo. Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. Exposure to aliphatic alcohols with more than 3 carbons may produce central nervous system effects such as headache, dizziness, drowsiness, muscle weakness, delirium, CNS depression, coma, seizure, and neurobehavioural changes. Symptoms are more acute with higher alcohols. Respiratory tract involvement may produce irritation of the mucosa, respiratory insufficiency, respiratory depression secondary to CNS depression, pulmonary oedema, chemical pneumonitis and bronchitis. Cardiovascular involvement may result in arrhythmias and hypotension. Gastrointestinal effects may include nausea and vomiting. Kidney and liver damage may result following massive exposures. The alcohols are potential irritants being, generally, stronger irritants than similar organic structures that lack functional groups (e.g. alkanes) but are much less irritating than the corresponding amines, aldehydes or ketones. Alcohols and glycols (diols) rarely represent serious hazards in the workplace, because their vapour concentrations are usually less than the levels which produce significant irritation which, in turn, produce significant central nervous system effects as well.
Ingestion	Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. Swallowing of the liquid may cause aspiration of vomit into the lungs with the risk of haemorrhaging, pulmonary oedema, progressing to chemical pneumonitis; serious consequences may result. Signs and symptoms of chemical (aspiration) pneumonitis may include coughing, gasping, choking, burning of the mouth, difficult breathing, and bluish coloured skin (cyanosis). The toxic effects of glycols (dihydric alcohols), following ingestion are similar to those of alcohol, with depression of the central nervous system (CNS), nausea, vomiting and degenerative changes in liver and kidney. for ethylene glycol: Ingestion symptoms include respiratory failure, central nervous depression, cardiovascular collapse, pulmonary oedema, acute kidney failure, and even brain damage. Ingestion of 100 ml has caused death. (ChemInfo) Toxicity of ethylene glycol to human (KB) cell cultures has been reported as less than that of ethanol. (NIOSHTIC) Ethylene glycol produces a three-stage response with the severity of each stage dependent on the amount of ingestion. Hepatic damage is usually minimal. Central nervous system depression characterise the first 12 hours post ingestion. Transient exhilaration occurs without the odour of ethanol. Gastrointestinal complaints include nausea and vomiting. Acidosis, coma, convulsions and myoclonic jerks may also be evident. The optic fundus is usually normal although the presence of papilloedema may confuse the presentation with that produced by methanol. Nystagmus and opthalmoplegias may appear. Cardiopulmonary effects are seen 12-24 hours post-ingestion and are characterised by tachycardia, tachypnea, and mild hypertension. Congestive heart failure and circulatory collapse may occur in severe intoxications. Renal effects are seen 24-72 hours post-ingestion and are characterised by oliguria, flank pain, acute tubular necrosis, renal failure, and rarely, bone marrow arrest. Renal damage may be permanent. Toxic effects of ethylene glycol are similar to those produced by ethanol but ethylene glycol produces toxic metabolites. Metabolic acidosis and anion gap result primarily from glycolic acid formation and some lactic acid formation. The citric acid cycle is inhibited as a result of reduced NAD/NADH ratios and to a limited extent, the formation of oxalic acid, and to metabolic acidosis. Oxalate formation produces myocardial depression and acute tubular necrosis. Glycoaldehyde, glycolic acid and glyoxylic acid may contribute to CNS depression and may also produce renal toxicity by producing renal oedema. Hypocalcaemia may result from chelation by oxalate. Oxalic acid, glycoxalic acid, glycoaldehyde and formic acid appear to form to only a limited degree during intoxication. Oral administration to pregnant mice and rats produced birth defects amongst the off-spring.
Skin Contact	Repeated exposure may cause skin cracking, flaking or drying following normal handling and use. Most liquid alcohols appear to act as primary skin irritants in humans. Significant percutaneous absorption occurs in rabbits but not apparently in man. Open cuts, abraded or irritated skin should not be exposed to this material The material may produce mild skin irritation; limited evidence or practical experience suggests, that the material either: ▸ produces mild inflammation of the skin in a substantial number of individuals following direct contact, and/or ▸ produces significant, but mild, inflammation when applied to the healthy intact skin of animals (for up to four hours), such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (non allergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.
Eye	Limited evidence or practical experience suggests, that the material may cause moderate eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged exposure may cause moderate inflammation (similar to windburn) characterised by a temporary redness of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	Exposure to the material may cause concerns for humans owing to possible developmental toxic effects, generally on the basis that results in appropriate animal studies provide strong suspicion of developmental toxicity in the absence of signs of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not a secondary non-specific consequence of other toxic effects. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. There is some evidence to provide a presumption that human exposure to the material may result in impaired fertility on the basis of: some evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects. Human volunteers exposed to ethylene glycol, 20 to 22 hours/day at mean daily concentrations ranging form 1.4 to 27 ppm for about 4 weeks complained of throat irritation, mild headache and low backache. Complaints became marked when the concentration in the exposure chamber was raised above 56 mg/m3 for part of the day. The most common complaint was irritation of the upper respiratory tract. Concentrations above 80 ppm were intolerable with a burning sensation along the trachea and a burning cough. Excessively exposed workers have reported drowsiness.

CAT ELC (Extended Life Coolant) Premix 50/50 with Embitterment	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

Continued...

ethylene glycol	**TOXICITY**	**IRRITATION**
	dermal (mouse) LD50: >3500 mg/kg[1]	Eye (rabbit): 100 mg/1h - mild
	Oral (Rat) LD50: >2000 mg/kg[2]	Eye (rabbit): 12 mg/m3/3D
		Eye (rabbit): 1440mg/6h-moderate
		Eye (rabbit): 500 mg/24h - mild
		Eye: no adverse effect observed (not irritating)[1]
		Skin (rabbit): 555 mg(open)-mild
		Skin: no adverse effect observed (not irritating)[1]
diethylene glycol	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 11890 mg/kg[2]	Eye (rabbit) 50 mg mild
	Inhalation(Rat) LC50: >4.6 mg/l4h[1]	Eye: no adverse effect observed (not irritating)[1]
	Oral (Rat) LD50: 12565 mg/kg[2]	Skin (human): 112 mg/3d-I mild
		Skin (rabbit): 500 mg mild
		Skin: no adverse effect observed (not irritating)[1]
2-ethylhexanoic acid, sodium salt	**TOXICITY**	**IRRITATION**
	dermal (rat) LD50: >2000 mg/kg[1]	Not Available
	Oral (Rat) LD50: 2043 mg/kg[1]	
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

ETHYLENE GLYCOL	[Estimated Lethal Dose (human) 100 ml; RTECS quoted by Orica] Substance is reproductive effector in rats (birth defects). Mutagenic to rat cells.
DIETHYLENE GLYCOL	The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Diglycolic acid is formed following the oxidation of accidentally ingested diethylene glycol in the body and can lead to severe complications with fatal outcome.
2-ETHYLHEXANOIC ACID, SODIUM SALT	Substance has been investigated as a mutagen in rodents. Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.
CAT ELC (Extended Life Coolant) Premix 50/50 with Embitterment & 2-ETHYLHEXANOIC ACID, SODIUM SALT	No significant acute toxicological data identified in literature search.
CAT ELC (Extended Life Coolant) Premix 50/50 with Embitterment & ETHYLENE GLYCOL	For ethylene glycol: Ethylene glycol is quickly and extensively absorbed through the gastrointestinal tract. Limited information suggests that it is also absorbed through the respiratory tract; dermal absorption is apparently slow. Following absorption, ethylene glycol is distributed throughout the body according to total body water. In most mammalian species, including humans, ethylene glycol is initially metabolised by alcohol. dehydrogenase to form glycolaldehyde, which is rapidly converted to glycolic acid and glyoxal by aldehyde oxidase and aldehyde dehydrogenase. These metabolites are oxidised to glyoxylate; glyoxylate may be further metabolised to formic acid, oxalic acid, and glycine. Breakdown of both glycine and formic acid can generate CO_2, which is one of the major elimination products of ethylene glycol. In addition to exhaled CO_2, ethylene glycol is eliminated in the urine as both the parent compound and glycolic acid. Elimination of ethylene glycol from the plasma in both humans and laboratory animals is rapid after oral exposure; elimination half-lives are in the range of 1-4 hours in most species tested. **Respiratory Effects.** Respiratory system involvement occurs 12-24 hours after ingestion of sufficient amounts of ethylene glycol and is considered to be part of a second stage in ethylene glycol poisoning The symptoms include hyperventilation, shallow rapid breathing, and generalized pulmonary edema with calcium oxalate crystals occasionally present in the lung parenchyma. Respiratory system involvement appears to be dose-dependent and occurs concomitantly with cardiovascular changes. Pulmonary infiltrates and other changes compatible with adult respiratory distress syndrome (ARDS) may characterise the second stage of ethylene glycol poisoning Pulmonary oedema can be secondary to cardiac failure, ARDS, or aspiration of gastric contents. Symptoms related to acidosis such as hyperpnea and tachypnea are frequently observed; however, major respiratory morbidities such as pulmonary edema and bronchopneumonia are relatively rare and usually only observed with extreme poisoning (e.g., in only 5 of 36 severely poisoned cases). **Cardiovascular Effects.** Cardiovascular system involvement in humans occurs at the same time as respiratory system involvement, during the second phase of oral ethylene glycol poisoning, which is 12- 24 hours after acute exposure. The symptoms of cardiac involvement include tachycardia, ventricular gallop and cardiac enlargement. Ingestion of ethylene glycol may also cause hypertension or hypotension, which may progress to cardiogenic shock. Myocarditis has been observed at autopsy in cases of people who died following acute ingestion of ethylene glycol. As in the case of respiratory effects, cardiovascular involvement occurs with ingestion of relatively high doses of ethylene glycol. Nevertheless, circulatory disturbances are a rare occurrence, having been reported in only 8 of 36 severely poisoned cases.Therefore, it appears that acute exposure to high levels of ethylene glycol can cause serious cardiovascular effects in humans. The effects of a long-term, low-dose exposure are unknown. **Gastrointestinal Effects.** Nausea, vomiting with or without blood, pyrosis, and abdominal cramping and pain are common early effects of acute ethylene glycol ingestion. Acute effects of ethylene glycol ingestion in one patient included intermittent diarrhea and abdominal pain, which were attributed to mild colonic ischaemia; severe abdominal pain secondary to colonic stricture and perforation developed 3 months after ingestion, and histology of the resected colon showed birefringent crystals highly suggestive of oxalate deposition. **Musculoskeletal Effects.** Reported musculoskeletal effects in cases of acute ethylene glycol poisoning have included diffuse muscle tenderness

Continued...

and myalgias associated with elevated serum creatinine phosphokinase levels, and myoclonic jerks and tetanic contractions associated with hypocalcaemia.
Hepatic Effects. Central hydropic or fatty degeneration, parenchymal necrosis, and calcium oxalate crystals in the liver have been observed at autopsy in cases of people who died following acute ingestion of ethylene glycol.
Renal Effects. Adverse renal effects after ethylene glycol ingestion in humans can be observed during the third stage of ethylene glycol toxicity 24-72 hours after acute exposure. The hallmark of renal toxicity is the presence of birefringent calcium oxalate monohydrate crystals deposited in renal tubules and their presence in urine after ingestion of relatively high amounts of ethylene glycol. Other signs of nephrotoxicity can include tubular cell degeneration and necrosis and tubular interstitial inflammation. If untreated, the degree of renal damage caused by high doses of ethylene glycol progresses and leads to haematuria, proteinuria, decreased renal function, oliguria, anuria , and ultimately renal failure. These changes in the kidney are linked to acute tubular necrosis but normal or near normal renal function can return with adequate supportive therapy.
Metabolic Effects. One of the major adverse effects following acute oral exposure of humans to ethylene glycol involves metabolic changes. These changes occur as early as 12 hours after ethylene glycol exposure. Ethylene glycol intoxication is accompanied by metabolic acidosis which is manifested by decreased pH and bicarbonate content of serum and other bodily fluids caused by accumulation of excess glycolic acid. Other characteristic metabolic effects of ethylene glycol poisoning are increased serum anion gap, increased osmolal gap, and hypocalcaemia. Serum anion gap is calculated from concentrations of sodium, chloride, and bicarbonate, is normally 12-16 mM, and is typically elevated after ethylene glycol ingestion due to increases in unmeasured metabolite anions (mainly glycolate).
Neurological Effects: Adverse neurological reactions are among the first symptoms to appear in humans after ethylene glycol ingestion. These early neurotoxic effects are also the only symptoms attributed to unmetabolised ethylene glycol. Together with metabolic changes, they occur during the period of 30 minutes to 12 hours after exposure and are considered to be part of the first stage in ethylene glycol intoxication. In cases of acute intoxication, in which a large amount of ethylene glycol is ingested over a very short time period, there is a progression of neurological manifestations which, if not treated, may lead to generalized seizures and coma. Ataxia, slurred speech, confusion, and somnolence are common during the initial phase of ethylene glycol intoxication as are irritation, restlessness, and disorientation. Cerebral edema and crystalline deposits of calcium oxalate in the walls of small blood vessels in the brain were found at autopsy in people who died after acute ethylene glycol ingestion. Effects on cranial nerves appear late (generally 5-20 days post-ingestion), are relatively rare, and according to some investigators constitute a fourth, late cerebral phase in ethylene glycol intoxication. Clinical manifestations of the cranial neuropathy commonly involve lower motor neurons of the facial and bulbar nerves and are reversible over many months.
Reproductive Effects: Reproductive function after intermediate-duration oral exposure to ethylene glycol has been tested in three multi-generation studies (one in rats and two in mice) and several shorter studies (15-20 days in rats and mice). In these studies, effects on fertility, foetal viability, and male reproductive organs were observed in mice, while the only effect in rats was an increase in gestational duration.
Developmental Effects: The developmental toxicity of ethylene glycol has been assessed in several acute-duration studies using mice, rats, and rabbits. Available studies indicate that malformations, especially skeletal malformations occur in both mice and rats exposed during gestation; mice are apparently more sensitive to the developmental effects of ethylene glycol. Other evidence of embyrotoxicity in laboratory animals exposed to ethylene glycol exposure includes reduction in foetal body weight.
Cancer: No studies were located regarding cancer effects in humans or animals after dermal exposure to ethylene glycol.
Genotoxic Effects: Studies in humans have not addressed the genotoxic effects of ethylene glycol. However, available *in vivo* and *in vitro* laboratory studies provide consistently negative genotoxicity results for ethylene glycol.

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

CAT ELC (Extended Life Coolant) Premix 50/50 with Embitterment

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

ethylene glycol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	6500-13000mg/l	1
EC50	48h	Crustacea	>100mg/l	2
LC50	96h	Fish	8050mg/l	4
EC50(ECx)	Not Available	Algae or other aquatic plants	6500-7500mg/l	1

diethylene glycol

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	96h	Algae or other aquatic plants	4566mg/l	2
EC50	72h	Algae or other aquatic plants	>6500<13000mg/l	2
EC50	48h	Crustacea	>100mg/l	2
LC50	96h	Fish	>100mg/l	4
NOEC(ECx)	192h	Algae or other aquatic plants	800mg/l	1

2-ethylhexanoic acid, sodium salt

Endpoint	Test Duration (hr)	Species	Value	Source
EC50	72h	Algae or other aquatic plants	49.3mg/l	2
EC50	48h	Crustacea	85.4mg/l	2
LC50	96h	Fish	>100mg/l	2
NOEC(ECx)	504h	Crustacea	18mg/l	2

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*

Continued...

for ethylene glycol:
log Kow : -1.93- -1.36
Half-life (hr) air : 24
Henry's atm m3 /mol: 6.00E-08
BOD 5 : 0.15-0.81,12%
COD : 1.21-1.29
ThOD : 1.26
BCF : 10-190
In the atmosphere ethylene glycol exists mainly in the vapour phase. It is degraded in the atmosphere by reaction with photochemically produced hydroxy radicals (estimated half-life 24-50 hours).
Ethylene glycol does not concentrate in the food chain.
Environmental fate:
Ethylene glycol has a low vapour pressure (7.9 Pa at 20 C); it is expected to exist almost entirely in the vapour phase if released to the atmosphere. The Henry's law constant for ethylene glycol is 1.41 × 10-3 or 6.08 × 10-3 Pa.m3/mol, depending on method of calculation, indicating a low capacity for volatilisation from water bodies or soil surfaces.
Ethylene glycol adsorbed onto silica gel and irradiated with light (wavelength >290 nm) degraded by 12.1% over 17 h . Photodegradation is not expected, as the molecule should not absorb at these wavelengths; the mechanism of this breakdown is, therefore, unknown. Estimated half-life in the atmosphere for reaction with hydroxyl radicals from various reports is 2.1 days , 8-84 h or 1 day.
Ethylene glycol released to the atmosphere will be degraded by reaction with hydroxyl radicals; the half-life for the compound in this reaction has been estimated at between 0.3 and 3.5 days. No hydrolysis of ethylene glycol is expected in surface waters.
The compound has little or no capacity to bind to particulates and will be mobile in soil. Soil partition coefficients (log Koc) of 0-0.62 were determined. Migration rates in five soil types were measured at between 4 and 27 cm per 12 h
The low octanol/water partition coefficient (log Kow -1.93 to -1.36)and measured bioconcentration factors in a few organisms indicate low capacity for bioaccumulation. Bioconcentration factors of 190 for the green algae (Chlorella fusca) , up to 0.27 in specific tissues of the crayfish (Procambarus sp.) , and 10 for the golden orfe (Leuciscus idus melanotus) confirm low bioaccumulation.
Ethylene glycol is readily biodegradable in standard tests using sewage sludge. Many studies show biodegradation under both aerobic and anaerobic conditions. Some studies suggest a lag phase before degradation, but many do not. Degradation occurs in both adapted and unadapted sludges. Rapid degradation has been reported in surface waters (less in salt water than in fresh water), groundwater, and soil inocula. Several strains of microorganisms capable of utilising ethylene glycol as a carbon source have been identified.
Ethylene glycol has been identified as a metabolite of the growth regulator ethylene in a number of higher plants and as naturally occurring in the edible fungus Tricholoma matsutake
Ecotoxicity:
Fish LC50 (96 h):118-550 mg/L
Ethylene glycol has generally low toxicity to aquatic organisms. Toxic thresholds for microorganisms are above 1000 mg/litre. EC50s for growth in microalgae are 6500 mg/litre or higher. Acute toxicity tests with aquatic invertebrates where a value could be determined show LC50s above 20 000 mg/litre, and those with fish show LC50s above 17 800 mg/litre. An amphibian test showed an LC50 for tadpoles at 17 000 mg/litre. A no-observed-effect concentration (NOEC) for chronic tests on daphnids of 8590 mg/litre (for reproductive end-points) has been reported. A NOEC following short-term exposure of fish has been reported at 15 380 mg/litre for growth. Tests using deicer containing ethylene glycol showed greater toxicity to aquatic organisms than observed with the pure compound, indicating other toxic components of the formulations. Laboratory tests exposing aquatic organisms to stream water receiving runoff from airports have demonstrated toxic effects and death. Field studies in the vicinity of an airport have reported toxic signs consistent with ethylene glycol poisoning, fish kills, and reduced biodiversity. These effects cannot definitively be ascribed to ethylene glycol. Terrestrial organisms are much less likely to be exposed to ethylene glycol and generally show low sensitivity to the compound. Concentrations above 100 000 mg/litre were needed to produce toxic effects on yeasts and fungi from soil. Very high concentrations and soaking of seeds produced inhibition of germination in some experiments; these are not considered of environmental significance. A no-observed-effect level (NOEL) for orally dosed ducks at 1221 mg/kg body weight and reported lethal doses for poultry at around 8000 mg/kg body weight indicate low toxicity to birds.
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethylene glycol	LOW (Half-life = 24 days)	LOW (Half-life = 3.46 days)
diethylene glycol	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
ethylene glycol	LOW (BCF = 200)
diethylene glycol	LOW (BCF = 180)

Mobility in soil

Ingredient	Mobility
ethylene glycol	HIGH (KOC = 1)
diethylene glycol	HIGH (KOC = 1)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. Otherwise: ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product. Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal.

Continued...

	▸ 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
HAZCHEM	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

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
ethylene glycol	Not Available
diethylene glycol	Not Available
2-ethylhexanoic acid, sodium salt	Not Available

Transport in bulk in accordance with the IGC Code

Product name	Ship Type
ethylene glycol	Not Available
diethylene glycol	Not Available
2-ethylhexanoic acid, sodium salt	Not Available

SECTION 15 Regulatory information

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

ethylene glycol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 10 / Appendix C
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List

diethylene glycol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 10 / Appendix C
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australian Inventory of Industrial Chemicals (AIIC)

2-ethylhexanoic acid, sodium salt is found on the following regulatory lists

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (2-ethylhexanoic acid, sodium salt)
Canada - DSL	Yes
Canada - NDSL	No (ethylene glycol; diethylene glycol; 2-ethylhexanoic acid, sodium salt)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes

Continued...

National Inventory	Status
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16 Other information

Revision Date	10/03/2023
Initial Date	30/09/2013

SDS Version Summary

Version	Date of Update	Sections Updated
6.1	23/12/2022	Classification review due to GHS Revision change.
7.1	10/03/2023	Classification change due to full database hazard calculation/update.

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

SAFETY DATA SHEET
DAPHNE HERMETIC OIL FVC68D

Version	Revision Date:	SDS Number:	Date of last issue: 2018/09/19
1.2	2019/10/18	100000003583	Date of first issue: 2016/12/02

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : DAPHNE HERMETIC OIL FVC68D

Product code : 32450842

Manufacturer or supplier's details

Company : Idemitsu Kosan Co., Ltd.

Address : 1-1 3-Chome Marunouchi Chiyoda-ku Tokyo, 100-8321, Japan

Telephone : +81-3-3213-3143

Emergency telephone : +55 11 3197 5891

Telefax : +81-3-3211-5343

Recommended use of the chemical and restrictions on use

Recommended use : Lubricant

Restrictions on use : None known.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Skin sensitization : Category 1

Reproductive toxicity : Category 2

Short-term (acute) aquatic hazard : Category 3

Long-term (chronic) aquatic hazard : Category 3

GHS label elements

Hazard pictograms :

Signal Word : Warning

Hazard Statements : H317 May cause an allergic skin reaction.
H361 Suspected of damaging fertility or the unborn child.
H412 Harmful to aquatic life with long lasting effects.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.

Other hazards which do not result in classification

No information available.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
tris(methylphenyl) phosphate	1330-78-5	>= 1 - < 2,5
2,6-di-tert-butyl-p-cresol	128-37-0	>= 0,25 - < 1
[[(2-ethylhexyl)oxy]methyl]oxirane	2461-15-6	>= 0,1 - < 1

No hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Polyether compound	-	>= 95
Lubricating oil additive	-	< 0,1

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Show this material safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : If on skin, rinse well with water.

In case of eye contact : Flush eyes with water as a precaution.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

If swallowed : Induce vomiting immediately and call a physician.
Keep respiratory tract clear.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.

Most important symptoms and effects, both acute and delayed	:	May cause an allergic skin reaction. Suspected of damaging fertility or the unborn child.

SECTION 5. FIRE-FIGHTING MEASURES

Unsuitable extinguishing media	:	High volume water jet
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	No hazardous combustion products are known
Specific extinguishing methods	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Advice on safe handling	:	Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Hygiene measures	:	When using do not eat or drink.

When using do not smoke.
Wash hands before breaks and at the end of workday.

Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
2,6-di-tert-butyl-p-cresol	128-37-0	TWA (Inhalable fraction and vapor)	2 mg/m3	ACGIH

Personal protective equipment

Respiratory protection : In the case of vapor formation use a respirator with an approved filter.

Hand protection

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Eye wash bottle with pure water
Tightly fitting safety goggles

Skin and body protection : Impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : transparent

Physical state : liquid

Color : colorless

Odor : characteristic

Pour point : -37,5 °C

Initial boiling point and boiling range : No data available

Flash point : 206 °C
Method: Cleveland open cup

Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Relative vapor density	:	No data available
Density	:	0,9369 g/cm3 (15 °C)
Solubility(ies)		
Water solubility	:	insoluble
Viscosity		
Viscosity, kinematic	:	66,57 mm2/s (40 °C)

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No decomposition if stored and applied as directed.
Chemical stability	:	No decomposition if stored and applied as directed.
Possibility of hazardous reactions	:	No decomposition if stored and applied as directed.
Conditions to avoid	:	No data available
Incompatible materials	:	Strong acids and strong bases
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Not classified based on available information.

Skin corrosion/irritation

Not classified based on available information.

Product:

Remarks: May cause skin irritation and/or dermatitis.

Serious eye damage/eye irritation

Not classified based on available information.

Product:

Remarks: Vapors may cause irritation to the eyes, respiratory system and the skin.

Respiratory or skin sensitization

Skin sensitization: May cause an allergic skin reaction.
Respiratory sensitization: Not classified based on available information.

Product:

Remarks: May cause sensitization of susceptible persons by skin contact or by inhalation of aerosol or dust.

Germ cell mutagenicity

Not classified based on available information.

Carcinogenicity

Not classified based on available information.

Reproductive toxicity

Suspected of damaging fertility or the unborn child.

STOT-single exposure

Not classified based on available information.

STOT-repeated exposure

Not classified based on available information.

Aspiration toxicity

Not classified based on available information.

Further information

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

tris(methylphenyl) phosphate:

M-Factor (Acute aquatic toxicity)	:	1

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG
Not regulated as a dangerous good

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation

ANTT
Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

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

Brazil. Ordinance No. 1274 on the control and monitoring of chemicals. : Not applicable

The ingredients of this product are reported in the following inventories:

ENCS	:	Listed
TSCA	:	Listed
EINECS	:	Listed
REACH	:	For further information, please contact
DSL	:	Conditional registration（The annual export quantity is limited）
AICS	:	Listed
KECI	:	Listed
PICCS	:	Not listed
IECSC	:	Listed
TCSI	:	Listed

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for

Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

BR / EN

SAFETY DATA SHEET

DAPHNE HERMETIC OIL FW68DA

Version	Revision Date:	SDS Number:	Date of last issue: -
1.0	18.08.2020	100000003379	Date of first issue: 18.08.2020

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : DAPHNE HERMETIC OIL FW68DA

Product code : 32450753

Manufacturer or supplier's details

Company : Idemitsu Kosan Co., Ltd.

Address : 1-1 3-Chome Marunouchi Chiyoda-ku Tokyo, 100-8321, Japan

Telephone : +81-3-3213-3143

Emergency telephone : +65-3158-1074

Telefax : +81-3-3211-5343

Recommended use of the chemical and restrictions on use

Recommended use : Lubricant

Restrictions on use : None known.

2. HAZARDS IDENTIFICATION

GHS Classification

Skin sensitization : Category 1

GHS label elements

Hazard pictograms :

Signal Word : Warning

Hazard Statements : H317 May cause an allergic skin reaction.

Precautionary Statements :

Prevention:

P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280 Wear protective gloves.

Response:

P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.

P362 + P364 Take off contaminated clothing and wash it before reuse.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards which do not result in classification

No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
tris(methylphenyl) phosphate	1330-78-5	>= 1 - < 2.5
[[(2-ethylhexyl)oxy]methyl]oxirane	2461-15-6	>= 1 - < 10
2,6-di-tert-butyl-p-cresol	128-37-0	>= 0.25 - < 1

No hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Polyether compound	-	>= 95
Lubricating oil additive	-	< 0.1

4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Show this material safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : If skin irritation persists, call a physician.
If on skin, rinse well with water.
If on clothes, remove clothes.

In case of eye contact : Flush eyes with water as a precaution.
Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

If swallowed : Induce vomiting immediately and call a physician.
Keep respiratory tract clear.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.

Most important symptoms and effects, both acute and delayed : May cause an allergic skin reaction.

5. FIRE-FIGHTING MEASURES

Unsuitable extinguishing media	:	High volume water jet
Specific hazards during fire fighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	No hazardous combustion products are known
Specific extinguishing methods	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for fire-fighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Advice on safe handling	:	Do not breathe vapors/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitization problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Conditions for safe storage	:	Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with

the technological safety standards.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
2,6-di-tert-butyl-p-cresol	128-37-0	PEL (long term)	10 mg/m3	SG OEL
		TWA (Inhalable fraction and vapor)	2 mg/m3	ACGIH

Personal protective equipment

Respiratory protection : In the case of vapor formation use a respirator with an approved filter.

Hand protection

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Eye wash bottle with pure water
Tightly fitting safety goggles

Skin and body protection : Impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures : When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : transparent

Physical state : liquid

Color : colorless

Odor : slight

Pour point : -42.5 °C

Initial boiling point and boiling range : No data available

Flash point : 208 °C
Method: Cleveland open cup

Relative vapor density : No data available

Density : 0.9440 g/cm3 (15 °C)

Solubility(ies)
Water solubility : insoluble

Viscosity
Viscosity, kinematic : 66.55 mm2/s (40 °C)

10. STABILITY AND REACTIVITY

Reactivity	:	No decomposition if stored and applied as directed.
Chemical stability	:	No decomposition if stored and applied as directed.
Possibility of hazardous reactions	:	No decomposition if stored and applied as directed.
Conditions to avoid	:	No data available
Incompatible materials	:	Strong acids and strong bases
Hazardous decomposition products	:	No hazardous decomposition products are known.

11. TOXICOLOGICAL INFORMATION

Acute toxicity
Not classified based on available information.

Skin corrosion/irritation
Not classified based on available information.

Product:
Remarks: May cause skin irritation and/or dermatitis.

Serious eye damage/eye irritation
Not classified based on available information.

Product:
Remarks: Vapors may cause irritation to the eyes, respiratory system and the skin.

Respiratory or skin sensitization
Skin sensitization: May cause an allergic skin reaction.
Respiratory sensitization: Not classified based on available information.

Product:
Remarks: May cause sensitization of susceptible persons by skin contact or by inhalation of aerosol or dust.

Germ cell mutagenicity
Not classified based on available information.

Carcinogenicity
Not classified based on available information.

Reproductive toxicity
Not classified based on available information.

STOT-single exposure

Not classified based on available information.

STOT-repeated exposure

Not classified based on available information.

Aspiration toxicity

Not classified based on available information.

Further information

Product:

Remarks: No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

tris(methylphenyl) phosphate:

M-Factor (Acute aquatic toxicity)	:	1

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Additional ecological information	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

14. TRANSPORT INFORMATION

International Regulations

UNRTDG
Not regulated as a dangerous good

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

15. REGULATORY INFORMATION

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

Workplace Safety and Health Act and Workplace Safety and Health (General Provisions) Regulations: This product is subjected to the SDS, labelling, PEL and other requirements in the Act/Regulations.

Environmental Protection and Management Act and Environmental Protection and Management (Hazardous Substances) Regulations	:	Not applicable
Fire Safety (Petroleum and Flammable Materials) Regulations	:	Not applicable

The ingredients of this product are reported in the following inventories:

ENCS	:	Listed
TSCA	:	Listed
EINECS	:	Listed
REACH	:	For further information, please contact
DSL	:	Listed
AICS	:	Listed
KECI	:	Listed
PICCS	:	Listed
IECSC	:	Listed
TCSI	:	Listed
NZIoC	:	Listed

16. OTHER INFORMATION

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with

x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Date format : dd.mm.yyyy

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SG / EN

Date of issue: 14 July 2025
SDS Version No: 3

Safety Data Sheet
Diesel

Classified as: Hazardous according to the EPA Hazardous Substances (Hazard Classifications) Notice 2020.

Section 1: SUBSTANCE AND SUPPLIER DETAILS

Product Name: Diesel

Other Names: Z Diesel, Automotive Gas Oil, Marine Gas Oil, Wintermix, Diesel Z, Z Bio D B5, B5 biodiesel.

Supplier: Z Energy Limited
3 Queens Wharf
Wellington
New Zealand

Phone: +64 4 472 0080

Local Contact: Phone – 0800 474 355
Email – general@z.co.nz

Recommended Use: Fuel for diesel engines.

In Case of Emergency Contact:

CHEMCALL: 0800 CHEMCALL (243 622) 24 hours
International - +64 4 917 9888

Section 2: HAZARDS IDENTIFICATION

This product is classified as a Dangerous Good for Transport.

This product is classified as hazardous according to criteria in the EPA Hazardous Substances (Hazard Classifications) Notice 2020.

HSNO APPROVAL NUMBER: **HSR001441**

HSNO CLASSIFICATIONS: 3.1D – Combustible liquid
6.1E – Aspiration hazard
6.7B – Suspected carcinogen
9.1B – Ecotoxic in the aquatic environment, chronic

GHS Classification: Flammable liquid – Category 4
Carcinogenicity – Category 2
Aspiration hazard – Category 1
Hazardous to the aquatic environment, chronic – Category 2

Labelling Elements:

Hazard Statements:

H227 Combustible liquid.
H304 May be fatal if swallowed and enters airways.
H351 Suspected of causing cancer.
H411 Toxic to aquatic life with long lasting effects.

GHS Pictograms:

Signal Word: **DANGER**

PREVENTION STATEMENTS:
P102 – Keep out of reach of children.
P103 – Read carefully and follow all instructions.
P202 – Do not handle until all safety precautions have been read and understood.
P210 – Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.
P273 – Avoid release to the environment.
P280 – Wear protective gloves, protective clothing, eye protection, face protection.

RESPONSE STATEMENTS:
P101 - If medical advice is needed, have product container or label at hand.
P301 + P331 – IF SWALLOWED: Do NOT induce vomiting.
P308 + P310 – If exposed or concerned: Immediately call a POISON CENTRE or doctor.
P370 + P378 - In case of fire: Use water spray, dry powder, foam, or carbon dioxide to extinguish.
P391 – Collect spillage.

STORAGE:
P403 – Store in a well-ventilated place.
P405 – Store locked up.

DISPOSAL:
P501 - In accordance with the EPA Hazardous Substances (Disposal) Notice 2017. Dispose of via an approved waste disposal contractor. Refer to Section 13 of the SDS.

Other information: This product is intended for use as a fuel in a closed system. If used for any other purpose, in open systems or as a spray, ignition and exposure risks will increase and a careful risk assessment should be carried out.

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

Mixture: A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range C9 through C20, with an average of C15, and boiling in the range of 160°C to 400°C, with a flashpoint above 60°C. Very small amounts of performance enhancing additives may be included.
May include up to 5% biodiesel (CAS, 67784-80-9).

Main Component	CAS Number	Concentration (%wt)
Diesel Fuel	68334-30-5	95 - 100%

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Section 4: FIRST AID MEASURES

Workplace Facilities Required: Eye wash and safety shower facilities should be provided in workplaces where there is a risk of significant exposure.

If Inhaled: Remove to fresh air and keep at rest. Seek medical attention if symptoms persist.

In Contact with Eye: Hold eyes open, flush continuously with water for at least 15 minutes. Seek medical attention if irritation develops and persists.

In Contact with Skin: Wash skin with soap and plenty of water, while removing contaminated clothing and shoes. Wash contaminated clothing before re-use. Seek medical attention if skin irritation develops and persists.

If Swallowed: DO NOT INDUCE VOMITING. Rinse mouth. Never give anything by mouth to an unconscious person. If unconscious, seek immediate medical attention. If vomiting occurs, keep head below hips to prevent aspiration to lungs.

Advice to Doctor: Treat symptomatically. Aspiration of product into lungs following vomiting may cause fatal pulmonary oedema.

Section 5: FIRE FIGHTING MEASURES

Fire/Explosion Hazard: Combustible liquid. Liquid can ignite leading to a flash fire, or an explosion in a confined space. May ignite on surfaces at temperatures above auto-ignition temperature. Vapour in the headspace of tanks and containers may ignite and explode at temperatures exceeding auto-ignition temperature, where vapour concentrations are within the flammability range. Keep away from hot surfaces, heat, sparks, and ignition sources.

Hazchem Code: 3Z.

Suitable Extinguishing Media: Use water spray or fog, carbon dioxide, dry powder, or foam. Sand or earth may be used on small fires. Do not use water jet.

Precautions in Connection with Fire: The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and may be reignited on surface water. Flammable vapours may be present even at temperatures below the flash point. Combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates and gases, including carbon monoxide and unidentified organic and inorganic compounds.

Advice for firefighters: Fire fighters should wear Self-Contained Breathing Apparatus (SCBA) operated in positive pressure mode and full protective clothing to prevent exposure to vapours or fumes. Water spray may be used to cool down heat-exposed containers. Fight fire from safe location. This product should be prevented from entering drains and watercourses.

Keep adjacent drums and tanks cool by spraying with water from a safe location. If possible, remove them from the danger zone. If adequate cooling cannot be achieved, the area needs to be evacuated, and further firefighting and cooling attempts should be carried out from a safe location.

Section 6: ACCIDENTAL RELEASE MEASURES

An emergency response plan meeting the requirements of Part 5 of the Health and Safety at Work (Hazardous Substances) Regulations 2017 is required when held in quantities greater than 1,000L.

Precautions:

Vapour can travel for considerable distances both above and below the ground surface. Underground services (drains, pipelines, cable ducts) can provide preferential flow paths.

Clear area of all unprotected personnel. Keep unnecessary and unprotected personnel from entering area. Do not breathe fumes/vapour. Avoid contact with skin and eyes. Remove any readily combustible materials and all sources of ignition. Ventilate area. Do not release to the environment. If spill enters waterways, contact local council pollution hotline.

Suitable Protective Equipment:

Emergency responders must use personal protective equipment, including gloves, PVC jacket and trousers, knee length, chemical resistant safety boots, and safety glasses with side shields or safety goggles. Respiratory protection may be required if large amounts of vapour/fumes is present. Contaminated clothing may be a fire hazard and therefore should be soaked with water before being removed.

Spill or Leak Procedures.

Stop leak if safe to do so. Contain and absorb spill using inert, non-combustible, absorbent material such as sand, earth. Collect using clean, non-sparking tools and place in a waste container for disposal. Ensure waste container is properly labelled. Do not dispose into an interceptor.

Maritime Spillages:
Maritime spillages should be dealt with using a Shipboard Oil Pollution Emergency Plan (SOPEP), as required by MARPOL Annex 1 Regulation 26.

Waste Disposal Methods:

Dispose of as per Section 13.

Emergency preparation:

Ensure there is appropriate and adequate personal protective equipment, trained personnel and clean up materials for management of accidental release.

Section 7: HANDLING AND STORAGE

Precautions for Safe Handling:

Avoid naked flames, hot surfaces, heat, and ignition sources. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Avoid contact with skin and eyes. Do not breathe vapour/fumes. Use local exhaust ventilation if there is risk of inhalation of vapours, mists, or aerosols. Do not eat, drink, or smoke when using this product. When handling product in drums, safety footwear should be worn, and proper handling equipment should be used. If using pressurised equipment, take extra care to avoid injection under the skin. Only use in well-ventilated areas. Take precautionary measures against static discharges. Ensure all equipment is properly bonded. Cloth, paper, and other materials that are used to absorb spills present a fire hazard. Avoid their accumulation by disposing of them safely and immediately. Remove contaminated clothing and wash hands and face before entering eating areas.

Product Transfer:

Electrostatic charges may be generated during pumping. Ensure electrical continuity by bonding all equipment. Avoid splash filling. Wait 2 minutes after tank filling (for tanks such as those on road tanker vehicles) before opening hatches or manholes. Wait 30 minutes after tank filling (for large storage tanks) before opening hatches or manholes. When filling tanks there is always a danger of static discharge leading to explosion. This is particularly hazardous when switch

loading tanks.

Product transfer may give rise to light hydrocarbon vapour in the headspace of tanks. This vapour may explode if there is a source of ignition such as static discharge.

Partly filled containers present a greater hazard than those that are full, therefore handling, transfer and sampling activities need special care. Conditions, such as filling empty Filter Water Separator vessels, that lead to the formation of hydrocarbon mists are also particularly hazardous.

Storage: Keep out of reach of children. Store locked up. This product must never be stored in buildings occupied by people. Drums and small containers should be stored in well-ventilated areas, flameproof cabinets, or stores. Keep container tightly closed in a dry, well-ventilated place away from direct sunlight and other sources of heat or ignition.

Keep in a bunded area with a sealed (low permeability) floor, to provide containment against spillage. Stack drums to a height not exceeding 3 metres without the use of racking. Locate tanks away from heat and other sources of ignition. Seek specialist advice for the design, construction, and operation of bulk storage facilities.

Site Storage Requirements: Site Signage will be required when quantities exceed 1,000L. For incompatibilities refer to Section 10.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Workplace Exposure Standards NZ: Workplace Exposure Standards have been established for this product.

Diesel Fuel: TWA 100 mg/m^3 (skin)

Diesel Particulate Matter (DPM) as elemental carbon: TWA 0.1 mg/m^3

Diesel engine exhaust is a confirmed carcinogen.

Engineering Controls: Eyewash facilities and safety showers should be provided in the work area where there is a risk of exposure to eyes and skin. If use generates large quantities of vapour/fumes, use engineering controls such as local exhaust ventilation to ensure workers are not exposed to levels exceeding the exposure standards.

Personal Protective Equipment: Avoid contact with skin and eyes. Avoid breathing vapour/fumes.

Hand protection: Wear protective gloves that are resistant to the product, e.g., neoprene rubber, nitrile. Refer to Australian and New Zealand Standard AS/NZS 2161 for protective gloves.

Skin and body protection: Wear protective clothing such as cotton overalls buttoned and neck and wrist. When handling large quantities, a chemical resistant apron is recommended. Refer to Australian and New Zealand Standard AS/NZS 4501 for occupational protective clothing.

Eye protection: Use safety glasses with side shields or safety goggles to protect eyes. A face shield may also be used with safety glasses to prevent splashes to face. Refer to AS/NZS 1336 and 1337 for suitable eye and face protection.

Respiratory protection: Where there is inadequate ventilation and use results in exposure to vapour/fumes, use a respirator with a replaceable organic vapour filter. Refer to AS/NZS 1715 and AS/NZS 1716 for suitable respiratory protection.

Other information: PPE selected must be impervious to the substance. Do not eat, smoke, or drink where material is handled, processed, or stored. Wash hands carefully before eating, drinking, or smoking. Handle in accordance with safe industrial hygiene practices.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Description:	Liquid	**Colour:**	Pale yellow, clear, bright
Odour:	Characteristic oil odour	**Odour Threshold:**	Not available
pH (20°C):	Not applicable	**Solubility (water, 20°C):**	Negligible
Freezing/Melting point:	Not available	**Boiling Point & Range:**	180°C – 360°C
Flammability:	Combustible liquid	**Flash Point:**	>61°C
LEL/UEL:	1 – 6% v/v	**Vapour Pressure (25°C):**	< 0.54 mm Hg
Decomposition Temp:	Not available	**Autoignition Temp:**	230°C
Density (15°C):	820-850 kg/m^3	**Vapour Density (20°C):**	>1 (air = 1)
Partition Coefficient: n-octanol/water	Not available	**Viscosity (at 40°C):**	2.0 – 4.5 cSt
Particle Characteristics:	Not applicable		

Section 10: STABILITY AND REACTIVITY

Stability: Stable under normal cool, dry storage conditions.

Reactivity: Not reactive under normal conditions of storage and use.

Conditions to Avoid: Heat, hot surfaces, ignition sources, sparks, flames.

Incompatibility: Keep away from oxidising agents and combustible materials such as paper, cardboard, wood.

Hazardous Decomposition: Thermal decomposition may release toxic fumes containing oxides of carbon.

Section 11: TOXICOLOGICAL INFORMATION

Acute Exposure

Acute Toxicity: Not classified as acutely toxic.
LD_{50} oral > 2,000 mg/kg.
LD_{50} dermal > 2,000 mg/kg
LC_{50} inhalation > 20 mg/L (vapour)

Inhalation: Large quantities of vapour will displace oxygen and may cause drowsiness, dizziness.

Ingestion: Ingestion of large quantities may cause nausea, vomiting, stomach pain, drowsiness, and dizziness. If vomiting occurs and is aspirated into lungs this may be fatal.

Skin Corrosion/Irritation: Product is not classified as a skin irritant or corrosive. Prolonged or repeated skin contact may cause defatting of the skin and dermatitis. High pressure injection into the skin may cause local necrosis if the product is not surgically removed.

Serious Eye Damage/Eye Irritation: Product is not classified as an eye irritant or corrosive. Contact with eyes may cause redness, stinging, weeping.

Respiratory or Skin Sensitisation: Product is not expected to be a contact or respiratory sensitiser.

Chronic Exposure:

Mutagen/Carcinogen/Reproductive Toxicant Product is classified as a suspected carcinogen and diesel engine exhaust is a confirmed carcinogen. Dermal application to mice resulted in skin tumours. Product is not expected to be mutagenic, or a reproductive or developmental toxicant.

Specific Target Organ Toxicity Single Exposure: No information available. Not expected to be a specific target organ toxicant by single exposure.

Specific Target Organ Toxicity Repeated Exposure: No information available. Not expected to be a specific target organ toxicant by repeated exposure.

Aspiration Hazard: Product is classified as an aspiration hazard and may cause fatal pulmonary oedema if aspirated into lungs.

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: LC_{50} >1 - ≤ 10 mg/L in the aquatic environment.

Product is ecotoxic in the aquatic environment with long-lasting effects. Avoid losses to the environment.

Persistence/degradability: Major components are biodegradable. Volatile components oxidise rapidly in air by photochemical reaction. Product may persist in anaerobic conditions.

Bioaccumulation: Contains components with the potential to bioaccumulate.

Mobility in soil: Product floats on water. Evaporates within a day from water or soil surfaces. Large volumes could penetrate soil and contaminate groundwater.

Other adverse effects: Films formed on water may affect oxygen transfer and damage organisms.

Ingredients with Ecotoxic classifications: Diesel is made from blending several refinery streams. Ecotoxic effects have been carried out on a variety of hydrocarbon blends and streams but not those containing additives. Diesel has been classified as toxic to the aquatic environment with long lasting, chronic, effects based on knowledge of the components in the diesel and the ecotoxicity of similar products.

Section 13: DISPOSAL CONSIDERATIONS

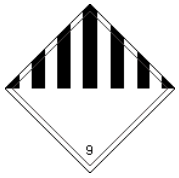
Disposal: Recycle and reuse wherever possible. Do not dispose into the environment, in drains or in water courses. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. Dispose of waste product via an approved waste disposal contractor.

Disposal of Packaging: Labels should not be removed from containers until they have been cleaned. Do not

cut, puncture, or weld on or near containers. Empty containers may contain hazardous combustible residues. Contaminated containers must not be treated as household waste. Containers should be cleaned by appropriate methods and then re-used or disposed of by landfill or incineration as appropriate. Do not incinerate closed containers. Advise flammable nature. Dispose of packaging via an approved waste disposal contractor.

Section 14: TRANSPORT INFORMATION

This product is classified as a Dangerous Good for transport in accordance with NZS5433:2020, IMDG or IATA.



NZS5433:2020
UN No: 3082
Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s. (Fuels, diesel)
Class: 9
Packing Group: III
Environmentally hazardous: Yes
Hazchem Code: 3Z

IMDG:
UN No: 3082
Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s. (Fuels, diesel)
Class: 9
Packing Group: III
Marine Pollutant: Yes
EmS: F-A, S-F

IATA:
UN No: 3082
Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s. (Fuels, diesel)
Class: 9
Packing Group: III
Environmentally hazardous: Yes

Ensure transportation methods prevent leakage from packages and collapsing loads.

Section 15: REGULATORY INFORMATION

HSNO Approval Code:	HSR001441
NZ Inventory of Chemicals:	All ingredients are listed in the NZ Inventory of Chemicals (NZIoC).
Australian Inventory of Chemical Substances:	All ingredients are listed on the Australian Inventory of Chemical Substances (AICS).

This substance triggers:

Compliance Certificate	N/A
Certified Handler	N/A
Emergency Response Plan	1,000L
Secondary Containment	1,000L
Signage	1,000L

This product will require 2 fire extinguishers to be available where quantities of 500L or more are stored at a location, with the exception of an unattended dispensing station for self-service refueling.

This substance is not required to be Tracked. All workplace personnel handling this substance are required to be trained on the safe handling and PPE requirements for the hazards associated with this substance.

Section 16: OTHER INFORMATION

The information provided in this Safety Data Sheet relates only to the specific material designated herein. This Safety Data Sheet summarises our best knowledge of the health and safety hazard information of the product and how to safely handle the product in the workplace. Each user should read this SDS and consider the information in the context of how the product will be handled and used in the workplace including its use in conjunction with other products.

This substance is approved under HSNO for use as a fuel. All reasonable care has been taken to ensure that the information and advice contained herein are from sources believed to be reliable and to represent the most up-to-date knowledge available at the date given in Section 16. No liability is assumed for any damages related to the use or misuse of this substance.

All chemical materials may present unknown hazards as people have varying degrees of sensitivity to chemicals. Therefore, this product should be used with caution. The information herein is given in good faith, but no warranty, express or implied is made.

SDS Issued: 14 July 2025

Supersedes: 1 September 2020

Reason for Revision: Update to GHS classifications.
Revised by: Simonne Moses - HSNO Consultant

References:

EPA NZ Approved Hazardous Substances with Controls Database.
Original SDS: Z Energy Limited, Diesel SDS, September 2020.

Summary of Abbreviations: EPA – Environmental Protection Authority
GHS – Global Harmonisation System
CAS – Chemical Abstracts Service
TWA – Time Weighted Average

END OF SAFETY DATA SHEET

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: **EMKARATE™ RL 46HB**

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

Identified uses: Refrigeration Lubricants.
Uses advised against: None identified.

1.3 Details of the supplier of the safety data sheet

Supplier

Company Name:	LUBRIZOL LIMITED
Address:	THE KNOWLE, NETHER LANE HAZELWOOD, DERBYSHIRE, DE56 4AN GB
Telephone:	(44) 01332-842211
E-mail contact:	EUSDS@lubrizol.com {Lubrizol Safety Data Sheets can be obtained at www.mylubrizol.com}

1.4 Emergency telephone number:

FOR TRANSPORT EMERGENCY CALL CHEMTREC (+1) 703 527 3887 OR WITHIN FRANCE 09.75.18.14.07

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The product has been classified according to the legislation in force.

Classification according to Regulation (EC) No 1272/2008 as amended.

Chronic hazards to the aquatic environment	Category 3	H412: Harmful to aquatic life with long lasting effects.

The full text for all H-phrases is displayed in section 16.

2.2 Label elements according to Regulation (EC) No 1272/2008 as amended

Signal Words: not applicable

Hazard Statement(s): H412: Harmful to aquatic life with long lasting effects.

Precautionary Statement

Disposal: P501: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Supplemental label information

not applicable

2.3 Other hazards: None identified.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Regulation No. 1272/2008.

Chemical name	Concentration	EC No.	REACH Registration No.	M-Factor:	Notes
Tricresylphosphate	1 - 2.5%	215-548-8			

600, 700 and 900 ECHA List Numbers do not have any legal significance; rather they are purely technical identifiers and are displayed for informational purposes only.

Classification Regulation No. 1272/2008.

Chemical name	Classification	Notes
Tricresylphosphate	Repr. 2; H361 Aquatic Chronic 1; H410 Aquatic Acute 1; H400	

The full text for all H-phrases is displayed in section 16.

See Section 15 for Regulation (EC) No. 1907/2006 REACH Article 59(1). Candidate List (Substances of Very High Concern (SVHC))

SECTION 4: First aid measures

General: IF exposed or concerned: Get medical advice/attention.

4.1 Description of first aid measures

Inhalation: Remove exposed person to fresh air if adverse effects are observed.

Eye contact: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses.

Skin Contact: Wash with soap and water. If skin irritation occurs, get medical attention.

Ingestion: Treat symptomatically. Get medical attention.

4.2 Most important symptoms and effects, both acute and delayed: See section 11.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: No data available.

Treatment: Treat symptomatically.

SECTION 5: Firefighting measures

General Fire Hazards: No unusual fire or explosion hazards noted.

5.1 Extinguishing media

Suitable extinguishing media: CO2, dry chemical, foam, water spray, water fog.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

5.2 Special hazards arising from the substance or mixture:	A solid stream of water will spread the burning material. Material creates a special hazard because it floats on water. See section 10 for additional information.

5.3 Advice for firefighters

Special fire fighting procedures:	No data available.
Special protective equipment for fire-fighters:	Recommend wearing self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:	No data available.
6.2 Environmental Precautions:	Avoid release to the environment. Prevent further leakage or spillage if safe to do so.
6.3 Methods and material for containment and cleaning up:	Dike far ahead of larger spill for later recovery and disposal. Pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.
6.4 Reference to other sections:	See sections 8 and 13 for additional information.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling:	Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Observe good industrial hygiene practices. Provide adequate ventilation. Use personal protective equipment as required. Launder contaminated clothing before reuse. Avoid environmental contamination.
Maximum Handling Temperature:	Not determined.
7.2 Conditions for safe storage, including any incompatibilities:	Store away from incompatible materials. See section 10 for incompatible materials.
Maximum Storage Temperature:	Not determined.
7.3 Specific end use(s):	End uses are listed in an attached exposure scenario when one is required.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

8.2 Exposure controls

Appropriate engineering controls: No special requirements under ordinary conditions of use and with adequate ventilation.

Individual protection measures, such as personal protective equipment

General information: Please follow the recommended personal protective equipment (PPE) guidelines below and refer to the appropriate EN standard where applicable. Use personal protective equipment as required.

Eye/face protection: If contact is likely, safety glasses with side shields are recommended. Eye protection should meet the standards set out in EN 166.

Skin protection

Hand Protection: Suitable gloves can be recommended by the glove supplier.

General: Because specific work environments and material handling practices vary, safety procedures should be specific for each intended application. The correct choice of protective gloves depends upon the chemicals being handled, and the conditions of work and use. Most gloves provide protection for only a limited time before they must be discarded and replaced (even the best chemically resistant gloves will break down after repeated chemical exposures). Gloves should be chosen in consultation with the supplier / manufacturer and taking account of a full assessment of the working conditions. For typical use and handling of chemical substances, gloves should meet the standards set out in EN 374. For applications involving mechanical risks with potential for abrasion or puncture, the standards set out in EN 388 should be considered. For tasks involving thermal hazards, the standards set out in EN 407 should be considered.

Break-through time: Breakthrough time data are generated by glove manufacturers under laboratory test conditions and represent how long a glove can be expected to provide effective permeation resistance. It is important when following breakthrough time recommendations that actual workplace conditions are taken into account. Always consult with your glove supplier for up-to-date technical information on breakthrough times for the recommended glove type.
For continuous contact, we suggest gloves with a minimum breakthrough time of 240 minutes, or > 480 minutes if suitable gloves can be obtained. If suitable gloves are not available to offer that level of protection, gloves with shorter breakthrough times may be acceptable as long as appropriate glove maintenance and replacement regimes are determined and adhered to.
For short-term, transient exposures and splash protection, gloves with shorter breakthrough times may commonly be used. Therefore, appropriate maintenance and replacement regimes must be determined and rigorously followed.

Glove thickness:	For general applications, we recommend gloves with a thickness typically greater than 0.35 mm. It is important to note that glove thickness is not the only predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, before being disposed of. Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential.
Other:	Gloves, coveralls, apron, boots as necessary to minimize contact.
Respiratory Protection:	Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respiratory protection program compliant with all applicable regulations must be followed whenever workplace conditions require the use of a respirator. Respiratory Protective Equipment (RPE) is not normally required where there is adequate natural or local exhaust ventilation to control exposure. In case of insufficient ventilation, wear suitable respiratory equipment. The correct choice of respiratory protection depends upon the chemicals being handled, the conditions of work and use, and the condition of the respiratory equipment. Safety procedures should be developed for each intended application. Respiratory protection equipment should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions. Please refer to the relevant EN standards for the RPE selected.
Hygiene measures:	Do not handle until all safety precautions have been read and understood. Obtain special instructions before use.
Environmental Controls:	No data available. See section 6 for details.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	
Physical state:	liquid
Form:	liquid
Color:	Colorless to yellow
Odor:	Mild
Odor Threshold:	No data available.

pH:	No data available.
Freezing point:	No data available.
Boiling Point:	No data available.
Flash Point:	260 °C (Cleveland Open Cup)
Evaporation Rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability Limit - Upper (%):	No data available.
Flammability Limit - Lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density (air=1):	No data available.
Relative density:	0.98 (20 °C)
Solubility(ies)	
Solubility in Water:	Insoluble in water
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Autoignition Temperature:	No data available.
Decomposition Temperature:	No data available.
Viscosity:	46 mm2/s (40 °C); 7.1 mm2/s (100 °C)
Explosive properties:	No data available.
Oxidizing properties:	No data available.
VOC Content:	No data available.

Other information

Bulk density:	8.22 lb/gal

SECTION 10: Stability and reactivity

10.1 Reactivity:	No data available.
10.2 Chemical Stability:	Material is stable under normal conditions.
10.3 Possibility of hazardous reactions:	Will not occur.
10.4 Conditions to avoid:	None known.
10.5 Incompatible Materials:	Strong acids. Oxidizing agents. Strong bases.
10.6 Hazardous Decomposition Products:	Thermal decomposition or combustion may generate smoke, carbon monoxide, carbon dioxide, and other products of incomplete combustion.

SECTION 11: Toxicological information

Information on likely routes of exposure

Inhalation:	No data available.
Ingestion:	No data available.

Skin Contact: No data available.

Eye contact: No data available.

11.1 Information on toxicological effects

Acute toxicity

Oral

Product**:** Ingestion of this material may cause gastric disturbances.
Not classified for acute toxicity based on available data.

Dermal

Product**:** Skin absorption of components of this material will cause systemic effects; note toxicity in other sections.
Not classified for acute toxicity based on available data.

Inhalation

Product**:** Not classified for acute toxicity based on available data.

Skin Corrosion/Irritation:

Product**:** Prolonged or repeated skin contact as from clothing wet with material may cause dermatitis. Symptoms may include redness, edema, drying, and cracking of the skin.
Remarks: Not classified as a primary skin irritant.

Serious Eye Damage/Eye Irritation:

Product**:** Remarks: Not classified as a primary eye irritant.

Respiratory sensitization:

No data available

Skin sensitization:

No data available

Specific Target Organ Toxicity - Single Exposure:

Tricresylphosphate If material is misted or if vapors are generated from heating, exposure may cause irritation of mucous membranes and the upper respiratory tract.

Aspiration Hazard:

No data available

Chronic Effects

Carcinogenicity:

No data available

Germ Cell Mutagenicity:

No data available

Reproductive toxicity:

Tricresylphosphate Suspected of damaging fertility.
This material has been shown to impair fertility and cause adverse reproductive effects in rats and mice.

Tricresylphosphate	Suspected of damaging fertility. This material has been shown to impair fertility and cause adverse reproductive effects in rats and mice.

Specific Target Organ Toxicity - Repeated Exposure:

Tricresylphosphate	Repeated occupational exposure to tricresyl phosphate over a prolonged period of time may cause delayed neurotoxicity characterized by ataxia and tremors.

SECTION 12: Ecological information

12.1 Ecotoxicity

Fish

Tricresylphosphate	LC 50 (Rainbow Trout, 4 Days): 0.6 mg/l NOEC (Rainbow Trout, 4 Days): 0.56 mg/l

Aquatic Invertebrates

Tricresylphosphate	EC 50 (Water flea (Daphnia magna), 2 d): 0.146 mg/l

Toxicity to Aquatic Plants

Tricresylphosphate	EC 50 (Alga, 3 Days): 0.4042 mg/l

Toxicity to soil dwelling organisms

No data available

Sediment Toxicity

No data available

Toxicity to Terrestrial Plants

No data available

Toxicity to Above-Ground Organisms

No data available

Toxicity to microorganisms

Tricresylphosphate	LC 50 (Sludge, 0.1 Days): > 1,000 mg/l

12.2 Persistence and Degradability

Biodegradation

Tricresylphosphate	Oxygen depletion 24.2 % (28 d, OECD TG 301 D)

BOD/COD Ratio

No data available

12.3 Bioaccumulative Potential

Bioconcentration Factor (BCF)

No data available

Partition Coefficient n-octanol / water (log Kow)

Tricresylphosphate	Log Kow: 5.93 (Measured)

12.4 Mobility:

No data available

12.5 Results of PBT and vPvB assessment

No data available

12.6 Other Adverse Effects: No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Disposal methods: Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Dispose of packaging or containers in accordance with local, regional, national and international regulations. Empty container contains product residue which may exhibit hazards of product.

Contaminated Packaging: Container packaging may exhibit hazards.

SECTION 14: Transport information

ADR
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

None known.

Shipping descriptions may vary based on mode of transport, quantities, temperature of the material, package size, and/or origin and destination. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material. For transportation, steps must be taken to prevent load shifting or materials falling, and all relating legal statutes should be obeyed. Review classification requirements before shipping materials at elevated temperatures.

SECTION 15: Regulatory information

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

EU Regulations

Regulation (EC) No. 2037/2000 Substances that deplete the ozone layer:
None present or none present in regulated quantities.

Regulation (EC) No. 850/2004 on persistent organic pollutants:
None present or none present in regulated quantities.

Regulation (EC) No. 689/2008 Import and export of dangerous chemicals:
None present or none present in regulated quantities.

Regulation (EC) No. 1907/2006, REACH Article 59(1). Candidate List:
None present or none present in regulated quantities.

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorisation, as amended:
None present or none present in regulated quantities.

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:
None present or none present in regulated quantities.

Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work.:
None present or none present in regulated quantities.

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breast feeding.:
None present or none present in regulated quantities.

Directive 96/82/EC (Seveso III): on the control of major accident hazards involving dangerous substances:

Chemical name	EC No.	Concentration
Tricresylphosphate	215-548-8	1.0 - 10%

EU. Regulation No. 166/2006 PRTR (Pollutant Release and Transfer Registry), Annex II: Pollutants:
None present or none present in regulated quantities.

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:

Chemical name	EC No.	Concentration
Tricresylphosphate	215-548-8	1.0 - 10%

Inventory Status

Australia (AICS)
All components are in compliance with chemical notification requirements in Australia.

Canada (DSL/NDSL)
All substances contained in this product are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List (DSL) or are exempt.

China (IECSC)
All components of this product are listed on the Inventory of Existing Chemical Substances in China.

European Union (REACh)
To obtain information on the REACH compliance status of this product, please e-mail REACH@SDSInquiries.com.

Japan (ENCS)
All components are in compliance with the Chemical Substances Control Law of Japan.

Korea (ECL)
All components are in compliance in Korea.

New Zealand (NZIoC)
All components are in compliance with chemical notification requirements in New Zealand.

Philippines (PICCS)
All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).

Switzerland (SWISS)
All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.

Taiwan (TCSCA)
All components of this product are listed on the Taiwan inventory.

United States (TSCA)
All substances contained in this product are listed on the TSCA inventory or are exempt.

The information that was used to confirm the compliance status of this product may deviate from the chemical information shown in Section 3.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Key literature references and sources for data: Internal company data and other publically available resources.

Wording of the H-statements in section 2 and 3:

H361	Suspected of damaging fertility or the unborn child.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

Abbreviations and acronyms:

ACGIH – American Conference of Governmental Industrial Hygienist
ADR - International Carriage of Dangerous Goods by Road
AICS - Australian Inventory of Chemical Substances
ATEmix - Acute Toxicity Estimate for the mixture
BCF - Bio concentration factor
DMSO - Dimethyl sulfoxide
DSL - Domestic Substance List
EC50 - Effective concentration that gives a response in 50% of the population
ECHA - European Chemical Agency
ECL - Existing Chemical List
ENCS - Existing and New Chemical Substances
EPA – Environmental Protection Agency
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
IECSC - Inventory of Existing Chemical Substances
IMDG - International Maritime Dangerous Goods
IP 346 – A gravimetric assay used to determine the percentage weight of polycyclic aromatics in oil, via a DMSO extraction technique
LC50 - Lethal concentration required to kill 50% of the population
MARPOL - International Conventions for the Prevention of Pollution from Ships
NDSL - Non Domestic Substance List
NOAEC - No observed adverse effect concentration
NOAEL - No observed adverse effect level
NOEC - No observed effective concentration
NTP - National Toxicology Program
NZloc - New Zealand Inventory of chemicals
OECD TG - Organization for Economic Cooperation and Development Test Guidelines
OSHA – Occupational, Safety, and Health Administration
PBT – Persistent bioaccumulative toxic chemical

PEL – Permissible Exposure Level
PICCS - Philippine Inventory of Chemicals and Chemical Substances
PPE - Personal Protective Equipment
PRTR - Pollutant Release and Transfer Register
REACH - Registration, Evaluation, Authorization & restriction of Chemicals
SVHC - Substance of Very High Concern
SWISS - Switzerland chemical ordinance
TCSCA - Toxic Chemical Substance Control Act
TLV – Threshold Limit Value
TSCA - Toxic Substances Control Act
TWA – Time Weighted Average
vPvB – very Persistent very Bioaccumulative

Issue Date: 09.11.2016

Disclaimer: As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local regulations remains the responsibility of the user.

CLEANER HAND SANITISER GELLER SOFTSHIELD ALCOHOL PUMP 500ML

Officemax

Chemwatch: **5484-62**
Version No: **7.1**
Safety Data Sheet according to the Health and Safety at Work (Hazardous Substances) Regulations 2017

Issue Date: **10/03/2023**
Print Date: **19/06/2023**
S.GHS.NZL.EN.E

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	CLEANER HAND SANITISER GELLER SOFTSHIELD ALCOHOL PUMP 500ML
Synonyms	Product code: 2568764, 2568772, 2570319, 2571374, 3812642; CLEANER HAND SANITISER SOFTEX GELLER ALCOHOL FLIP CAP 1L; CLEANER HAND SANITISER SOFTEX GELLER ALCOHOL PUMP 1L; CLEANER HAND SANITISER GELLER SOFTSHIELD ALCOHOL REFILL 5L
Proper shipping name	ETHANOL (ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)
Chemical formula	Not Applicable
Other means of identification	Not Available

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

Relevant identified uses	Instant Hand Sanitiser. Use according to manufacturer's directions. SDS are intended for use in the workplace ONLY. For domestic-use products, refer to consumer labels.

Details of the manufacturer or supplier of the safety data sheet

Registered company name	**Officemax**
Address	30 Sir Woolf Fisher Drive East Tamaki Manukau New Zealand
Telephone	0800 426 473
Fax	0800 226 473
Website	www.officemax.co.nz
Email	enquiries@officemax.co.nz

Emergency telephone number

Association / Organisation	**CHEMWATCH EMERGENCY RESPONSE (24/7)**
Emergency telephone numbers	+64 800 700 112
Other emergency telephone numbers	+61 3 9573 3188

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

SECTION 2 Hazards identification

Classification of the substance or mixture

Considered a Hazardous Substance according to the criteria of the New Zealand Hazardous Substances New Organisms legislation.
Classified as Dangerous Goods for transport purposes.

Chemwatch Hazard Ratings

	Min	Max
Flammability	3	
Toxicity	1	
Body Contact	2	
Reactivity	1	
Chronic	0	

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

Classification [1]	Flammable Liquids Category 2, Serious Eye Damage/Eye Irritation Category 2
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from CCID EPA NZ; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

Determined by Chemwatch using GHS/HSNO criteria	3.1B, 6.4A

Label elements

Hazard pictogram(s)	
Signal word	**Danger**

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.

Precautionary statement(s) Prevention

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/intrinsically safe equipment.

Precautionary statement(s) Response

P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.

Precautionary statement(s) Disposal

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

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
64-17-5	70	ethanol

Legend:	*1. Classified by Chemwatch; 2. Classification drawn from CCID EPA NZ; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available*

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	Wipe off excess with absorbent tissue or towel. Seek medical attention if swelling/redness/blistering or irritation occurs.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.

	‣ Transport to hospital, or doctor.
Ingestion	‣ Immediately give a glass of water. ‣ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Indication of any immediate medical attention and special treatment needed

For acute or short term repeated exposures to ethanol:

- Acute ingestion in non-tolerant patients usually responds to supportive care with special attention to prevention of aspiration, replacement of fluid and correction of nutritional deficiencies (magnesium, thiamine pyridoxine, Vitamins C and K).
- Give 50% dextrose (50-100 ml) IV to obtunded patients following blood draw for glucose determination.
- Comatose patients should be treated with initial attention to airway, breathing, circulation and drugs of immediate importance (glucose, thiamine).
- Decontamination is probably unnecessary more than 1 hour after a single observed ingestion. Cathartics and charcoal may be given but are probably not effective in single ingestions.
- Fructose administration is contra-indicated due to side effects.

SECTION 5 Firefighting measures

Extinguishing media

- Alcohol stable foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

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

Advice for firefighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ May be violently or explosively reactive. ‣ Wear breathing apparatus plus protective gloves in the event of a fire. ‣ Prevent, by any means available, spillage from entering drains or water course.
Fire/Explosion Hazard	‣ Liquid and vapour are highly flammable. ‣ Severe fire hazard when exposed to heat, flame and/or oxidisers. ‣ Vapour may travel a considerable distance to source of ignition. ‣ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material.

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	‣ Remove all ignition sources. ‣ Clean up all spills immediately. ‣ Avoid breathing vapours and contact with skin and eyes. ‣ Control personal contact with the substance, by using protective equipment.
Major Spills	‣ Clear area of personnel and move upwind. ‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ May be violently or explosively reactive. ‣ Wear breathing apparatus plus protective gloves.

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	None under normal operating conditions. ‣ Avoid all personal contact, including inhalation. ‣ Wear protective clothing when risk of overexposure occurs. ‣ Use in a well-ventilated area.

	‣ Prevent concentration in hollows and sumps.
Other information	‣ Store in original containers in approved flammable liquid storage area. ‣ Store away from incompatible materials in a cool, dry, well-ventilated area. ‣ **DO NOT** store in pits, depressions, basements or areas where vapours may be trapped. ‣ No smoking, naked lights, heat or ignition sources.

Conditions for safe storage, including any incompatibilities

Suitable container	‣ Packing as supplied by manufacturer. ‣ Plastic containers may only be used if approved for flammable liquid. ‣ Check that containers are clearly labelled and free from leaks.
Storage incompatibility	‣ Avoid oxidising agents, acids, acid chlorides, acid anhydrides, chloroformates. ‣ Avoid strong bases.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
New Zealand Workplace Exposure Standards (WES)	ethanol	Ethanol (Ethyl alcohol)	1000 ppm / 1880 mg/m3	Not Available	Not Available	oto - Ototoxin

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
ethanol	Not Available	Not Available	15000* ppm

Ingredient	Original IDLH	Revised IDLH
ethanol	3,300 ppm	Not Available

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.
Individual protection measures, such as personal protective equipment	
Eye and face protection	No special equipment for minor exposure i.e. when handling small quantities. OTHERWISE: ‣ Safety glasses with side shields. ‣ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	‣ Bare skin is cleaned with this material. ‣ Application of hand cream / barrier cream after use is recommended.
Body protection	See Other protection below
Other protection	No special equipment needed when handling small quantities. **OTHERWISE:** ‣ Overalls. ‣ Barrier cream. ‣ Eyewash 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:
CLEANER HAND SANITISER GELLER SOFTSHIELD ALCOHOL PUMP 500ML

Respiratory protection

Type A 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.

Material	CPI
BUTYL	A
NEOPRENE	A
NITRILE	A
NITRILE+PVC	A
PE/EVAL/PE	A
PVC	B
NATURAL RUBBER	C
NATURAL+NEOPRENE	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.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 5 x ES	Air-line*	A-2	A-PAPR-2 ^
up to 10 x ES	-	A-3	-
10+ x ES	-	Air-line**	-

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

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

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Clear highly flammable liquid with slight ether like odour ; mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	0.853
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)	78	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	13	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	HIGHLY FLAMMABLE.	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	19	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	3.3	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	- Unstable in the presence of incompatible materials. - Product is considered stable. - Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7

Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	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. Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.
Ingestion	The material has **NOT** 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.
Skin Contact	Not considered an irritant through normal use. Discontinue use if irritation occurs
Eye	There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain.
Chronic	No adverse effects anticipated from normal use. Principal hazards are accidental eye contact and cleaner overuse. Overuse or obsessive cleaner use may lead to defatting of the skin and may cause irritation, drying, cracking, leading to dermatitis.

CLEANER HAND SANITISER GELLER SOFTSHIELD ALCOHOL PUMP 500ML	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
ethanol	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: 17100 mg/kg[1]	Eye (rabbit): 500 mg SEVERE
	Inhalation(Rat) LC50: 64000 ppm4h[2]	Eye (rabbit):100mg/24hr-moderate
	Oral (Rat) LD50: 7060 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
		Skin (rabbit):20 mg/24hr-moderate
		Skin (rabbit):400 mg (open)-mild
		Skin: no adverse effect observed (not irritating)[1]
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*	

ETHANOL	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.

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

CLEANER HAND SANITISER GELLER SOFTSHIELD ALCOHOL PUMP 500ML	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
ethanol	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	EC50(ECx)	96h	Algae or other aquatic plants	<0.001mg/L	4
	EC50	72h	Algae or other aquatic plants	275mg/l	2
	LC50	96h	Fish	42mg/l	4
	EC50	96h	Algae or other aquatic plants	<0.001mg/L	4
	EC50	48h	Crustacea	2mg/l	4

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*

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ethanol	LOW (Half-life = 2.17 days)	LOW (Half-life = 5.08 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
ethanol	LOW (LogKOW = -0.31)

Mobility in soil

Ingredient	Mobility
ethanol	HIGH (KOC = 1)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority. ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▸ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material). ▸ Decontaminate empty containers.

Ensure that the hazardous substance is disposed in accordance with the Hazardous Substances (Disposal) Notice 2017

Disposal Requirements

Packages that have been in direct contact with the hazardous substance must be only disposed if the hazardous substance was appropriately removed and cleaned out from the package. The package must be disposed according to the manufacturer's directions taking into account the material it is made of. Packages which hazardous content have been appropriately treated and removed may be recycled.
The hazardous substance must only be disposed if it has been treated by a method that changed the characteristics or composition of the substance and it is no longer hazardous.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO
HAZCHEM	•2YE

Land transport (UN)

UN number or ID number	1170
UN proper shipping name	ETHANOL (ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)
Transport hazard class(es)	Class: 3 Subsidiary risk: Not Applicable

Packing group	II
Environmental hazard	Not Applicable
Special precautions for user	Special provisions: 144 Limited quantity: 1 L

Air transport (ICAO-IATA / DGR)

UN number	1170
UN proper shipping name	Ethanol or Ethanol. solution
Transport hazard class(es)	ICAO/IATA Class: 3 ICAO / IATA Subrisk: Not Applicable ERG Code: 3L
Packing group	II
Environmental hazard	Not Applicable
Special precautions for user	Special provisions: A3 A58 A180 Cargo Only Packing Instructions: 364 Cargo Only Maximum Qty / Pack: 60 L Passenger and Cargo Packing Instructions: 353 Passenger and Cargo Maximum Qty / Pack: 5 L Passenger and Cargo Limited Quantity Packing Instructions: Y341 Passenger and Cargo Limited Maximum Qty / Pack: 1 L

Sea transport (IMDG-Code / GGVSee)

UN number	1170
UN proper shipping name	ETHANOL (ETHYL ALCOHOL) or ETHANOL SOLUTION (ETHYL ALCOHOL SOLUTION)
Transport hazard class(es)	IMDG Class: 3 IMDG Subrisk: Not Applicable
Packing group	II
Environmental hazard	Not Applicable
Special precautions for user	EMS Number: F-E, S-D Special provisions: 144 Limited Quantities: 1 L

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
ethanol	Not Available

Transport in bulk in accordance with the IGC Code

Product name	Ship Type
ethanol	Not Available

SECTION 15 Regulatory information

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

This substance is to be managed using the conditions specified in an applicable Group Standard

HSR Number	Group Standard
HSR002552	Cosmetic Products Group Standard 2020

Please refer to Section 8 of the SDS for any applicable tolerable exposure limit or Section 12 for environmental exposure limit.

ethanol is found on the following regulatory lists

New Zealand Approved Hazardous Substances with controls	New Zealand Inventory of Chemicals (NZIoC)
New Zealand Hazardous Substances and New Organisms (HSNO) Act - Classification of Chemicals	New Zealand Workplace Exposure Standards (WES)
New Zealand Hazardous Substances and New Organisms (HSNO) Act - Classification of Chemicals - Classification Data	

Hazardous Substance Location

Subject to the Health and Safety at Work (Hazardous Substances) Regulations 2017.

Hazard Class	Quantity (Closed Containers)	Quantity (Open Containers)
3.1B	100 L in containers more than 5 L	50 L
3.1B	250 L in containers up to and including 5 L	50 L

Certified Handler

Subject to Part 4 of the Health and Safety at Work (Hazardous Substances) Regulations 2017.

Class of substance	Quantities
Not Applicable	Not Applicable

Refer Group Standards for further information

Maximum quantities of certain hazardous substances permitted on passenger service vehicles

Subject to Regulation 13.14 of the Health and Safety at Work (Hazardous Substances) Regulations 2017.

Hazard Class	Gas (aggregate water capacity in mL)	Liquid (L)	Solid (kg)	Maximum quantity per package for each classification
3.1B				1 L

Tracking Requirements

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (ethanol)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16 Other information

Revision Date	10/03/2023
Initial Date	08/09/2021

SDS Version Summary

Version	Date of Update	Sections Updated
6.1	21/04/2022	Name
7.1	10/03/2023	Classification change due to full database hazard calculation/update.

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

Safety data sheet

Printing date 23.03.2023 *Version number 1* *Revision: 23.03.2023*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name: HFC-32
Article number: HFC32
EC number:
200-839-4
1.2 Relevant identified uses of the substance or mixture and uses advised against:
No further relevant information available.

1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier:
DAIKIN INDUSTRIES, LTD. CHEMICALS DIVISION:
OSAKA UMEDA TWIN TOWERS SOUTH, 1-13-1 Umeda, Kita-ku, Osaka-shi, Osaka, 530-0001, Japan
Phone:+81-6-6147-9702 Fax:+81-6-6147-9807

Further information obtainable from: http://www.daikin.com/
1.4 Emergency telephone number:
Japan: +81-6-6349-7521
China: +86-532-8388-9090, +86-21-34151689
South Korea: +82-2-568-1722
Americas: CHEMTREC +1-800-424-9300 (Outside US/Canada: +1-703-527-3887)
Europe: +49-211-179 225-0

*
SECTION 2: Hazard identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008

Flam. Gas 1B H221 Flammable gas.

Press. Gas (Liq.) H280 Contains gas under pressure; may explode if heated.

2.2 Label elements
Labelling according to Regulation (EC) No 1272/2008:
The substance is classified and labelled according to the CLP regulation.
Signal word: Danger
Precautionary statements:
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage, eliminate all ignition sources.
P410+P403 Protect from sunlight. Store in a well-ventilated place.

SECTION 3: Composition/information on ingredients

Information on ingredients:

CAS: 75-10-5 Difluoromethane 100%
Flam. Gas 1B, H221
Press. Gas (Liq.), H280
Identification number(s)
EC number: 200-839-4

SECTION 4: First aid measures

4.1 Description of first aid measures
General information: Seek immediate medical advice.
After inhalation:
Take affected persons into fresh air. Keep at rest.
At high levels, cardiac arrhythmia may occur.

Safety data sheet

After skin contact:
Immediately wash with water and soap and rinse thoroughly.
In cases of frost bites, rinse with plenty of water. Do not remove clothing.
After eye contact: *Rinse opened eye for several minutes under running water.*
Information for doctor:
Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.
4.2 Most important symptoms and effects, both acute and chronic:
Frost bites
High concentrations cause asphyxiation. May cause an abnormal heart rhythm and prove suddenly fatal.
4.3 Indication of any immediate medical attention and special treatment needed:
No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing agents:
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
For safety reasons unsuitable extinguishing agents: *Water with full jet*
5.2 Special hazards arising from the substance or mixture:
Formation of toxic gases is possible during heating or in case of fire.
Hydrogen fluoride (HF)
5.3 Advice for firefighters:
Protective equipment: *Wear fully protective suit.*

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:
Stay on the windward side.
Wear protective equipment. Keep unprotected persons away.
6.2 Environmental precautions: *Do not allow to enter sewers/surface or ground water.*
6.3 Methods and material for containment and cleaning up: *Ensure adequate ventilation.*
6.4 Reference to other sections: *See Section 8 for information on personal protection equipment.*

SECTION 7: Handling and storage

7.1 Precautions for safe handling:
Waste air is to be released into the atmosphere only via suitable separators.
Open and handle receptacle with care.
Information about fire - and explosion protection:
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
7.2 Conditions for safe storage, including any incompatibilities:
Storage
Requirements to be met by storerooms and receptacles:
Store only in unopened original receptacles.
Store in a cool and dry location.
Information about storage in one common storage facility: *Not required.*
Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed receptacle.
Protect from heat and direct sunlight.
Maximum storage temperature: *40 ℃*
7.3 Specific end use(s): *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

8.1 Control parameters *No further information available.*

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Ingredients with limit values that require monitoring at the workplace:

CAS: 75-10-5 Difluoromethane
WEEL (USA) 1000 ppm
DNELs:
Inhalative
DNEL - general population 750 mg/m³ (long-term exposure) (systemic effects)
DNEL - worker 7035 mg/m³ (long-term exposure) (systemic effects)
PNECs:
PNEC
0.142 mg/l (freshwater) (aqua)
0.534 mg/kg dw (freshwater) (sediment)
1.42 mg/l (intermittent release) (aqua)
Additional information: *The lists valid during the making were used as basis.*

8.2 Exposure controls
Appropriate engineering controls *No further data; see item 7.*
Individual protection measures, such as personal protective equipment
General protective and hygienic measures:
Wash hands before breaks and at the end of work.
Do not eat or drink while working.
Keep away from tobacco products.
Respiratory protection:
Wear respirator for organic gases, where leakage may occur.
Use suitable respiratory protective device in case of insufficient ventilation.
Use respiratory protective device with organic gas cartridge.
Hand protection
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.


Protective gloves

To avoid skin problems reduce the wearing of gloves to the required minimum.
Material of gloves:
Strong material gloves
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product 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.
Leather
Penetration time of glove material
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
Eye/face protection


Safety glasses

Body protection: *Protective work clothing*

*
SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties
General Information

Physical state	*Liquefied gas*
Colour:	*Colourless*
Odour:	*Odourless*
Odour threshold:	*Not determined.*
Melting point/freezing point:	*-136 °C*
Boiling point or initial boiling point and boiling range	*-51.7 °C*

DAIKIN

Safety data sheet

Flammability	Flammable
Lower and upper explosion limit	
Lower explosive limit:	No further information available. 13.8 Vol% (High Pressure Gas Safety Act: Japan)
Upper explosive limit:	Not determined. 29.9 Vol% (High Pressure Gas Safety Act: Japan)
Flash point:	Not applicable.
Ignition temperature:	530 °C (1018hPa)
Decomposition temperature:	No further information available.
pH	Not determined.
Viscosity:	
Kinematic viscosity	Not determined.
Dynamic:	Not determined.
Solubility	
water:	No further information available. 1680 mg / l (25 ℃ atmospheric pressure)
Partition coefficient n-octanol/water (log value)	0.21 log POW
Vapour pressure at 25 °C:	1.69 MPa
Density and/or relative density	
Density at 25 °C:	0.961 g/cm³ (Saturated liquid)
Relative density	Not determined.
Vapour density	Not determined.
Particle characteristics	No further information available.

9.2 Other information:

Form:	Liquefied gas
Auto-ignition temperature:	Not determined.
Explosive properties:	Not determined.
Evaporation rate	Not applicable.

Information with regard to physical hazard classes

Explosives	Not applicable
Flammable gases	
Flammable gas.	
Aerosols	Not applicable
Oxidising gases	Not applicable
Gases under pressure	
Contains gas under pressure; may explode if heated.	
Flammable liquids	Not applicable
Flammable solids	Not applicable
Self-reactive substances and mixtures	Not applicable
Pyrophoric liquids	Not applicable
Pyrophoric solids	Not applicable
Self-heating substances and mixtures	Not applicable
Substances and mixtures, which emit flammable gases in contact with water	Not applicable
Oxidising liquids	Not applicable
Oxidising solids	Not applicable
Organic peroxides	Not applicable
Corrosive to metals	Not applicable
Desensitised explosives	Not applicable

SECTION 10: Stability and reactivity

10.1 Reactivity No further relevant information available.
10.2 Chemical stability
Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
10.3 Possibility of hazardous reactions: Reacts with alkali and metals.
10.4 Conditions to avoid: No further relevant information available.
10.5 Incompatible materials: Alkali or alkaline earth metals - powdered Al, Zn, Mg, etc.

10.6 Hazardous decomposition products: Poisonous gases/vapours

*
SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008
Acute toxicity Based on available data, the classification criteria are not met.
LD/LC50 values relevant for classification:

CAS: 75-10-5 Difluoromethane
Inhalative LC0/4h > 520000 ppm (Rat)
Skin corrosion/irritation:

CAS: 75-10-5 Difluoromethane
Inhalative Cardiac sensitive 350000 ppm (Dog)
Development 50000 ppm (Rat and rabbit)
Serious eye damage/irritation: Based on available data, the classification criteria are not met.
after inhalation: No further information available.
Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.
Germ cell mutagenicity: Based on available data, the classification criteria are not met.
Carcinogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity: Based on available data, the classification criteria are not met.
STOT-single exposure: Based on available data, the classification criteria are not met.
STOT-repeated exposure: Based on available data, the classification criteria are not met.
Aspiration hazard: Based on available data, the classification criteria are not met.
Other information (about experimental toxicology):
Chromosomal Aberration Study in vitro- Negative
Mouse Micronucleus Assay in Vivo - Negative
Additional toxicological information:
Repeated dose toxicity NOAEC (inhalation): 105000 mg/m³ (rat) (OECD 413)
CMR effects
Mutagenicity:
Ames test: negative (OECD 471)
In vitro mammalian chromosome aberration test: negative (OECD 473)
Mammalian erythrocyte micronucleus test: negative (OECD 474)
Toxicity for reproduction:
NOAEC (inhalation): 208000 mg/m³ (mouse) (OECD 478; read across)
Developmental toxicity:
NOAEC (inhalation): 105000 mg/m³ (rat)
11.2 Information on other hazards:
Endocrine disrupting properties:

Substance is not listed.

*
SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity:
EC50/96 h 142 mg/l (algae) (QSAR)
LC50/48 h 652 mg/l (daphnia) (QSAR)
LC50/96 h 1507 mg/l (fish) (QSAR)
12.2 Persistence and degradability:
Not easily biodegradable
5% after 28 days (OECD 301 D)
Behaviour in environmental systems
Components: Half-life in air: 1237 days
12.3 Bioaccumulative potential:
Due to the distribution coefficient n-octanol/water an accumulation in organisms is not expected.

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Other information
Koc = 1.49 - 21-73 (QSAR)
log Koc = 0.17 - 1.34 (QSAR)
12.4 Mobility in soil: *No further relevant information available.*
12.5 Results of PBT and vPvB assessment
PBT: *Not applicable.*
vPvB: *Not applicable.*
12.6 Endocrine disrupting properties *The product does not contain substances with endocrine disrupting properties.*
12.7 Other adverse effects:
Additional ecological information:
General notes:
Ozone depletion potential(ODP) : 0
Global warming potential(GWP) : 675 / IPCC Fourth Assessment Report (AR4)

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Recommendation:
Must be specially treated adhering to official regulations.
Incineration in an adequate incinerator is recommended.

Uncleaned packaging
Recommendation: *Disposal must be made according to official regulations.*

SECTION 14: Transport information

14.1 UN number or ID number
ADR, IMDG, IATA *3252*
14.2 UN proper shipping name:
ADR: *3252 DIFLUOROMETHANE (REFRIGERANT GAS R 32)*
IMDG, IATA *DIFLUOROMETHANE (REFRIGERANT GAS R 32)*
14.3 Transport hazard class(es):

ADR

Class: *2 Gases.*
Label: *2.1*
IMDG, IATA

Class: *2.1 Gases.*
Label: *2.1*
14.4 Packing group:
IMDG, IATA *Not applicable*
14.5 Environmental hazards:
Marine pollutant: *No*
14.6 Special precautions for user: *Warning: Gases.*
Hazard identification number (Kemler code): *23*
14.7 Maritime transport in bulk according to IMO instruments *Not applicable.*
Transport/Additional information: *Avoid direct sunlight. Make sure of no damage, corrosion, leaks on the receptacles.*
Take necessary measures for preventing cargo shift.

Safety data sheet

Printing date 23.03.2023 *Version number 1* *Revision: 23.03.2023*

Trade name: HFC-32

UN "Model Regulation": *UN3252, DIFLUOROMETHANE (REFRIGERANT GAS R 32), 2.1*

* SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Labelling according to Regulation (EC) No 1272/2008
The substance is classified and labelled according to the CLP regulation.
Hazard pictograms

GHS02

Signal word *Danger*
Hazard statements
H221 Flammable gas.
H280 Contains gas under pressure; may explode if heated.
Precautionary statements
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage, eliminate all ignition sources.
P410+P403 Protect from sunlight. Store in a well-ventilated place.
DIRECTIVE 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment – Annex II

Other regulations, limitations and prohibitive regulations:
High Pressure Gas Safety Act (Japan) : non-flammable gas
ISO817 : Classification A2L (lower flammability)
15.2 Chemical safety assessment: *A Chemical Safety Assessment has not been carried out.*

SECTION 16: Other information

The product is for the industrial use only. We do not guarantee the safety in case the product is used for the other purposes. When using the product for health-care application or food/feed application, consult us in advance.
This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Department issuing SDS: *EHS Department*
Contact: *http://www.daikin.com/*
Abbreviations and acronyms:
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Flam. Gas 1B: Flammable gases – Category 1B
Press. Gas (Liq.): Gases under pressure – Liquefied gas
**** Data compared to the previous version altered.***

Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40

Not Available

Chemwatch Hazard Alert Code: **1**

Chemwatch: **7082-55**
Version No: **5.1.1.1**
Safety Data Sheet according to HSNO Regulations

Issue Date: **01/11/2019**
Print Date: **19/06/2020**
S.GHS.NZL.EN

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

Product Identifier

Product name	Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40
Synonyms	engine oil
Other means of identification	Not Available

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

Relevant identified uses	Engine oil.

Details of the supplier of the safety data sheet

Registered company name	**Not Available**
Address	Not Available
Telephone	Not Available
Fax	Not Available
Website	Not Available
Email	Not Available

Emergency telephone number

Association / Organisation	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	+64 800 700 112
Other emergency telephone numbers	+61 2 9186 1132

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

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Classification [1]	Not Applicable
Determined by Chemwatch using GHS/HSNO criteria	Not Available

Label elements

Hazard pictogram(s)	Not Applicable
SIGNAL WORD	**NOT APPLICABLE**

Hazard statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

Page 1 continued...

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available		base oil, as
Not Available	>60	mineral oil
Not Available	1-5	zinc alkyl dithiophosphate
Not Available	NotSpec	additives, proprietary

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with eyes: ▸ Wash out immediately with water. ▸ If irritation continues, seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▸ Other measures are usually unnecessary.
Ingestion	▸ Immediately give a glass of water. ▸ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

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

- 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

Advice for firefighters

Fire Fighting	▸ 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.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). ▸ May emit acrid smoke. ▸ Mists containing combustible materials may be explosive. Combustion products include: carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. May emit poisonous fumes.

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	Slippery when spilt.

Continued...

	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite. ▸ Wipe up. ▸ Place in a suitable, labelled container for waste disposal.
Major Spills	Slippery when spilt. Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ No smoking, naked lights or ignition sources. ▸ Increase ventilation. ▸ Stop leak if safe to do so. ▸ Contain spill with sand, earth or vermiculite. ▸ Collect recoverable product into labelled containers for recycling. ▸ Absorb remaining product with sand, earth or vermiculite. ▸ Collect solid residues and seal in labelled drums for disposal. ▸ Wash area and prevent runoff into drains. ▸ If contamination of drains or waterways occurs, advise emergency services.

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

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ 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	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area. ▸ Store away from incompatible materials and foodstuff containers. ▸ Protect containers against physical damage and check regularly for leaks. ▸ Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	**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. ▸ 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
New Zealand Workplace Exposure Standards (WES)	mineral oil	Oil mist, mineral	5 mg/m3	10 mg/m3	Not Available	om-Sampled by a method that does not collect vapour.

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
mineral oil	Mineral oil, heavy or light; (paraffin oil; Deobase, deodorized; heavy paraffinic; heavy naphthenic); distillates; includes 64741-53-3, 64741-88-4, 8042-47-5, 8012-95-1; 64742-54-7	140 mg/m3	1,500 mg/m3	8,900 mg/m3

Ingredient	Original IDLH	Revised IDLH
mineral oil	2,500 mg/m3	Not Available

Exposure controls

Continued...

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure. General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed 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.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air)	0.25-0.5 m/s (50-100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (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 (500-2000 f/min.)

Within each range the appropriate value depends on:

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.

Personal protection	
Eye and face protection	▸ Safety glasses with side shields ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. 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]
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. ▸ Skin cleansing cream. ▸ Eye wash unit.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Amber liquid with a mild odour; does not mix with water.

Physical state	Liquid	**Relative density (Water = 1)**	0.878
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

Continued...

Initial boiling point and boiling range (°C)	316	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	224	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	7.0Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	0.9	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	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	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	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. Not normally a hazard due to non-volatile nature of product
Ingestion	The material has **NOT** 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.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. 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.
Eye	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).
Chronic	Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. 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.

Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
mineral oil	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
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*	

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.

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

Continued...

Toxicity

Mobil Cat Diesel Engine Oil (DEO) CH-4 SAE 15W40	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
mineral oil	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*				

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
	No Data available for all ingredients	No Data available for all ingredients

Bioaccumulative potential

Ingredient	Bioaccumulation
	No Data available for all ingredients

Mobility in soil

Ingredient	Mobility
	No Data available for all ingredients

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. Otherwise: ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product.

Ensure that the hazardous substance is disposed in accordance with the Hazardous Substances (Disposal) Notice 2017

Disposal Requirements

Not applicable as substance/ material is non hazardous.

SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

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

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

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

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

Not Applicable

SECTION 15 REGULATORY INFORMATION

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

This substance is to be managed using the conditions specified in an applicable Group Standard

HSR Number	Group Standard
Not Applicable	Not Applicable

MINERAL OIL IS FOUND ON THE FOLLOWING REGULATORY LISTS

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

New Zealand Approved Hazardous Substances with controls

New Zealand Workplace Exposure Standards (WES)

Continued...

Hazardous Substance Location

Subject to the Health and Safety at Work (Hazardous Substances) Regulations 2017.

Hazard Class	Quantity beyond which controls apply for closed containers	Quantity beyond which controls apply when use occurring in open containers
Not Applicable	Not Applicable	Not Applicable

Certified Handler

Subject to Part 4 of the Health and Safety at Work (Hazardous Substances) Regulations 2017.

Class of substance	Quantities
Not Applicable	Not Applicable

Refer Group Standards for further information

Tracking Requirements

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AICS	Yes
Canada - DSL	Yes
Canada - NDSL	Yes
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Revision Date	01/11/2019
Initial Date	14/07/2005

SDS Version Summary

Version	Issue Date	Sections Updated
5.1.1.1	01/11/2019	One-off system update. NOTE: This may or may not change the GHS classification

Other information

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

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

Definitions and abbreviations

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

Continued...

end of SDS

Safety data sheet

Printing date 23.03.2023 Version number 2 Revision: 23.03.2023

* SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name: R-410A
Article number: R410A STD
1.2 Relevant identified uses of the substance or mixture and uses advised against: Refrigerant

1.3 Details of the supplier of the safety data sheet
Manufacturer/Supplier:
DAIKIN INDUSTRIES, LTD. CHEMICALS DIVISION:
OSAKA UMEDA TWIN TOWERS SOUTH, 1-13-1 Umeda, Kita-ku, Osaka-shi, Osaka, 530-0001, Japan
Phone:+81-6-6147-9702 Fax:+81-6-6147-9807

Further information obtainable from: http://www.daikin.com/
1.4 Emergency telephone number:
Japan: +81-6-6349-7521
China: +86-532-8388-9090, +86-21-34151689
South Korea: +82-2-568-1722
Americas: CHEMTREC +1-800-424-9300 (Outside US/Canada: +1-703-527-3887)
Europe: +49-211-179 225-0

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008

Press. Gas (Liq.) H280 Contains gas under pressure; may explode if heated.

2.2 Label elements
Labelling according to Regulation (EC) No 1272/2008:
The product is classified and labelled according to the CLP regulation.
Signal word: Warning
Precautionary statements:
P410+P403 Protect from sunlight. Store in a well-ventilated place.

SECTION 3: Composition/information on ingredients

Information on ingredients:

CAS: 354-33-6 Pentafluoroethane 49.5-51.5%
Press. Gas (Liq.), H280

CAS: 75-10-5 Difluoromethane 48.5-50.5%
Flam. Gas 1B, H221
Press. Gas (Liq.), H280

Additional information: For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures
General information: Seek immediate medical advice.
After inhalation:
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult a doctor if symptoms persist.
In case of unconsciousness place patient stably in side position for transportation.
In case of emergency to rescue the victims; be sure to wear supplied-air respirator (SAR) or self-contained breathing apapratus (SCBA).
If the patient does not breathe or hardly breathes, unbutton clothes, secure the airway for breathing and perform artificial respiration.
At high levels, cardiac arrhythmia may occur.
After skin contact:
Rinse with warm water.

In cases of frost bites, rinse with plenty of water. Do not remove clothing.
Immediately rinse with warm water and soap.
Consult a doctor in case of complaints.
After eye contact:
Rinse opened eye for several minutes under running water.
Consult an ophthalmologist in case of complaints.
After swallowing: *Not applicable.*
Information for doctor:
Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.
The examining physician should advise workers taking medications containing catecholamines that they may be at increased risk and should avoid excessive exposure.
4.2 Most important symptoms and effects, both acute and chronic:
Frost bites
High concentrations cause asphyxiation. May cause an abnormal heart rhythm and prove suddenly fatal.
4.3 Indication of any immediate medical attention and special treatment needed:
No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing agents:
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
Use fire extinguishing methods suitable for surrounding conditions.
5.2 Special hazards arising from the substance or mixture:
Hydrogen fluoride (HF)
Formation of toxic gases is possible during heating or in case of fire.
Receptacle may explode when heated.
5.3 Advice for firefighters:
Move receptacle to a safe place immediately if possible. If not, spray water on the receptacles and surrounding equipment to cool.
If receptacle catches fire: cool them with plenty of water.
If possible, close valves of receptacles to shut off the gas supply.
Protective equipment:
Wear self-contained breathing apparatus and protective suit.
Do not inhale explosion gases or combustion gases.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:
Remove persons from danger area.
Wear appropriate protective devices (See Section 8 Exposure Controls/Personal Protection).
Avoid contact with eyes and skin.
Do not inhale the product.
Ensure adequate ventilation before entering the area.
Stay on the windward side.
Keep out unauthorized persons.
6.2 Environmental precautions:
Suppress gases/fumes/haze with water spray.
Do not allow to enter sewers/surface or ground water.
Must not be emitted into the environment.
6.3 Methods and material for containment and cleaning up: *Ensure adequate ventilation.*
6.4 Reference to other sections:
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

*
SECTION 7: Handling and storage

7.1 Precautions for safe handling:
Waste air is to be released into the atmosphere only via suitable separators.

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Ensure good ventilation/exhaustion at the workplace.
Handle with care. Avoid jolting, friction and impact.
For heating receptacle, use hot compresses or lukewarm water below 40 °C.
Do not use heaters.
Stay on the windward side when working outdoors.
Be careful of leakage when attaching/detaching receptacles.
Inhaling large quantities may cause cardiac arrhythmia or asphyxiation or both.
Keep away from naked flame or metal heated over 300 - 400 °C to prevent thermal decomposition that may form toxic gases.
Do not handle until all safety precautions have been read and understood.
Information about fire - and explosion protection:
The product is not flammable.
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.
7.2 Conditions for safe storage, including any incompatibilities:
Storage
Requirements to be met by storerooms and receptacles:
Store only in unopened original receptacles.
Store in a cool and dry location.
Keep containers tightly sealed.
Information about storage in one common storage facility:
See section 10 for information on incompatible materials.
Further information about storage conditions:
Protect from heat and direct sunlight.
Store containers in a well ventilated area.
Store locked up.
7.3 Specific end use(s): *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

8.1 Control parameters *No further information available.*
Ingredients with limit values that require monitoring at the workplace:
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

8.2 Exposure controls
Appropriate engineering controls *No further data; see item 7.*
Individual protection measures, such as personal protective equipment
General protective and hygienic measures:
Do not smoke.
Wash hands before breaks and at the end of work.
Do not eat or drink while working.
Keep away from tobacco products.
Respiratory protection: *Use respiratory protective device with organic gas cartridge.*
Hand protection

Protective gloves

To avoid skin problems reduce the wearing of gloves to the required minimum.
Material of gloves:
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product 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.
Leather

Eye/face protection

Safety glasses

Body protection: Protective work clothing

*
SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information	
Physical state	Liquefied gas
Colour:	Colourless
Odour:	Ether-like
Odour threshold:	Not determined.
Melting point/freezing point:	Undetermined.
Boiling point or initial boiling point and boiling range	-52.7 °C
Flammability	No data.
Lower and upper explosion limit	
Lower explosive limit:	No further information available.
Upper explosive limit:	Not determined.
Flash point:	Not applicable.
Decomposition temperature:	No further information available.
pH	Not applicable.
Viscosity:	
Kinematic viscosity	Not determined.
Dynamic:	Not determined.
Solubility	
water:	No further information available.
Partition coefficient n-octanol/water (log value)	No further information available.
Vapour pressure at 25 °C:	1.65 MPa (16,84 kgf/cm2 abs)
Density and/or relative density	
Density at 25 °C:	1.06 g/cm³
Relative density at 25 °C	1.06
Vapour density at 25 °C	0.056 (/100g H2O 1atm)
Particle characteristics	No further information available.

9.2 Other information:

Form:	Liquefied gas
Auto-ignition temperature:	Product is not self-igniting.
Explosive properties:	Not determined.
Evaporation rate	Not applicable.

Information with regard to physical hazard classes

Explosives	Not applicable
Flammable gases	Not applicable
Aerosols	Not applicable
Oxidising gases	Not applicable
Gases under pressure	

Contains gas under pressure; may explode if heated.

Flammable liquids	Not applicable
Flammable solids	Not applicable
Self-reactive substances and mixtures	Not applicable
Pyrophoric liquids	Not applicable
Pyrophoric solids	Not applicable
Self-heating substances and mixtures	Not applicable
Substances and mixtures, which emit flammable gases in contact with water	Not applicable
Oxidising liquids	Not applicable

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Oxidising solids	Not applicable
Organic peroxides	Not applicable
Corrosive to metals	Not applicable
Desensitised explosives	Not applicable

SECTION 10: Stability and reactivity

10.1 Reactivity No further relevant information available.
10.2 Chemical stability
Thermal decomposition / conditions to be avoided: To avoid thermal decomposition do not overheat.
10.3 Possibility of hazardous reactions: No dangerous reactions known under normal conditions of use.
10.4 Conditions to avoid: Keep away from heat, sparks, flame, high temperature.
10.5 Incompatible materials: Alkali or alkaline earth metals - powdered Al, Zn, Mg, etc.
10.6 Hazardous decomposition products: Hydrofluoric acid, carbonyl fluoride

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008 No futher information available.
Acute toxicity no data
LD/LC50 values relevant for classification: No further information available.
Skin corrosion/irritation: No further information available.
Serious eye damage/irritation: No further information available.
after inhalation: No further information available.
Respiratory or skin sensitisation: No further information available.
Germ cell mutagenicity:
In vitro tests did not show mutangenic effects.(Pentafluoroethane)
In vivo tests did not snow mutangenic effects.(Pentafluoroethane)
Carcinogenicity: No further information available.
Reproductive toxicity:
No toxicity to reproduction (Pentafluoroethane)
Inhalation, mouse, 208000 mg/m3, Effect on fertility, NOAEC (Difluoromethane)
foetotoxic effect (Difluoromethane)
STOT-single exposure: No further information available.
STOT-repeated exposure: Based on available data, the classification criteria are not met.
Aspiration hazard:
Other information (about experimental toxicology): No further information available.
Subacute to chronic toxicity: No further information available.
11.2 Information on other hazards:
Endocrine disrupting properties:

None of the ingredients is listed.

*
SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity: No further relevant information available.
12.2 Persistence and degradability: No further relevant information available.
Abiotic degradation:
Air, indirect photo-oxidation, t 1/2 from 4.16-28.2 y
Conditions: sensitizer: OH radicals
Degradation products: Carbon dioxide (CO2)/hydrofluoric acid/ TFA
12.3 Bioaccumulative potential:
Due to the distribution coefficient n-octanol/water an accumulation in organisms is not expected.
12.4 Mobility in soil: No further relevant information available.
12.5 Results of PBT and vPvB assessment
PBT: No further relevant information available.
vPvB: No further information available.
12.6 Endocrine disrupting properties For information on endocrine disrupting properties see section 11.
12.7 Other adverse effects:
Ecotoxical effects: no data

DAIKIN **Safety data sheet**

Printing date 23.03.2023 *Version number 2* *Revision: 23.03.2023*

Trade name: R-410A

Additional ecological information:
General notes:
Ozone depletion potential(ODP) : 0(CFC-11 1.0)
Global warming potential(GWP) : 1700(CO2=1 100years integrated value)

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Recommendation:
Disposal must be made according to official regulations.
Incineration in an adequate incinerator is recommended.

Uncleaned packaging
Recommendation: *Disposal must be made according to official regulations.*

SECTION 14: Transport information

14.1 UN number or ID number
ADR, IMDG, IATA *UN1078*
14.2 UN proper shipping name:
ADR, IMDG, IATA *REFRIGERANT GAS, N.O.S.*
14.3 Transport hazard class(es):

ADR

Class: *2 Gases.*
Label: *2.2*
IMDG, IATA

Class: *2.2 Gases.*
Label: *2.2*
14.4 Packing group:
ADR: *Not applicable*
14.5 Environmental hazards:
Marine pollutant: *No*
14.6 Special precautions for user: *Warning: Gases.*
Hazard identification number (Kemler code): *20*
Stowage Category *A*
14.7 Maritime transport in bulk according to IMO instruments *Not applicable.*
Transport/Additional information: *Avoid direct sunlight. Make sure of no damage, corrosion, leaks on the receptacles.*
Take necessary measures for preventing cargo shift.

ADR
Limited quantities (LQ): *120 ml*
Excepted quantities (EQ) *Code: E1*
Maximum net quantity per inner packaging: 30 ml
Maximum net quantity per outer packaging: 1000 ml
Tunnel restriction code: *C/E*
IMDG
Limited quantities (LQ) *120 ml*

Safety data sheet

Printing date 23.03.2023 *Version number 2* *Revision: 23.03.2023*

Trade name: R-410A

Excepted quantities (EQ)	*Code: E1* *Maximum net quantity per inner packaging: 30 ml* *Maximum net quantity per outer packaging: 1000 ml*
UN "Model Regulation":	*UN 1078 REFRIGERANT GAS, N.O.S., 2.2*

* SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
No further relevant information available.
Labelling according to Regulation (EC) No 1272/2008
The product is classified and labelled according to the CLP regulation.
Hazard pictograms

GHS04

Signal word *Warning*
Hazard statements
H280 Contains gas under pressure; may explode if heated.
Precautionary statements
P410+P403 Protect from sunlight. Store in a well-ventilated place.

National regulations *No further information available.*
15.2 Chemical safety assessment: *A Chemical Safety Assessment has not been carried out.*

SECTION 16: Other information

The product is for the industrial use only. We do not guarantee the safety in case the product is used for the other purposes. When using the product for health-care application or food/feed application, consult us in advance.
This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Department issuing SDS: *EHS Department*
Contact: *http://www.daikin.com/*
Abbreviations and acronyms:
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Flam. Gas 1B: Flammable gases – Category 1B
Press. Gas (Liq.): Gases under pressure – Liquefied gas
**** Data compared to the previous version altered.***

Solstice® ZE Refrigerant (R-1234ze(E))

000000016095

Version 1.3 Revision Date 13.04.2025

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name	:	Solstice® ZE Refrigerant (R-1234ze(E))
SDS-number	:	000000016095
Type of product	:	Substance
Remarks	:	SDS according to Art. 31 of Regulation (EC) 1907/2006.
Chemical name	:	trans-1,3,3,3-Tetrafluoroprop-1-ene
CAS-No.	:	29118-24-9
REACH Registration Number	:	01-0000019758-54

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

Use of the Substance/Mixture	:	Refrigerant
Uses advised against	:	none

1.3. Details of the supplier of the safety data sheet

Company	:	Honeywell Advanced Limited One Spencer Dock, North Wall Quay Dublin 1 Ireland	Honeywell International, Inc. 115 Tabor Road Morris Plains, NJ 07950-2546 USA
Telephone	:	+353 1 447 9350	
For further information, please contact:	:	SafetyDataSheet@Honeywell.com	

1.4. Emergency telephone number

Emergency telephone number	:	+1-703-527-3887 (ChemTrec-Transport) +1-303-389-1414 (Medical)
	:	Poison Control Center: Ireland: +353(1)8092166

Honeywell

Solstice® ZE Refrigerant (R-1234ze(E))

000000016095

Version 1.3 Revision Date 13.04.2025

United Kingdom: (+44) 844 892 0111

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Gases under pressure Liquefied gas
H280 Contains gas under pressure; may explode if heated.

2.2. Label elements

REGULATION (EC) No 1272/2008

Hazard pictograms	:		
Signal word	:	Warning	
Hazard statements	:	H280	Contains gas under pressure; may explode if heated.
Precautionary statements	:	P410 + P403	Protect from sunlight. Store in a well-ventilated place.
Special labelling of certain products:	:	Contains fluorinated greenhouse gases.	

2.3. Other hazards

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite. This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher. The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical name	CAS-No. Index-No. REACH Registration Number EC-No.	Classification 1272/2008	Concentration	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	29118-24-9 01-0000019758-54 471-480-0	Press. Gas ; H280	100 %	

3.2. Mixtures

Not applicable

Occupational Exposure Limit(s), if available, are listed in Section 8.
For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice:
First aider needs to protect himself. Move out of dangerous area. Keep warm and in a quiet place. Show this safety data sheet to the doctor in attendance. Take off all contaminated clothing immediately.

Inhalation:
If inhaled, remove to fresh air. Get medical attention if irritation develops and persists.

Skin contact:
Rapid evaporation of the liquid may cause frostbite. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. Call a physician if irritation develops or persists.

Eye contact:
Immediately flush eye(s) with plenty of water. Call a physician immediately.

Ingestion:
Ingestion is unlikely because of the physical properties and is not expected to be hazardous. As this product is a gas, refer to the inhalation section.

4.2. Most important symptoms and effects, both acute and delayed

No data available

4.3. Indication of any immediate medical attention and special treatment needed

No data available

See Section 11 for more detailed information on health effects and symptoms. :

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Water mist
Dry powder
Foam
Carbon dioxide (CO2)

5.2. Special hazards arising from the substance or mixture

Contents under pressure.
Heating will cause pressure rise with risk of bursting
Cool closed containers exposed to fire with water spray.
Product is not combustible under normal conditions.
However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.
Do not allow run-off from fire fighting to enter drains or water courses.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Some risk may be expected of corrosive and toxic decomposition products.
Fire may cause evolution of:
Hydrogen fluoride
Carbon oxides
Carbonyl halides
Halogenated compounds

5.3. Advice for firefighters

Wear full protective clothing and self-contained breathing apparatus.
Exposure to decomposition products may be a hazard to health.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.In the event of fire, cool tanks with water spray.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Provide adequate ventilation. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid skin contact with leaking liquid (danger of frostbite). Use personal protective equipment. Keep people away from and upwind of spill/leak.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. The product evaporates readily. Prevent spreading over a wide area (e.g. by containment or oil barriers).

6.3. Methods and materials for containment and cleaning up

Do not direct water spray at the point of leakage.
Allow to evaporate.

6.4. Reference to other sections

For personal protection see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling:
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Exhaust ventilation at the object is necessary.

Advice on protection against fire and explosion:
Do not spray on a naked flame or any incandescent material. Keep away from direct sunlight. Fire or intense heat may cause violent rupture of packages. Vapours may form explosive mixtures with air. The product is not easily combustible.

Hygiene measures:

Avoid breathing vapours, mist or gas. Keep working clothes separately.

7.2. Conditions for safe storage, including any incompatibilities

Further information on storage conditions:
Keep containers tightly closed in a cool, well-ventilated place. Keep only in the original container at temperature not exceeding 50°C Keep away from direct sunlight.

Advice on common storage:
Do not store together with: Oxidizing agents

7.3. Specific end use(s)

no additional data available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits:

Components	Basis / Value type	Value / Form of exposure	Exceeding Factor	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	HONEYWELL TWA	800 ppm		We are not aware of any national exposure limit.

HONEYWELL - Limit established by Honeywell International Inc.
TWA - Time weighted average

DNEL/ PNEC-Values

Component	End-use/impact	Exposure duration	Value	Exposure routes	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	Workers / Long-term systemic effects		3902 mg/m3	Inhalation	
trans-1,3,3,3-Tetrafluoroprop-1-ene	Consumers / Long-term systemic		830 mg/m3	Inhalation	

	effects				

Component	Environmental compartment / Value	Remarks
trans-1,3,3,3-Tetrafluoroprop-1-ene	Fresh water: 0,1 mg/l	Assessment factor: 1000

8.2. Exposure controls

Occupational exposure controls

The Personal Protective Equipment must be in accordance with EN standards:respirator EN 136, 140, 149; safety glasses EN 166; protective suit: EN 340, 463, 468, 943-1, 943-2; gloves EN 374, 511; safety shoes EN-ISO 20345.
The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Avoid inhalation of vapour or mist.

Engineering measures
Local exhaust

Personal protective equipment
Respiratory protection:
In case of insufficient ventilation wear suitable respiratory equipment.
Self-contained breathing apparatus (EN 133)

Hand protection:
Protective gloves against cold
(EN 511)
Gloves must be inspected prior to use.
Replace when worn.

Eye protection:
Goggles

Skin and body protection:
Wear suitable protective equipment.
Protective footwear

Environmental exposure controls

Handle in accordance with local environmental regulations and good industrial practices.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

(a) Physical state	:	gaseous
(b) Colour	:	colourless
(c) Odour	:	slight ether-like
(e) Boiling point/boiling range	:	-19 °C
(f) Flammability	:	does not ignite Method: Flammability (gases)
(g) Lower and upper explosion limit	:	Lower explosion limit No LEL and UEL was assigned at standard testing conditions, 20°C. Exhibits flame limits at temperatures in excess of 28˚ C.
	:	Upper explosion limit No LEL and UEL was assigned at standard testing conditions, 20°C. Exhibits flame limits at temperatures in excess of 28˚ C.
(h) Flash point	:	Not applicable
(i) Auto-ignition temperature	:	368 °C
(j) Decomposition temperature	:	Hazardous decomposition products formed under fire conditions. To avoid thermal decomposition, do not overheat.
(k) pH	:	neutral
(l) Viscosity, kinematic	:	No data available

(m) Solubility(ies)	:	Water solubility: 0,373 g/l
(n) Partition coefficient: n-octanol/water	:	log Pow 1,6
(o) Vapour pressure	:	4.271 hPa at 20 °C 11.152 hPa at 54,4 °C
(p) Density and / or relative density	:	1,17 g/cm3 at 21,1 °C
(q) Relative vapour density	:	4 (Air = 1.0)
(r) Particle characteristics	:	No data available

9.2 Other Information

Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions.

10.2. Chemical stability

Hazardous decomposition products formed under fire conditions.
To avoid thermal decomposition, do not overheat.

10.3. Possibility of hazardous reactions

Hazardous polymerisation does not occur.

10.4. Conditions to avoid

Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.
Can form a combustible mixture with air at pressures above atmospheric pressure.

10.5. Incompatible materials

Reactions with alkali metals.

10.6. Hazardous decomposition products

Halogenated compounds
Carbon oxides
Hydrogen fluoride
Carbonyl halides

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

(a) Acute toxicity

Acute oral toxicity:
Not applicable
study technically not feasible

Acute dermal toxicity:
No data available
study technically not feasible

Acute inhalation toxicity:
LC0
Species: Rat
Value: > 207000 ppm
Exposure time: 4 h
Method: OECD Test Guideline 403

Acute toxicity (other routes of administration):
No data available

(b) Skin corrosion/irritation:
Species: Rabbit
Result: No skin irritation
Method: OECD Test Guideline 404

(c) Serious eye damage/eye irritation:
No data available
study technically not feasible

(d) Respiratory or skin sensitisation:
Species: human
Result: Does not cause skin sensitisation.

(e) Germ cell mutagenicity:
Test Method: Chromosome aberration test in vitro
Cell type: Human lymphocytes
Result: negative
Method: OECD Test Guideline 473

Test Method: Ames test
Result: negative

Test Method: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Species: Mouse
Cell type: Micronucleus
Application Route: Inhalation
Method: OECD Test Guideline 474
Result: negative

(f) Carcinogenicity:
Note: No data available

(g) Reproductive toxicity:
Test Type: Two-generation study
Method: OECD Test Guideline 416
Species: Rat
Route of Application: Inhalation
General Toxicity - Parent: NOEL: > 20.000 ppm
General Toxicity F1: NOEL: > 20.000 ppm
Method: OECD Test Guideline 414
Species: Rat
Route of Application: Inhalation
General Toxicity Maternal: NOEC: 15.000 ppm
Developmental Toxicity: NOAEC: 15.000 ppm

(h) STOT-single exposure:
No data available

(i) STOT - repeated exposure:
Species: Rat
Application Route: Inhalation
Exposure time: 90 d
NOEL: 5000
Method: OECD Test Guideline 413
Note: Subchronic toxicity

(j) Aspiration hazard:
No data available

11.2. Information on other hazards

Endocrine disrupting properties
No data available

Other information:
Cardiac Sensitization (dog): No effects

SECTION 12: Ecological information

12.1. Toxicity

Toxicity to fish:
LC0
static test
Species: Cyprinus carpio (Carp)
Value: > 117 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to aquatic plants:
NOEC
Growth rate
Species: Algae
Value: > 170 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC
Biomass
Species: Algae

Value: > 170 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to aquatic invertebrates:
EC50
static test
Species: Daphnia magna (Water flea)
Value: > 160 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

12.2. Persistence and degradability

Biodegradability:
aerobic
Result: Not readily biodegradable.

12.3. Bioaccumulative potential

No bioaccumulation is to be expected (log Pow <= 4).

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

Substance is not persistent, bioaccumulative, and toxic (PBT).
Substance is not very persistent and very bioaccumulative (vPvB).

12.6. Endocrine disrupting properties

No data available

12.7. Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product:

Dispose according to legal requirements. Contact manufacturer.

Packaging:
Legal requirements are to be considered in regard of reuse or disposal of used packaging materials

Further information:
Provisions relating to waste:
EC Directive 2006/12/EC; 2008/98/EEC
Regulation No. 1013/2006
For personal protection see section 8.

SECTION 14: Transport information

14.1 UN number or ID number
ADR/RID:3163 IMDG:3163 IATA:3163

14.2 UN proper shipping name
ADR/RID:LIQUEFIED GAS, N.O.S.(TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)
IMDG:LIQUEFIED GAS, N.O.S.(TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)
IATA:Liquefied gas, n.o.s.(trans-1,3,3,3-Tetrafluoroprop-1-ene)

14.3 Transport hazard class(es)
ADR/RID:2.2 IMDG: 2.2 IATA: 2.2

14.4 Packaging group
No data available

14.5 Environmental hazards
ADR/RID:no Marine pollutant: no

14.6 Special precautions for user
IMDG Code segregation group according chapter 3.1.4.4 : NONE,

14.7 Maritime transport in bulk according to IMO instruments
No data available

SECTION 15: Regulatory information

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

Basis	Value	Remarks
Substances of very high concern (SVHC)		This product does not contain

		substances of very high concern according to Regulation (EC) No Article 57 above the respective regulatory 1907/2006 (REACH), concentration limit of ≥ 0.1 % (w/w).
Regulation (EC) No. 1907/2006, Annex XIV		Not listed
Regulation (EC) No. 1907/2006, Annex XVII		Not listed
Regulation (EU) No 517/2014 Annex II		Listed

Global warming potential :
3,88

Other inventory information

USA. List of Active Substances on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory, as amended
On TSCA Inventory

Australia. Inventory of Industrial Chemicals (AIIC), as amended
On the inventory, or in compliance with the inventory

Canada. Domestic Substances List (DSL), as amended
All components of this product are on the Canadian DSL

Japan. Kashin-Hou Law List
On the inventory, or in compliance with the inventory

Korea. Existing Chemicals Inventory (KECI)
On the inventory, or in compliance with the inventory

Philippines. Inventory of Chemicals and Chemical Substances (PICCS)
Not in compliance with the inventory

China. Inventory of Existing Chemical Substances (IECSC)
On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand
On the inventory, or in compliance with the inventory

Taiwan Chemical Substance Inventory (TCSI)
On the inventory, or in compliance with the inventory

15.2 Chemical safety assessment

A chemical safety assessment has been carried out. In accordance to the article 14(4) of the REACH regulation (EC) No. 1907/2006, exposure estimation and risk characterization is not required.

SECTION 16: Other information

Text of H-statements referred to under heading 3

trans-1,3,3,3-Tetrafluoroprop-1-ene	:	H280	Contains gas under pressure; may explode if heated.

Further information

All directives and regulations refer to amended versions.
Vertical lines in the left hand margin indicate a relevant amendment from the previous version.

Abbreviations:
EC European Community
CAS Chemical Abstracts Service
DNEL Derived no effect level
PNEC Predicted no effect level
vPvB Very persistent and very biaccumulative substance
PBT Persistent, bioaccmulative und toxic substance

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user.
This information should not constitute a guarantee for any specific product properties.

Solstice® ZE Refrigerant (R-1234ze(E))

000000016095

Version 1.3 Revision Date 13.04.2025

Appendix 6:

Stationary Container System Compliance Certificates (to be inserted)

Appendix 7:

Fuel Delivery Procedures (to be inserted)

Appendix 8:

Spill Procedure

Spill Response Procedure

THE **FIRST PRIORITY** DURING ANY SPILL IS TO ENSURE PERSONNEL **SAFETY.**

CALL 1-1-1 if the spill poses a significant threat of fire, risk to off-site public human health or safety or a major first aid incident exists. Then follow the procedures in the sites Emergency Response Plan.

If none of these apply, proceed as follows:

1. **ISOLATE** the source electronically or manually if safe to do so. This may involve tipping the container up, securely closing a container, etc.
2. **NOTIFY** the Site Manager that a spill has occurred, the location of the spill and material spilled. If required, the Site Manager will notify the 24 hour spill report hotline (09) 377 3107 as soon as practicable.
3. **COLLECT** the spill kit. Even if the spill is too big for the spill kit to handle, it should help contain the spill until more appropriate clean up equipment arrives.
4. **CONTAIN** the spill by blocking the flow using absorbent materials, plugging the leak and protecting water runoff pathways and personnel areas using absorbent mats / socks and sandbags as necessary.
    - Barricade the area to prevent unintentional exposure.
    - If the spill could get to a stormwater channel or drain block the relevant channel / drain**.**
5. **IDENTIFY** if the spill is a hazardous substance and if so, what, and ensure that the appropriate SDS procedures are followed for handling the hazardous substance.
6. **DON** appropriate PPE, if required.
7. **CLEAN UP** the spill by sweeping it up (solid spills) or using absorbent materials from the spill kit (liquid spills).
    - **DO NOT hose any spills down stormwater or wastewater drains.**
    - **Do not use detergents or other cleaning fluids until you have checked with Site Manager, what products if any are acceptable.**
    - Place all used equipment from the spill kit and any other material affected by the spill in a watertight, lidded container (the spill kit container itself can be used for this purpose if volume is sufficient).
    - The Site Manager will arrange the appropriate disposal through an approved and licensed industrial waste contractor.
8. **LOG THE INCIDENT** by completing an Incident Response Form (Appendix 10 of the EMP).
9. **RESTOCK** the spill kit by replacing all products used during the clean-up.

Appendix 9:

Incident Response Form

ASP Stage 2 Data Centre
1350 Dairy Flat Highway, Dairy Flat

Environmental Incident Report

	Name (Position)	Date	Signature
Prepared By:			
Reviewed By:			

Date and Time of Incident:					
Location of Incident:					
Who was involved?					
Was there a spill / gas leak?	Y / N	What was spilled / leaked?		Approximate Volume:	
Cause of Incident*:					
Immediate action taken:					
Action to prevent re-occurrence*				Date Actioned:	

*Continue on a separate sheet if necessary

Appendix 10:

Hazardous Substances - Routine Inspection Checklist

ENGEO

Hazardous Substances Routine Inspection

ASP Stage 2 Data Centre

1350 Dairy Flat Highway, Dairy Flat

	Name (Position)	Date	Signature
Inspected By:			
Reviewed By:			

	Checked?			Comments
	Northern Outdoor Plant Yard	Southern Outdoor Plant Yard	Area for parking tankers during tank filling	
Is the area tidy with no liquid pooling on the ground or other signs of a leak or spill?				
Are all labels, warning signs and notices clearly visible and easy to read?				
Is all equipment and containers in good condition with no evidence of damage that could result in a leak?				
Is the spill kit (if appropriate) at full capacity?				
Is an up to date (i.e. less than 5 years old) SDS available for each of the substances easily available?				
Have any changes been made to the substances stored in the area (e.g. type of substance, maximum volume etc.)? If so, has the Hazardous Substances Inventory for the site been updated				
Any other comments / notes				

Appendix 11:

Site Inspection Checklist

ENGEO

ASP Stage 2 Data Centre, 1350 Dairy Flat Highway, Dairy Flat			
Monthly Inspection			
	Name (Position)	Date	Signature
Prepared By:			
Reviewed By:			
Inspection Date			

The inspection checklist is to be completed bi-monthly and copies kept in the Site Manager's records. The checklist must be signed and dated once all items have been inspected.

	Checked	Signed
Has the EMP been reviewed and updated if necessary?		
Are all SDS up to date (i.e. less than five years old)?		
Northern Outdoor Plant Yard		
Is the area tidy with no liquids pooling or other signs of a leak?		
Are all bunds / secondary containment watertight and in good condition?		
Are all thoroughfares and accessways clear of obstacles?		
Are all signs in the correct location and clearly visible?		
Are stormwater flow paths and catchpit grates intact and clear of debris / refuse?		
Have catchpit sumps been monitored for sediment and cleaned out if necessary (i.e. volume of sediment should be <20% of the sump capacity)?		
Are all spill kits: • Clearly labelled? • Signposted? • At full capacity with nothing needing replacement?		
Southern Outdoor Plant Yard		
Is the area tidy with no liquids pooling or other signs of a leak?		
Are all bunds / secondary containment watertight and in good condition?		
Are all thoroughfares and accessways clear of obstacles?		
Are all signs in the correct location and clearly visible?		

	Checked	Signed
Are stormwater flow paths and catchpit grates intact and clear of debris / refuse?		
Have catchpit sumps been monitored for sediment and cleaned out if necessary (i.e. volume of sediment should be <20% of the sump capacity)?		
Are all spill kits: • Clearly labelled? • Signposted? • At full capacity with nothing needing replacement?		
Fire Pump Room		
Is the area tidy with no liquids pooling or other signs of a leak?		
Are all bunds / secondary containment watertight and in good condition?		
Are all thoroughfares and accessways clear of obstacles?		
Are all signs clearly visible?		
External Roadway and Underground Tank Fill Area		
Is the area clean and tidy with no obstacles in pedestrian or vehicle routes?		
Are all signs in the correct location and clearly visible?		
Are all stormwater catchpit grates intact and clear of debris / refuse?		
Have catchpit sumps been monitored for sediment and cleaned out if necessary (i.e. volume of sediment should be <20% of the sump capacity)?		
Are all spill kits: • Clearly labelled? • Signposted? • At full capacity with nothing needing replacement?		
Refuse Area		
Is the area clean and tidy with no obstacles in pedestrian or vehicle routes?		
Are all waste bins: • In good condition? • Clearly labelled? • Signposted?		

	Checked	Signed
• Located in their designated locations? • Have lids closed (where appropriate)?		
Any Additional Comments?		

Appendix 12:

Fuel Reconciliation Procedure (to be inserted)

Appendix 13:

Stormwater Operation and Maintenance Plan (to be inserted)