GHD Advisory

Hume Food Organics and Garden Organics Facility

Preliminary Hazard Analysis Report

Transport Canberra and City Services

17 May 2023

→ The Power of Commitment

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Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	F Duncan	A. Montgomery	* record on file	A. Montgomery	* record on file	17/05/23

Executive summary

The Australian Capital Territory (ACT) Government has identified diversion of municipal food organic and garden organic (FOGO) waste from landfill as a key action to achieve resource recovery and emissions reduction targets.

ACT NoWaste, the Business Unit of Territory and Municipal Services Directorate that manages contracts and services agreements for domestic waste and recycling activities, has proposed to develop a food organics and garden organics (FOGO) facility to strengthen Canberra's circular economy and meet the ACT and Australian Government targets. The facility would be designed to have an annual processing capacity of 70,000 tonnes per annum to meet future demand.

The key elements of the proposal include:

– Construction of an in-vessel composting facility with enclosed maturation and odour-controlled waste receival area.
– Enclosed composting vessels or tunnels with forced aeration and process control.
– Maturation areas within an enclosed building.
– Storage of finished product within an enclosed building (compost maturation and refining building) or a semi-enclosed product storage area.

The results of the hazard identification indicate that most risks have the potential for off-site impact. The most likely hazard scenarios that has the potential for off-site impact includes:

– Construction of the facility.
– Use of hazardous materials.
– Impacts from fires at the facility.
– Odour releases from composting process.
– Bird strikes to aircraft from an increase in birds attracted to waste storage.
– Attraction of pests to waste storage.

The assessment of the hazards through a qualitative PHA showed that the risk rating was medium or low, based on the implementation of control and mitigation measures. This is within the risk appetite of ACT NoWaste.

The hazard and risk study demonstrates that the proposal could be designed, constructed and operated in a safe manner, that will meet relevant regulations, standards and policies.

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Terms and abbreviations

Abbreviation	Meaning
ACT	Australian Capital Territory
ADG	Australian dangerous good
AS	Australian Standard
DG	Dangerous good
EIS	Environmental impact statement
EPSDD	Environment, Planning, and Sustainable Development Directorate
ESA	Emergency Services Agency (ACT)
FOGO	Food organics and garden organics
GHS	Global harmonised system
HRRE	Hume Resource Recovery Estate
kg	Kilogram
MLRMC	Mugga Lane Resource Management Centre
MRF	Materials Recovery Facility
PD Act	*Planning and Development Act 2005*
PHA	Preliminary hazard analysis
PLM Act	*Australian Capital Territory (Planning and Land Management) Act 1988*
PPE	Personal protective equipment
SDS	Safety data sheet
SWMS	Safe work method statements
TaMS	Territory and Municipal Services Directorate
TCCS	Transport Canberra and City Services
tpa	Tonnes per annum

1. Introduction

1.1 Background

The Australian Capital Territory (ACT) Government is working to reduce waste to landfill and increase resource recovery. The strategic direction for the management of waste in the Territory is set out in the 'ACT Waste Management Strategy 2011-25' (ACT Government, 2011). The strategy commits the ACT Government to minimise organic waste going to landfill and recovering organic waste resources. It also sets a target of increasing the rate of resource recovery to over 90 percent by 2025, with no recoverable waste sent to landfill.

The Federal Government also has a target of halving the amount of organic waste sent to landfill for disposal by 2030, as set out in the 'National Waste Policy Action Plan' (DEE, 2019).

A waste feasibility study was established in mid-2015 to identify a pathway towards achieving the ACTs waste management targets and examine options to drive better resource recovery. In 2018, the ACT Government released the final recommendations from the study as the 'Waste Feasibility Study: Roadmap and Recommendations Discussion Paper' (ACT NoWaste, 2018). Key recommendations from this were to identify a site and establish an organics progressing facility to process food organics and garden organics (FOGO) and the implementation of a kerbside FOGO collection.

The 'ACT Climate Change Strategy 2019 to 2025' (ACT Government, 2019) also identifies FOGO collection for all households and the investigation of organic waste processing as key priorities. An opt-in FOGO collection pilot is currently underway in the ACT (Belconnen), which has so far diverted more than 480 tonnes of material from landfill (ACT Government, 2022).

There is currently no processing facility within the ACT that can accept and process FOGO material. ACT NoWaste is therefore proposing to develop a new FOGO facility (the 'proposal') in Hume to strengthen the Territory's circular economy and help meet Territory and Federal Government landfill diversion and resource recovery targets.

The proposal is defined as the construction and operation of a new FOGO facility with the capacity to receive up to 70,000 tonnes per year of FOGO for in-vessel composting.

1.2 Purpose of this report

GHD Pty Ltd (GHD) was engaged by Transport Canberra and City Services Directorate (TCCS) to prepare a preliminary risk screening and preliminary hazard analysis (PHA). This report will support the preparation of an Environmental Impact Statement (EIS) for the project.

This report addresses the relevant criteria in the ACT Government Environment, Planning and Sustainable Development Directorate final scoping document, issued 19 July 2022 (application number 202200016) for the project as outlined in Section 2.2 and assesses the hazards and risks associated with the project.

This report focuses on hazards and risk associated with the activities connected to the project.

This report:

– Describes the existing environment with respect to the project and site hazards.
– Describes the project in relation to hazardous materials and dangerous good.
– Recommends measures to mitigate the impacts identified.

1.2.1 Scoping document requirements

Table 1.1 Scoping document requirements

Requirement	Section addressed
Provide an assessment of the potential threat of fire occurring at the facility, such as risk in relation to fire in stockpiled material, any effect on the surrounding area that a fire may have, and the protection measures necessary to address the potential threat of fire.	Bushfire Risk Assessment
A bushfire assessment must be undertaken by a suitably qualified person.	Bushfire Risk Assessment
A climate change risk assessment is required addressing the risk from increased events from flood, bushfire or extreme heat risk.	Climate Change EIS Chapter
Outline management procedures to be followed should critical infrastructure failure occur.	Section 7.1.7
Describe any hazardous materials and dangerous chemicals to be used or stored on site during construction and operation.	Section 7.1.2
Provide assessment and mitigation measures against the requirements of the “National Airport Safeguarding Framework (NASF)” and airport operations including “Guideline C - Managing the Risk of Wildlife Strikes in the Vicinity of Airports.”	Section 7.1.6
Provide a Wildlife Management Program in accordance with the NASF Guidelines.	Appendix B
Describe any hazardous materials and dangerous chemicals to be used or stored on site during construction and operation.	Section 6
Identify any Schedule 11 hazardous chemical, as per Work Health and Safety Regulation 2011 (WHS Regulation).	Section 6
Provide details of maximum storage capacities for any hazardous chemicals.	Section 6
Provide safety data sheets for any hazardous chemicals.	Appendix C
Identify whether any Schedule 11 hazardous chemicals meet the placard quantity as per the WHS Regulation.	Section 6

1.3 Limitations

This report: has been prepared by GHD for TCCS and may only be used and relied on by TCCS for the purpose agreed between GHD and TCCS.

GHD otherwise disclaims responsibility to any person other than TCCS arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by TCCS and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Legislative and policy context and guidance

2.1 Planning and Development Act 2007

The *Planning and Development Act 2007* (PD Act) is the key legislation informing planning and development on Territory land in the ACT.

The PD Act sets out requirements that include, but are not limited to, the provision of offsets and a policy to compensate for impacts that have significant adverse impacts on protected matters. It also provides the formal process for development approvals, the management of public land, and complaints and enforcement.

The Act also references Schedule 11 hazardous chemicals which are set out in the ACT *Work Health and Safety Regulations 2011*.

2.2 Environment, planning and sustainable development directorate requirements

The environment, planning and sustainable development directorate final scoping document, issued 19 July 2022 lists the requirements relevant to hazards and risk. These are outlined in Section 1.2.1.

3. Methodology

The process to determine the potential hazards and risks of the proposal is included in the following sections.

3.1 Hazard identification

During the assessment of the proposal, a determination of whether the proposal poses significant risk is required. Hazard identification highlights any risks associated with the interaction of the proposal (as a whole) with the surrounding environment. This is a systematic process to identify any potential offsite impacts. The aim of the hazard identification process is to show the proposal does not pose any significant risk or offence.

The hazard identification is a desktop qualitative assessment and involves documenting possible events that could lead to a possible off-site incident. The assessment then lists potential causes of the incident, as well as identification of operational and organisational safeguards to prevent the incidents from occurring or to mitigate their impact. The hazard identification is conducted for both construction and operation of the proposal.

3.2 Preliminary Hazard Analysis

A preliminary hazard analysis (PHA) is completed to determine the risk to people, property and the environment at the proposed location and in the presence of controls. Criteria of acceptability are used to determine if the development project is classified as a 'hazardous industry'. If this is the case, the development project may not be permissible within most industrial zonings in ACT.

The PHA will identify potential hazards, analyse these hazards in terms of their impact to people and the environment and their likelihood of occurrence, quantify the resultant risk to surrounding land uses and assess the risk to demonstrate that the project will not impose an unacceptable level of risk. Depending on the significance of consequences identified, a higher (or lower) level of analysis is required.

The proposed levels of PHA are:

– A qualitative PHA is completed for low potential for impact.
– A semi-quantitative PHA is completed for medium potential for impact.
– A fully quantitative PHA is completed for high potential for impact.

All PHA levels use an approach based on comprehensive hazard identification to demonstrate that the activity does not pose a significant risk. The PHA process complies with Australian Standard AS 31000:2018 risk management – principles and guidance, and follows the following steps:

– System definition.
– Hazard identification.
– Likelihood analysis.
– Consequence analysis.
– Risk calculations/ analysis.
– Risk evaluation (compare against criteria and consider risk mitigation and management options).

4. Existing environment

The proposal would sit inside an existing landscape with existing land uses. To identify the hazards and risks, the existing environmental context must be set. Of note is the identification of sensitive receivers and predominate land use surrounding the aspects, as well as any potential interaction with other infrastructure or land. Sensitive receivers are groups who are considered vulnerable or who have limited mobility, such as hospitals, schools and childcare facilities, aged care, and prisons. Other land use types include residential, industrial, open space/ recreation and commercial.

The facility is to be located within the current bounds of the Hume Resource Recovery Estate (HRRE) on Block 5, Section 26 Hume, off John Corey Road. The proposal is situated on Territory Land within the suburb of Hume.

The proposal site is surrounded by industrial facilities. ACT Skip Hire is on the adjacent block to the south. Further south, across John Cory Road is Soft Landing Mattress Recycling. South and east across Monaro Highway is the Hume Industrial Estate. Hume Materials Recovery Facility is west of the site across Recycling Road. The Mugga Lane Landfill is located approximately 200 m north-west of the proposal site.

The nearest residential receivers are approximately 1.2 km and 1.8 km to the north-east of the proposal site. There are no sensitive receivers in the immediate vicinity.

5. Proposal description

The ACT Government has identified diversion of municipal FOGO waste from landfill as a key action to achieve resource recovery and emissions reduction targets. In-vessel composting processing only FOGO wastes collected from households in the ACT has been selected as the preferred option for the process. In this process, composting is contained within a vessel or building and aeration and temperature is controlled to optimise the composting process.

In-vessel composting technologies have been implemented in other Australian locations for FOGO waste processing, and a variety of technology providers and site configurations are possible. They all broadly involve an enclosed and odour-controlled waste receival area, enclosed composting vessels or tunnels with forced aeration and process control, and maturation areas for compost (with or without).

Household FOGO waste will be delivered to the site by kerbside waste collection trucks. If commercial food waste is accepted at the facility, it will also potentially be delivered by food waste and/or liquid waste collection vehicles. Smaller vehicles such as staff and visitor cars and maintenance vehicles will also need to access the site.

5.1 Proposal site

The proposal is located in the suburb of Hume of the southern urban fringe of Canberra (refer Figure 3.1). Hume is a light-industrial suburb with minimal residential development. The proposal site is located on Block 5, Section 26 Hume, Recycling Road. The proposal site is currently a vacant block of land and the total site area is approximately 4 hectares.

Hume Materials Recovery Facility is west of the site across Recycling Road. The Mugga Lane Landfill is located approximately 200 metres north-west of the site. The nearest residential receiver is approximately two kilometres to the west of the proposal site. Monaro Highway is situated to the south, and the proposal site is visible from the highway; south and east across Monaro Highway is the Hume Industrial Estate. The proposal site is approximately one kilometre from the New South Wales (NSW) border.

The proposal would involve the following key features, subject to detailed design:

- Receival hall
- Primary composting tunnels and tunnel hallway
- Maturation and refining hall
- Product storage shed
- Odour management system
- Ancillary supporting infrastructure including:
  - Administration building
  - Machinery shed/workshop
  - Weighbridges
  - Access roads and pavements
  - Hardstand parking
  - Stormwater and leachate management

5.2 Operations

It is intended that the facility will operate on a single shift basis with waste acceptance (opening hours) from Monday to Friday to coincide with and accommodate deliveries from municipal kerbside collection trucks, as well as bulk product load-out to wholesale offtake. Weekends are therefore available for carrying out planned (and unplanned) repairs and maintenance, thereby providing a high level of processing continuity assurance.

Active operation times for various mobile and fixed plant and equipment will be around six to seven hours per day. This includes decontamination and feedstock preparation, tunnel loading/unloading, compost maturation pile

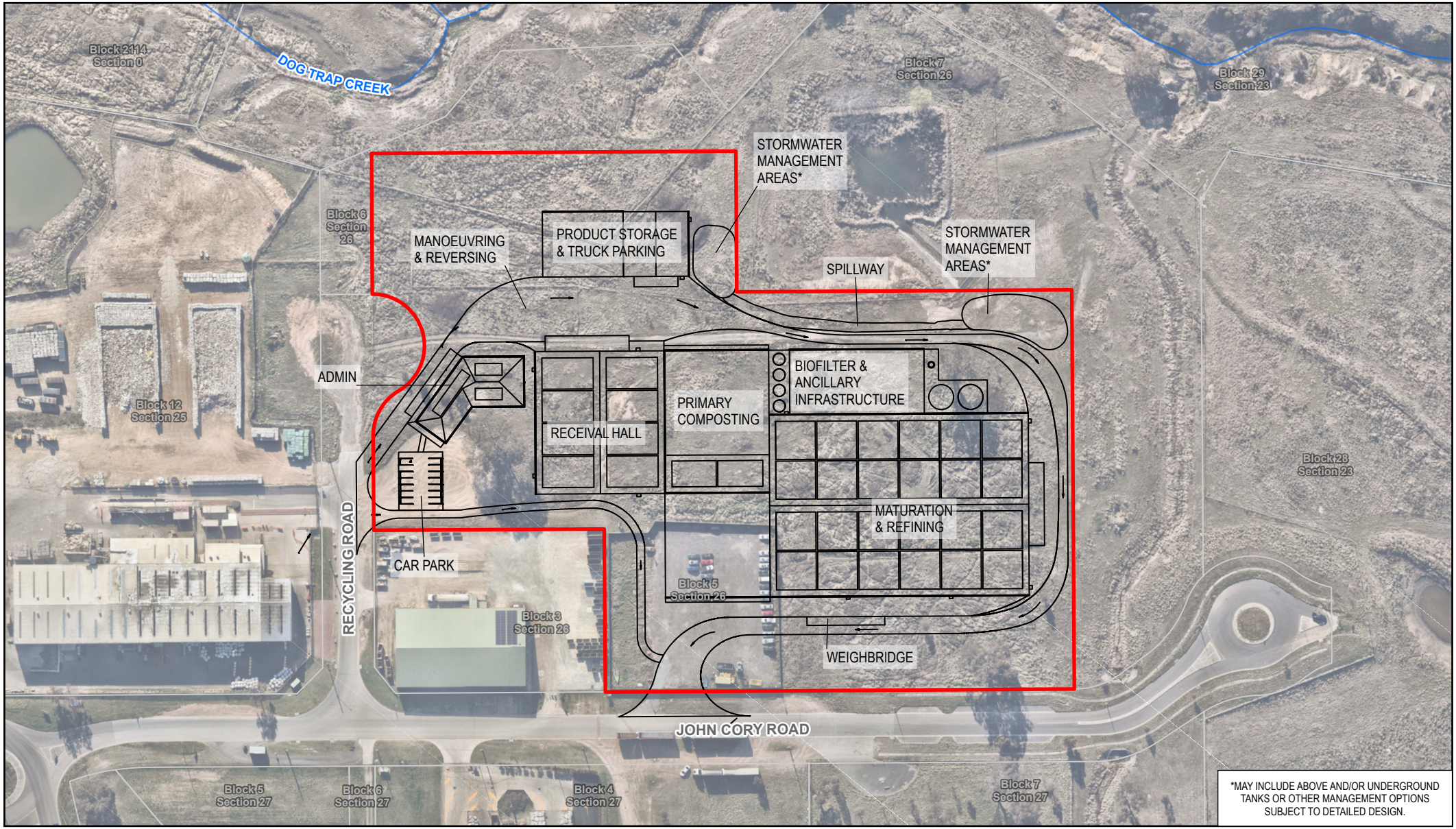
maintenance, product screening and refinement, and finished product load-out. Night-time operation (outside of the compost tunnel) and movements of mobile plant is not required.

Tunnel composting is a 24 hour continuous process enabling effective pasteurisation and rapid active composting cycles. Accordingly, blowers, fans and pumps are operating (or cycling) continuously, including nights and weekends. Fans and pumps are selected and/or configured as low noise emitting equipment such that noise emissions from the facility will comply with regulatory requirements.

Figure 5.1 shows the footprint of the proposed facility.

The composting plant incorporates a tunnel composting process with air quality management via extraction and biofiltration, and a high level of process monitoring and control of critical process parameters. This minimises the environmental impact of the operation and enables production of consistently high quality recycled organic products. The process comprises of the following main elements:

– FOGO waste receival and decontamination
– Shredding, mixing and moistening
– Pasteurisation and composting in enclosed tunnels with forced aeration
– Odour treatment
– Recycled water plant
– Enclosed maturation in static piles (on hardstand)
– Product refinement
– Residual waste management (materials removed during decontamination and product refinement).



Legend

- Proposal site
- Cadastre
- Proposal site layout
- Watercourses

Paper Size ISO A4

0 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Hume Food Organics and Garden Organics Facility
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Project No. **12540460**
Revision No. **0**
Date **17/10/2023**

Indicative concept layout

FIGURE 5.1

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Data source: Imagery - Nearmap: extracted 17/10/2023; DEM - ACT Government, 2015; Roads, Cadastre - ACTmapi, 2022; Watercourses - NSWSS, 2022. Created by: pfernandes

6. Hazard Identification

The hazard identification was conducted as a desktop study and includes consideration of any hazard. Of note is that as organic waste is composted, the process emits carbon dioxide, heat and water vapour.

Table 6.1 lists the identified hazards associated with the project.

In undertaking the hazard identification study, the following assumptions were made:

– All equipment is installed and operated in accordance with appropriate Australian Standards, codes and guidelines.
– All equipment and systems are designed to be inherently safe.
– Both on-site and off-site risks are considered.

Table 6.1 Identified hazards

Hazard scenario	Phase	Causes	Consequence	Potential for off-site impact
Fire	All project phases	Accumulation of flammable waste product	Personal injury Asset damage	Yes (health and environmental impact)
Hazardous chemicals spill	All project phases	Chemicals transfer/ transport	Personal injury	Yes (health and environmental impact)
Noise	All project phases	Heavy vehicle uses during construction Equipment use	Complaints	Yes (health impact)
Dust	Construction	Earth movement Vehicle movement	Complaints Environmental damage	Yes (health and environmental impact)
Spontaneous combustion	Operational	Heat generated during composting	Personal injury Asset damage	Yes (health impact)
Bird strikes aircraft	Operational	Birds being attracted toward organic waste	Injury/ fatality to birds Asset damage	Yes (environmental impact)
Failure of critical infrastructure	Operational	Lack of maintenance	Loss of production Personal injury Asset damage	No
Odour	Operational	Failure of odour treatment facility Composting process	Environmental breaches Complaints from neighbours	Yes (health impact)
Asphyxiation	Operational	By-product of composting	Personal injury/ fatality	No
Pest infestation	Operational	Build-up of waste material	Injury to native wildlife	Yes (environmental impact)
Spread of pathogens and disease	Operational	Waste and wastewater making its way into water ways Deceased pests	Personal injury/ health issues	Yes (health and environmental impact)

Schedule 11 to the Work Health and Safety Regulations 2011, outlines the threshold quantities for placarding and providing a manifest for materials storage. A list of the expected hazardous chemicals to be used during construction and operation is shown in Table 6.2 and Table 6.3 respectively. Minimal chemicals are expected to be stored on site during construction. As the final chemical supply details are not finalised, example safety data sheets (SDS) are provided in Appendix C.

Table 6.2 Indicative hazardous chemicals used during construction

Product Name	UN number	GHS Class	GHS category	Indicative maximum Quantity (kg)	Schedule 11 placard threshold (litres)	Schedule 11 manifest threshold (litres)	Schedule 11 Requirements
Spray paint	multiple	Gas under pressure	Acute toxicity 1	0.02	50	500	None
LPG	1075	Flammable gas	1	0.09	200	5,000	None
Acetylene (welding)	1001	Flammable gas	1	0.01	200	5,000	None
Oxygen (welding)	1072	Gas under pressure	Other	0.05	1,000	10,000	None
Paint (oil based considered worst case)	1263	flammable liquid	2	0.1	in combination 1,000	in combination 10,000	None
Solvents	multiple	flammable liquid	3	0.1	in combination 1,000	in combination 10,000	None
Epoxy resins	multiple	flammable liquid	3	0.1	in combination 1,000	in combination 10,000	None
Diesel (C1)	3082	flammable liquid	4	2.5	10,000	100,000	None
General oils and lubricants (C2)	multiple	flammable liquid	4	0.5	10,000	100,000	None
Bitumen	3257	flammable liquid	4	-	10,000	100,000	None
Cleaning products	multiple	Eye irritation	1	0.005	None	None	None
Concrete	N/A	Not classified as DG		-	None	None	None
Steel structural members	N/A	Not classified as DG		-	None	None	None
Plasterboard	N/A	Not classified as DG		-	None	None	None
Sealants / joint fillers	N/A	Not classified as DG		0.05	None	None	None
Detergent	N/A	Not classified as DG		0.005	None	None	None

Table 6.3 Indicative hazardous chemicals used during operation

Product Name	UN number	GHS Class	GHS category	Indicative maximum Quantity (kg)	Schedule 11 placard threshold (litres)	Schedule 11 manifest threshold (litres)	Schedule 11 Requirements
Diesel	3082	flammable liquid	4	5,000	10,000	100,000	None
Oils and lubricants	multiple	flammable liquid	4	1,000	10,000	100,000	None
Sulphuric Acid	1830	Skin corrosive	1A	2,000	50	500	Both placard and manifest
Laboratory chemicals	multiple	Skin corrosive	1A	10	in combination 1,000	in combination 10,000	Placard
Biocide	N/A	Eye irritation	1	1,000	None	None	None

Whilst only sulphuric acid triggers the need for a manifest, management of all chemicals in a consistent manner is recommended. In this manner, a register of all chemicals used on site should be kept that includes global harmonised system (GHS) and Australian dangerous goods (ADG) designations, quantities and storage locations. A current safety data sheet (SDS) should also be accessible to all personnel for all chemicals used on site. Sulphuric acid and the laboratory chemicals also require placarding.

The expectation is that any hazardous chemical will be transported to site following the ADG code requirements. Whilst diesel is likely to be trucked in via a bulk tanker and transferred to a fixed storage vessel, the other chemicals are expected to be transported in package form, for example a 1,000 litre iso-container and used as required.

To limit the potential of a fire initiating from diesel storage, it is recommended the goods are stored in dedicated locations away from potential ignition sources, as per Australian Standards AS 1940:2017 The Storage and Handling of Flammable and Combustible Liquids.

Results of the hazard identification indicate that most risks have the potential for off-site impact. The most likely hazard scenarios that has the potential for off-site impact include:

– Construction of the facility
– Use of hazardous materials
– Impacts from fires at the facility
– Odour releases from composting process
– Bird strikes to aircraft from an increase in birds attracted to waste storage
– Attraction of pests to waste storage.

7. Preliminary hazard analysis

The results of the hazard identification process indicate that whilst there are several hazard scenarios that have the potential for off-site impact, it is considered that there is minimal, if any, potential for high-level harm. Therefore, a qualitative PHA is appropriate.

The hazard identified for the proposal, as discussed in Section 6 were risk assessed and the results are presented in Table 7.1. ACT NoWaste's risk matrix and risk criteria were used to assess the likelihood and consequence of the hazard with their existing controls.

The assessment of the hazards show that the risk is rated as medium or low, which is within the risk appetite of ACT NoWaste.

Recommended safeguards for each of the hazard scenarios have been included in Table 7.1 which contain, or control each of the hazards to an acceptable level.

The potential for unauthorised access resulting in safety risks is low, based on ACT workplace safety laws and the location of the site. A work health and safety management plan and safe work method statements would be developed in accordance with regulatory requirements.

Table 7.1 Hazard Identification

Hazard scenario	Phase	Causes	Consequence	Identified / recommended safeguards	Consequence rating	Likelihood rating	Risk rank
Fire	All project phases	Accumulation of flammable waste product Building/ electrical fire	– Personal injury – Asset damage	– Fire Management Plan – Appropriate placement of smoke detectors, fire extinguishers, fire blankets, fire hose reels and sprinklers – Emergency Management Plan	Moderate (3)	Unlikely (2)	Medium
Hazardous chemicals spill	All project phases	Chemicals transfer/ transport	– Personal injury	– Licenced transporters of chemicals – Trained handlers of chemicals – Safe work method statements (SWMS) and procedures for the use of chemicals – Safety data sheets (SDS) for all chemicals used and/ or stored on site – Personal protective equipment (PPE)	Minor (2)	Unlikely (2)	Medium
Noise	All project phases	Heavy vehicle uses during construction Equipment use	– Complaints	– Construction Management Plan – Equipment designed to minimise noise generation	Insignificant (1)	Possible (3)	Low
Dust	Construction	Earth movement Vehicle movement	– Complaints – Environmental damage	– Construction Management Plan – Water cart where appropriate	Insignificant (1)	Possible (3)	Low
Spontaneous combustion	Operational	Heat generated during composting	– Personal injury – Asset damage	– Tunnel composting process with air quality management and a process monitoring of air and moisture levels and temperature monitoring	Minor (2)	Rare (1)	Low

Hazard scenario	Phase	Causes	Consequence	Identified / recommended safeguards	Consequence rating	Likelihood rating	Risk rank
Brid strikes aircraft	Operational	Birds being attracted toward organic waste	– Injury/ fatality to birds – Asset damage	– Adhere to the Guideline C of NASF, Managing the Risk of Wildlife Strikes in the Vicinity of Airports – Waste stored and processed in-building – Use deterrent technologies as required – FOGO contamination will be stored in enclosed skip bins within the receival hall for off-site disposal or recycling – Recyclable materials will be held in dedicated sealed skip bins. This will be managed in accordance with the site operations plan and be serviced regularly by a waste contractor. – Waste from office and administration activities would be stored in appropriate bins (with lids). – The site would be kept clean and tidy – A Waste Management Plan is created for the site to continuously manage and monitor waste. – Any unwanted putrescible waste sources will go into waste bins to be taken to landfill.	Moderate (3)	Rare (1)	Medium
Failure of critical infrastructure	Operational	Lack of maintenance	– Loss of production – Personal injury – Asset damage	– Regular maintenance schedule undertaken by qualified personnel – Adequate training provided on operating machinery	Minor (2)	Unlikely (2)	Medium

Hazard scenario	Phase	Causes	Consequence	Identified / recommended safeguards	Consequence rating	Likelihood rating	Risk rank
Odour	Operational	Failure of odour treatment facility Composting process	– Environmental breaches – Complaints	– Odour treatment biofilter – Receival hall will be operated under negative pressure to contain odour, dust and bio-aerosols – Receival hall and corridor will be ventilated via an air extraction and ducting system which will be connected to an odour treatment biofilter – Air volume exchange ratio for the receival hall will be at least 2 air changes per hour. – Vehicle access to the facility will be via rapid acting automated doors	Moderate (3)	Unlikely (2)	Medium
Asphyxiation	Operational	By-product of composting	– Personal injury	– Tunnel composting process with air quality management and a process monitoring of air and moisture levels and temperature monitoring	Major (4)	Rare (1)	Medium
Pest infestation	Operational	Build-up of waste material	– Injury to native wildlife	– Waste stored and processed in-building – Engage pest management professionals as required – Regular cleaning waste units /area	Moderate (3)	Rare (1)	Medium
Spread of pathogens and disease and/or contaminated water from runoff	All project phases	- Waste and wastewater making its way into water ways - Silt build up during construction - Deceased pests - Proximity of Dog Trap creek	– Personal injury/ health issues	– Waste stored and processed in-buildings or vessels – Secondary containment shall be in place for all liquid-containing process elements. – All liquids collected or generated within the facility from the processing activities shall be collected for re-use, treatment or sampling – Septic tank systems are utilised on the broader site – Reused leachate/water from tunnels to be recirculated within the tunnels	Major (4)	Rare (1)	Medium

7.1 Management of hazards

7.1.1 Construction management

Prior to construction starting, a construction management plan would be completed by the construction contractor. The purpose of this management plan is to describe how the construction contractor will manage and verify the safety compliance and risk aspects of the project works for the construction phase of the proposal, including a construction hazard assessment.

The construction hazard assessment would identify the proposed methodology of the site construction, particularly for hazardous situations. The detailed methodology will indicate the potential hazards and the control measures required to mitigate risks to as low as reasonably practicable during the construction stage.

The construction hazard assessment would produce a risk register, which would be treated as a live document to be regularly reviewed during the construction phase. Any information considered to be relevant to the operational phase would be carried forward in the risk register.

7.1.2 Chemical management

There are a few chemicals, including DGs that would be used on-site. To reduce the risk of a loss of containment of chemicals, chemical and spill management is required.

Chemicals would be stored in accordance with Australian Standards. The storage locations would be within designated work areas. Each chemical would have appropriate labelling, an appropriately sized bund, separation where necessary and would be disposed of in accordance with Australian Standards. Access to a safety data sheet (SDS) library that covers all chemicals located on site is required, including being available for emergency services. Safety showers and eye wash stations would be installed in accordance with Australian Standards. Spill kits would be accessible to personnel in chemical storage areas.

Additionally, appropriate safe work procedures would be implemented for the handling of all chemicals including transfer, storage, spill prevention and clean up requirements.

7.1.3 Fire management

ACT NoWaste should provide fire prevention, detection, protection and fighting measures that are appropriate for the specific fire hazard and adequate to meet the extent of potential fires. Specifically, the fire safety requirements of the Building Code of Australia would be applicable. This includes the provision of smoke detectors, fire extinguishers, fire blankets, fire hose reels and sprinklers where appropriate. All fire protection systems should be inspected and maintained in accordance with *AS1851-2012 Routine Service of Fire Protection Systems and Equipment*.

Incoming FOGO and product stockpiles are to be kept in a tidy manner prior to processing and all efforts should be made to limit exposure to ignition sources. All hot works are to be undertaken in accordance with ACT NoWaste's hot work procedure and permit system in accordance with existing operations procedures to minimise the potential for flammable materials to be ignited. Regular maintenance of all mechanical components associated with the raw material delivery, shredding and mixing processes should also be undertaken to prevent overheating.

If the conditions in the stockpiled or windrowed material are not managed appropriately, there is potential for spontaneous combustion of the composting material. However, with the ability to manage air and moisture levels, temperature monitoring and scheduled turnover of compost piles, it is not considered likely that the conditions necessary for spontaneous combustion would be present. Regardless, it is recommended that these management strategies are applied to prevent spontaneous combustion.

Fires would be managed in accordance with ACT NoWaste's emergency response procedures. If the fire cannot be extinguished immediately, local emergency services would be contacted to provide assistance.

7.1.4 Odour management

Odour management and tunnel composting are critical to operation of the facility. Regular maintenance of all mechanical components associated with the raw material delivery, shredding and mixing processes should also be undertaken to mitigate equipment failure events.

The receival hall would be normally closed and operated under negative pressure to contain odour, dust and bio-aerosols. Vehicle access to the facility would be via rapid acting automated doors. The receival hall and corridor would be ventilated via an air extraction and ducting system which will be connected to an odour treatment biofilter.

The mixing procedure would provide for initial processing (including placement in tunnels) of high-odour and high-moisture wastes within 24 hours of delivery.

Enclosing and ducting air away from key process stages may be a source of offensive odour so the following measures would be in place to controls the hazard:

– Effective aeration of compost through processing in enclosed tunnels for a four-week process and addressing the cause of odour (e.g., low oxygen levels in the compost pile, loss of structure and porosity), and
– Recycling potentially odorous air within the tunnel composting process as much as possible, to minimise total air volume requiring treatment.

All air exhausted from the composting tunnels, as well as extracted air from the main building and receival hall, would be ducted to the odour management system for treatment and final discharge of treated air.

7.1.5 Pest and pathogen management

FOGO and composting can attract pest animals, which can impact native wildlife and also spread pathogens. Pathogens in wastewater can also be spread if they reach waterways.

The short-term nature of the transportation of the FOGO from residential areas to the composting facility is not expected to create any potential biosecurity impacts. Outdoor storage of FOGO is not planned, with all receival of waste being completed in-building. Subsequent composting and processing would also occur in-building. The processing of the FOGO would include pasteurisation prior to packaging of the finished compost product to minimise the spread of pest weeds.

Leachate from the composting tunnels and condensate from odour extraction ductwork would be collected through a network of sealed pipes and gravity drained into a sealed process water tank. Process water would be recycled back through the tunnel composting process to maintain optimal moisture content in the organic material.

Maintaining the integrity of the treatment buildings to exclude pest animal entry would require ongoing focus.

7.1.6 Wildlife strikes aircraft

Guideline C of National Airports Safeguarding Framework (NASF), Managing the Risk of Wildlife Strikes in the Vicinity of Airports (Guideline C) aims to provide guidelines to land users and planning decision makers to manage the risk of collusions between wildlife and aircraft at or near airports where that risk may be increased by the presence of wildlife-attracting land uses. It is important to note that:

– The majority of the site activities would be contained within an enclosed building, eliminating access to birds.
– Processed material would be housed either inside the maturation and refining building or in a semi-enclosed hardstand area adjacent to the building.

Additionally, FOGO would be delivered by kerbside collection vehicle or other commercial food waste and/or liquid waste collection vehicles which would be covered and be delivered directly into the receival hall to avoid attraction of wildlife. No unprocessed product will be stored outside of the building.

7.1.7 Failure of critical infrastructure

Management of critical infrastructure, including processes to follow should a failure occur, would be detailed in the site's Asset Management Plan (AMP). The requirements and contents of the AMP would be subject to the final detail design and updated in conjunction with the maintenance schedule and operational contingency planning.

7.2 Summary of management measures

Mitigation measures that would be implemented to minimise the potential impacts of the FOGO facility are listed in Table 7.2.

Table 7.2 Hazard and risk management measures

Impact / Aspect	Mitigation Measure	Timing
Fire	– Fire Management Plan for construction and operations – Appropriate placement of smoke detectors, fire extinguishers, fire blankets, fire hose reels and sprinklers within buildings – Emergency Management Plan	Prior to and during the project
Hazardous chemicals	– Each chemical to have appropriate labelling, an appropriately sized bund and stored within designated work areas – Safe work method statements (SWMS) and procedures for the use of chemicals – Safety data sheets (SDS) for all chemicals used and/ or stored on site – Appropriate PPE provided for users of chemicals	Prior to and during the project
Wildlife strikes aircraft	– Adhere to the Guideline C of NASF, Managing the Risk of Wildlife Strikes in the Vicinity of Airports – Waste stored and processed in-buildings or vessels – Use deterrent technologies as required – FOGO contamination or other waste generated as a result of the operation will be stored in an enclosed skip bins for off-site disposal or recycling within the receival hall – Recyclable materials will be held in dedicated sealed skip bins. This will be managed in accordance with the site operations plan and be serviced regularly by a waste contractor. – The site would be kept clean and tidy – Waste from office and administration activities would be stored in appropriate bins (with lids). – A Waste Management Plan is created for the site to continuously manage and monitor waste. – Any unwanted putrescible waste sources will go into waste bins to be taken to landfill.	During the operation of facility
Odour escaping facility	– Receival hall to be normally closed and operated under negative pressure – Air exhaust from composting facility directed to odour treatment facility – Odour treatment biofilter operation and maintenance – Effective aeration of compost	During the operation of facility
Pest infestation	– Maintenance of treatment buildings to exclude pest animal entry – Engage pest management professionals as required – Housekeeping	During the operation of facility
Spread of pathogens and disease	– Pasteurisation of compost – Maintenance of process water recycle system	During the operation of facility
Failure of critical infrastructure	– Regular maintenance schedule undertaken by qualified personnel – Adequate training provided on operating machinery – Asset Management Plan	During the operation of facility

8. Conclusions

This report identified hazards associated with the proposed Hume FOGO facility in accordance with the requirements of the ACT Environment, Planning and Sustainable Development Directorate.

The results of the hazard identification indicate that most risks have the potential for off-site impact. The most likely hazard scenarios that has the potential for off-site impact includes:

– construction of the facility
– use of hazardous materials
– impacts from fires at the facility
– odour releases from composting process
– bird strikes to aircraft from an increase in birds attracted to waste storage
– attraction of pests to waste storage.

The assessment of the hazards through a qualitative PHA showed that the risk rating was medium or low, based on the implementation of control and mitigation measures. This is within the risk appetite of ACT NOWaste.

The hazard and risk study demonstrates that the proposal could be designed, constructed and operated in a safe manner, that will meet relevant regulations, standards and policies.

Any changes to the assumptions used in this report should result in a review of the PHA process and an update as required.

9. References

ACT Government. 2011. ACT Waste Management Strategy 2011-25

ACT Government. 2019. ACT Climate Change Strategy 2019 to 2025

ACT Government, 2022. FOGO facility given the go-go, Media Release, Chris Steele MLA, March 2022.

ACT NOWaste. 2018. Waste Feasibility Study: Roadmap and Recommendations Discussion Paper

Department of Energy and Environment (DEE). 2019. National Waste Policy Action Plan.

Appendix A

Risk Matrix

RISK MATRIX		Impact	Insignificant	Minor	Moderate	Major	Catastrophic
Frequency		Matrix	*1*	*2*	*3*	*4*	*5*
Likelihood	Almost Certain	*5*	Medium	High	High	Extreme	Extreme
	Likely	*4*	Medium	Medium	High	High	Extreme
	Possible	*3*	Low	Medium	Medium	High	Extreme
	Unlikely	*2*	Low	Medium	Medium	High	High
	Rare	*1*	Low	Low	Medium	Medium	High

Figure 9.1 TCCS Risk matrix

Impact	Insignificant	Minor	Moderate	Major	Catastrophic
1. People (Health & Safety)	Near miss no injuries	Minor injury or requiring First Aid treatment or short-term injury (less than four weeks. and/or minor psychological injury.	Single injury causing hospitalisation or multiple medical treatment cases; and/or psychological injury resulting in GP/Health Professional help.	Serious injury (including loss of limbs) or multiple serious injuries causing hospitalisation and/or permanent disability; and/or psychological injury requiring medium professional support.	Single or multiple Deaths or multiple life-threatening injuries; and/or psychological injury requiring long term professional support.
2. Financial	Less than 1% of **Budget**	1% to 5% of **Budget**	> 5% to 10% of **Budget**	> 10% to 25% of **Budget**	> than 25% of **Budget**
3. Reputation & Image	**Public Confidence:** Minor dissatisfaction across a small proportion of the community and or stakeholder groups. **Media:** Isolated negative local media attention. **Govt Scrutiny:** Internal Review.	**Public Confidence:** Moderate dissatisfaction across a small proportion of the community and or stakeholder groups. **Media:** Negative Local media attention across multiple channels. **Govt Scrutiny:** Scrutiny required by internal committees or internal audit to prevent escalation.	**Public Confidence:** Dissatisfaction across a few demographics groups and or moderate dissatisfaction across multiple stakeholder groups. **Media:** Adverse national or sustained local media attention.(up to one week) **Govt Scrutiny:** Scrutiny required by external committees or ACT Auditor General's Office, or inquest, etc.	**Public Confidence:** Dissatisfaction across a large range of demographics groups. Major dissatisfaction across multiple stakeholder groups. **Media:** Sustained adverse national media attention across multiple media channels. (more than one week) **Govt Scrutiny:** Legislative Assembly scrutiny; Minister/Chief Minister involvement.	**Public Confidence:** Whole community dissatisfaction. Severe dissatisfaction across ALL stakeholder groups. **Media:** Adverse International media attention across multiple media channels. **Govt Scrutiny:** Ministerial/Assembly inquiry or Coronial inquiry.
4. Compliance & Regulation	Non-compliance with policy, contract or standard operating procedures which are not legislated or regulated.	Numerous instances of non-compliance with policy, contract or standard operating procedures which are not legislated or regulated.	Non-compliance with policy, contract or standard operating procedures which require self reporting to the appropriate regulator and immediate rectification.	Restriction of business operations by regulator due to non-compliance with guidelines and / or significant non-compliance with policy , contract or procedures which threaten business delivery.	Operations shut down by regulator for failing to comply with relevant legislation/regulations /or significant non-compliance with could result in failure to provide business objectives and critical service delivery.
5. Service Delivery (Products & Services)	**Business Continuity:** Loss of, or interruption to non-critical infrastructure or essential services up to 3 days. **Strategic Objectives:** Negligible impact on business outcomes. KPI's relating to delivery of strategic objectives not threatened.	**Business Continuity:** Interruption to core services affecting critical infrastructure or public safety or cessation of essential services for up to 3 days. **Strategic Objectives:** Minor impact on business outcomes and/or strategic objectives.	**Business Continuity:** Cessation of essential service ; infrastructure or public safety for up to 3 days and/or disruptions for up to 1 week. **Strategic Objectives:** Moderate impact on business outcomes and/or strategic objectives. One or more key accountability requirements not met.	**Business Continuity:** Cessation of business essential services for up to 3 days and/or continual disruption over subsequent weeks. **Strategic Objectives:** Significant impact on business outcomes and/or strategic objectives. Strategies not consistent with Government's agenda. KPI's show services are degraded.	**Business Continuity:** Total cessation of core services affecting critical infrastructure or public safety Cessation of services essential to business continuity for more than 1 week and/or continual disruption over subsequent months. **Strategic Objectives:** Strategic business processes fail and business objectives not met. Critical system failure/s Business severely affected.
6. Environment & Sustainability	Limited effect to environment, culture or something of low significance. Effects are limited to a small area, with a rapid recovery.	Transient, repairable. Minor effects to cultural or heritage items, environment including disturbance of native vegetation or waterways.	Moderate, short-term harm to cultural or heritage items or environment and/or disturbance of native vegetation or waterways. Mostly repairable.	Significant, medium-term harm. Major impacts to environment, threatened species or habitat, and/or damage to large area of native vegetation or waterways. Permanent damage to structures or items of cultural significance.	Long term environmental harm. Widespread impacts to environment, threatened species, native vegetation or waterways. Irreparable damage to, or loss of highly valued items of cultural and/ or heritage significance
7. ICT Systems & Record Management	Interruption to **electronic records, data and systems** access less than ½ day. **Systems breach** identified, business administration system, no personal or classified information stored.	Interruption to **electronic records, data and systems** access ½ to 1day. **Systems breach** identified, business administration system, some identifiable information stored, non client welfare threatening (data accessed known)	Significant interruption (but not permanent loss) to **data and electronic records access**, lasting 1 - 7 days. **Systems breach** identified, business administration system, some identifiable information stored, non client welfare threatening (data accessed unknown)	Complete, permanent loss of some **electronic records and/or data**, or loss of **systems** access for more than 7 days. **Systems breach** identified, business administration system, identifiable/classified information stored, non client welfare threatening	Complete, permanent loss of all **electronic records, data or system access.** **Systems breach**, Government or business Critical Systems client and or business welfare threatened
8. Integrated Public Transport Network	Unplanned network interruption resulting in cessation of services up to 10 minutes.	Unplanned network interruption resulting in cessation of services for between 10 and 30 minutes.	Unplanned network interruption resulting in cessation of services > 30 mins up to 4 hours.	Unplanned network interruption resulting in cessation of services > 4 hours up to 1 day.	Unplanned network interruption resulting in cessation of services for more than 2 days.
9. Project Delivery	**Schedule Delay:** Delays Less than 2 weeks impacting on achievement of key objectives or milestones. **Quality:** Single minor design and or quality issues – aesthetics.	**Schedule Delay:** Delays 2 - 4 weeks (inclusive) impacting on achievement of key objectives or milestones. **Quality:** Multiple minor design and or quality issues – aesthetics.	**Schedule Delay:** Delays 4 - 8 weeks (inclusive) impacting on achievement of key objectives or milestones. **Quality:** Single moderate design and or quality issue – fit for purpose, customer experience, urban design	**Schedule Delay:** Delays 8 - 12 weeks (inclusive) impacting on achievement of key objectives or milestones. **Quality:** Single major design and or quality issue – safety, design longevity and or performance or multiple moderate quality issues – fit for purpose, customer experience, urban design	**Schedule Delay:** Delays greater than 12 weeks impacting on achievement of key objectives or milestones. **Quality:** Multiple major design and or quality issues – safety, design longevity and or performance

Figure 9.2 TCCS Consequence table

Appendix B

Wildlife Management Plan

Our ref: 12540460

03 May 2023

Hume MRF and FOGO facility Wildlife Management Plan

1. Introduction

1.1 Legislative context

The following Wildlife Management Plan (WMP) for the proposed Hume Food and Garden Organics (FOGO) facility and Materials Recovery Facility (MRF) has been compiled to satisfy the requirements of the *National Airports Safeguarding Framework principles and guidelines* (DITRDCA, 2019). This framework has been established primarily to enhance current and future safety of aviation operations in Australia. Specifically, under guideline C of the framework, the risk of wildlife strikes in the vicinity of airports requires management.

According to this guideline, potentially incompatible land uses within 13 kilometres of airports should be managed. This includes land use that has the potential to attract large numbers of birds, such as rubbish dumps.

1.2 Proposed Hume FOGO and MRF developments

The proposed Hume FOGO and MRF are located approximately seven kilometres south of Canberra Airport, within the 13-kilometre buffer specified by the guideline (DITRDCA, 2019). Both proposals involve the construction of waste management facilities, with all waste processing activities to be undertaken internally within the fully enclosed facilities.

2. Wildlife management plan

2.1 Outline

According to point 22 of the guideline, suggestions for wildlife management to mitigate the risk of conflict with aviation traffic includes (DITRDCA, 2019):

– Regular monitoring surveys to monitor bird numbers at the site
– Wildlife hazard assessments by qualified ornithologists or biologists
– Wildlife awareness and management training for relevant staff
– Establishment of bird population triggers
– Implementation of activities to reduce hazardous bird populations
– Adoption of wildlife deterrent technologies to reduce hazardous bird populations.

Based on the proposed design, mitigation measures and operations of the facilities, habitat for birds within the broader locality as well as directly around the proposal sites that would not be removed and proximity to the nearest airport itself, the following measures are recommended (see section 2.2).

2.2 Management measures

To satisfy the guideline (DITRDCA, 2019), recommended wildlife population management measures for the proposal include:

1. Wildlife awareness and management training for relevant staff

All staff at both the Hume FOGO and MRF should be trained to identify wildlife, specifically birds, and their behaviour and understand the habits of different species of birds that may be attracted to waste facilities for foraging opportunities. This may include smaller species like Ravens (*Corvus* ssp.) as well as larger birds like the Australian White Ibis (*Threskiornis molucca*). Workers should be trained to identify flocking behaviour and assess if bird flocks are present during operation of the facilities. If large, sedentary, bird flocks are present once operation begins (greater than 20 individuals), then further management action may need to be undertaken, such as a wildlife hazard assessment by qualified ornithologists and the re-evaluation of management measures. However, as the operations for each facility would be entirely self-contained within the buildings on-site, this is expected to minimise the olfactory and visual cues that birds would typically use to locate waste sites for foraging (Rubene et al., 2019). Therefore, it is unlikely that birds would flock at the sites due to a lack of opportunities for foraging.

2. Wildlife hazard assessments by qualified ornithologists

As mentioned above, in the event that birds are flocking in significant numbers within groups that are sedentary, a wildlife hazard assessment should be undertaken by a suitably qualified ornithologist to assess the potential hazard level to aviation traffic from the presence of birds. The risk level to air traffic would vary depending on the size of any bird groupings present and the flight paths that aircraft take to the airport. With the proposed facilities located at a significant distance from the airport, this would further mitigate the risk associated to aircraft should any larger groups of birds be present. However, to be conservative, an assessment would need to be considered. This would provide an outline of associated risk levels as well as management measures.

3. Adoption of wildlife deterrent technologies to reduce hazardous bird populations

Consideration should be given to adopting wildlife deterrent technology only if a qualified ornithologist suggests that the risk level to aircraft is high and outlines potential deterrent measures to disperse local populations of any birds present at the sites. This would ultimately be informed by a wildlife hazard assessment, should it be necessary (as per above). Nonetheless, possible humane deterrents are bird spikes to prevent perching, drones to scare groups of birds and visual bird deterrents, however any methodology would be assessed and recommended by an ornithologist in the events it is deemed necessary.

4. Other measures

Considering that the proposed facilities are both partially or completely enclosed, the following other measures may be useful in preventing birds being attracted to the sites. These include:

– Ensuring all doors and other entrances remain closed when not in use to prevent the release of visual or odour cues that wildlife may utilise to detect possible foraging resources.
– Adequate measures to dispose of waste generated at the site itself and to ensure waste being brought to and from the sites is properly handled to prevent potential overflow of waste.

3. Conclusion

Based on the proposed development, it is unlikely that wildlife would be attracted to the sites in large numbers. Nonetheless, the management measures recommended here would help to ensure wildlife conflict is avoided and therefore satisfy the guidelines under the *National Airports Safeguarding Framework principles and guidelines*.

Regards

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Andrew Smith
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References

Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA). 2019. National Airports Safeguarding Framework principles and guidelines. Canberra, ACT.

GHD. 2023a. Hume FOGO Facility: Preliminary Hazard Analysis Report. Prepared for Transport Canberra and City Services Directorate.

GHD. 2023b. Materials Recovery Facility: Preliminary Hazard Analysis Report. Prepared for Transport Canberra and City Services Directorate.

Rubene, D., Leidefors, M., Ninkovic, V., Eggers, S., & Low, M. 2019. Disentangling olfactory and visual information used by field foraging birds. *Ecology and Evolution*, 9(1), 545-552.

Appendix C

Example safety data sheets

BOC
A Member of The Linde Group

SAFETY DATA SHEET

 # 001

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **ACETYLENE**

Synonyms 001 - SDS NUMBER ● 16110367F - MATERIAL NUMBER ● DISSOLVED ACETYLENE ● ETHYNE ● PRODUCT CODES: 040, 041

1.2 Uses and uses advised against

Uses FUEL ● INDUSTRIAL APPLICATIONS

1.3 Details of the supplier of the product

Supplier name **BOC LIMITED (AUSTRALIA)**

Address 10 Julius Avenue, North Ryde, NSW, 2113, AUSTRALIA

Telephone 131 262, (02) 8874 4400

Website http://www.boc.com.au

1.4 Emergency telephone numbers

Emergency 1800 653 572 (24/7) (Australia only)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Flammable Gases: Category 1A
Chemically Unstable Gases: Category A
Gases Under Pressure: Dissolved gas

Health Hazards

Not classified as a Health Hazard

Environmental Hazards

Not classified as an Environmental Hazard

2.2 GHS Label elements

Signal word **DANGER**

Pictograms

Hazard statements

H220 Extremely flammable gas.
H230 May react explosively even in the absence of air.
H280 Contains gas under pressure; may explode if heated.

Prevention statements

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.

Response statements

P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	In case of leakage, eliminate all ignition sources.

Storage statements

P403	Store in a well-ventilated place.

Disposal statements

None allocated.

2.3 Other hazards

Asphyxiant. Effects are proportional to oxygen displacement.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content (v/v)
ACETYLENE	74-86-2	200-816-9	>98%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye Adverse effects not expected from this product.

Inhalation If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available. For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor.

Skin Adverse effects not expected from this product.

Ingestion Ingestion is not considered a potential route of exposure.

First aid facilities None allocated.

4.2 Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility / consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

4.3 Immediate medical attention and special treatment needed

Treat for asphyxia.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services or manufacturer's advisor. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders.

5.2 Special hazards arising from the substance or mixture

Extremely flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

5.3 Advice for firefighters

Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. This material is capable of forming explosive mixtures in air. May react explosively even in the absence of air.

5.4 Hazchem code

2SE

2	Fine Water Spray.
S	Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Dilute spill and run-off.
E	Evacuation of people in and around the immediate vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Eliminate all sources of ignition. Consider the risk of potentially explosive atmospheres.

6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Carefully move material to a well ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Use of safe work practices are recommended to avoid inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement. Never open an acetylene cylinder valve without the regulator attached. Gas regulator of suitable pressure and flow rating fitted to cylinder and manifold with low pressure gas distribution equipment which controls fuel gas mixture and flame. The regulator and other equipment must be compatible with the product and suited for the particular use. Never "sniff" acetylene as it may ignite spontaneously. Instead, carefully inspect the outlet and if there are any signs of dirt, blow it out with a jet of clean compressed air or nitrogen.

7.2 Conditions for safe storage, including any incompatibilities

Do not store near incompatible substances and sources of ignition. Cylinders should be stored: upright, prevented from falling, in a secure area; below 65°C, in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits. Post "No Smoking or Open Flames" signs in the storage areas. Refer to applicable legislation on flammable storage quantity restrictions. Never transfer acetylene to another cylinder or other container.

7.3 Specific end uses

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Acetylene	SWA [AUS]	Asphyxiant			

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering controls Provide suitable ventilation to minimise or eliminate exposure. Confined areas (e.g. tanks) should be adequately ventilated or gas tested. Flammable/explosive vapours may accumulate in poorly ventilated areas.

PPE

Eye / Face	Wear safety glasses.
Hands	Wear leather or cotton gloves.
Body	Wear coveralls and safety boots.
Respiratory	If using product in a confined area, wear an Air-line respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS GAS
Odour	GARLIC-LIKE ODOUR
Flammability	EXTREMELY FLAMMABLE
Flash point	< 23°C
Boiling point	-84°C
Melting point	NOT AVAILABLE
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	0.906 (Air = 1)
Relative density	NOT APPLICABLE
Solubility (water)	SOLUBLE
Vapour pressure	4700 kPa @ 25°C
Upper explosion limit	100 %
Lower explosion limit	2.3 %
Partition coefficient	NOT AVAILABLE
Autoignition temperature	305°C
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	100 %
Critical pressure	6,242 kPa
Critical temperature	36.3°C (dissolved in acetone and porous medium)
Cylinder pressure (when full)	1550 kPa @ 15°C

10. STABILITY AND REACTIVITY

10.1 Reactivity

Forms explosive acetylides with copper, silver and mercury. Do not use alloys containing more than 65% copper.

10.2 Chemical stability

Generally stable under recommended conditions of storage. However, sensitive to heat or shock and may become explosive, even in the absence of air.

10.3 Possibility of hazardous reactions

Polymerises with evolution of heat. Avoid contact with curing agents, accelerators, and/or initiators.

10.4 Conditions to avoid

Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g. hypochlorites), copper, copper alloys (>70% copper), silver and mercury to form explosive acetylides. May decompose violently at high temperatures and/or pressures or in the presence of a catalyst. Hazardous by-products may be produced when this gas/gas mixture is used in welding, cutting and associated processes.

10.6 Hazardous decomposition products

May evolve toxic gases if heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity	Based on available data, the classification criteria are not met.
Skin	Not classified as a skin irritant.
Eye	Not classified as an eye irritant.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT - single exposure	Asphyxiant. Effects are proportional to oxygen displacement. Over exposure may result in dizziness, drowsiness, weakness, fatigue, breathing difficulties and unconsciousness.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No ecological damage is expected to be caused by this product.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

This product is not expected to bioaccumulate.

12.4 Mobility in soil

Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5 Other adverse effects

No known effects from this product. Fume from fabrication processes which use this gas/gas mixture may be harmful to the environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1001	1001	1001
14.2 Proper Shipping Name	ACETYLENE, DISSOLVED	ACETYLENE, DISSOLVED	ACETYLENE, DISSOLVED
14.3 Transport hazard class	2.1	2.1	2.1
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards

No information provided.

14.6 Special precautions for user

Hazchem code 2SE

GTEPG 2A1

EmS F-D, S-U

Other information Refer to Commonwealth, State and Territory Dangerous Goods Legislation which contain requirements which affect gas storage and transport. Special transport precautions: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
Before transporting product containers:
Ensure there is adequate ventilation.
Ensure that containers are firmly secured.
Ensure cylinder valve is closed and not leaking.
Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
Ensure valve protection device (where provided) is correctly fitted.

15. REGULATORY INFORMATION

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

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Safe Work Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals (GHS Revision 7).

Inventory listings **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**
All components are listed on AIIC, or are exempt.

16. OTHER INFORMATION

Additional information The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders.

When using this gas/gas mixture for welding, cutting and associated processes, additional hazards may be generated by the process such as radiation, noise and fume. Risk assessments should be made for each activity to identify and quantify the individual hazards involved. Please refer to the relevant Safety Data Sheets for the welding consumables being used or, if available, the materials being welded.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

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It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

Prepared by

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[End of SDS]

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **BITUMEN**

Synonym(s) BITUMEN CLASS 170, 240, 320, 450, 600

1.2 Uses and uses advised against

Use(s) BITUMEN ● PAVING ● ROAD MAKING

1.3 Details of the supplier of the product

Supplier name **BORAL CONSTRUCTION MATERIALS LTD.**

Address Level 3, 40 Mount Street, Nth Sydney, NSW, 2060, AUSTRALIA

Telephone (02) 9220 6300

Email sds@rmt.com.au

Website www.boral.com.au

1.4 Emergency telephone number(s)

Emergency 1800 555 477 (6.30am – 5pm WST)

Emergency (A/H) 13 11 26 (Poisons Information Centre)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

GHS classification(s) Flammable Liquids: Category 4

2.2 Label elements

Signal word **WARNING**

Pictogram(s)

None allocated.

Hazard statement(s)

H227 Combustible liquid.

Prevention statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response statement(s)

P370 + P378 In case of fire: Use appropriate media for extinction.

Storage statement(s)

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

Disposal statement(s)

P501 Dispose of contents/container in accordance with relevant regulations.

2.3 Other hazards

Contact with molten product can result in thermal burns. Bitumens, occupational exposure to straight-run bitumens and their emissions during road paving, are classified as possibly carcinogenic to humans (IARC Group 2B).

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
BITUMEN	8052-42-4	232-490-9	>99%
BITUMEN (OXIDISED)	64742-93-4	265-196-4	>99%
HYDROGEN SULPHIDE	7783-06-4	231-977-3	<0.01%
RESIDUES, PETROLEUM, VACUUM	64741-56-6	265-057-8	<0.01%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye If contact with hot material occurs, flush gently with cold running water. Adhered material should only be removed under the medical direction. Seek immediate medical advice.

Inhalation If inhaled, remove from contaminated area. To protect rescuer, use a Type A (Organic vapour) respirator or an Air-line respirator (in poorly ventilated areas). Apply artificial respiration if not breathing.

Skin If contact with hot material occurs, drench area immediately with cold water, do not attempt to remove material adhered to the skin. Seek immediate medical attention.

Ingestion For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor (at once). If swallowed, do not induce vomiting. Ingestion is considered unlikely due to product form.

First aid facilities Eye wash facilities and safety shower are recommended.

4.2 Most important symptoms and effects, both acute and delayed

Avoid contact with hot material, as burns may result.

4.3 Immediate medical attention and special treatment needed

Burns caused by bitumen require special medical treatment. Consultation with a burns specialist experienced in bitumen burns is advisable in the first instance.

Refer to the Australian Asphalt Pavement Association (AAPA) bitumen burns card for further information (http://www.aapa.asn.au).

Bitumen burns: If hot bitumen contacts the skin, flush immediately with water and make no attempt to remove it. Use wet, cold towels if face, neck, shoulder or back etc are burnt. Cool burn areas for 30 minutes and seek immediate medical attention. Where bitumen completely circles a limb, it may have a tourniquet effect and should be split longitudinally as it cools. If eye burns result flush with water for 15 minutes, pad and seek immediate medical attention.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

In case of fire, use water fog, foam, dry chemical or carbon dioxide extinguisher or spray. Do not use water jets.

5.2 Special hazards arising from the substance or mixture

Combustible. May evolve toxic gases (carbon/ sulphur/ nitrogen oxides, hydrogen sulphide, hydrocarbons) when heated to decomposition.

5.3 Advice for firefighters

Evacuate area and contact emergency services. Toxic gases may be evolved in a fire situation. Remain upwind and notify those downwind of hazard. Wear full protective equipment including Self Contained Breathing Apparatus (SCBA) when combating fire. Use waterfog to cool intact containers and nearby storage areas.

5.4 Hazchem code

2W

2 Fine Water Spray.

W Risk of violent reaction or explosion. Wear liquid-tight chemical protective clothing and breathing apparatus. Contain spill and run-off.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS. Clear area of all unprotected personnel. Ventilate area where possible. Allow material to cool. Contact emergency services where appropriate.

6.2 Environmental precautions

Contain material and prevent product from entering drains and waterways. Collect and seal in properly labelled containers for disposal. If contamination of sewers or waterways has occurred, contact local emergency services.

6.3 Methods of cleaning up

Contain spillage, then cover / absorb spill with non-combustible absorbent material (vermiculite, sand, or similar), collect and place in suitable containers for disposal. Eliminate all sources of ignition.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities

Store in a well ventilated area removed from ignition sources, oxidising agents and foodstuffs. Keep storage vessels closed when not in use. Take precautionary measures against electrostatic discharges.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Bitumen fume	SWA (AUS)	--	5	--	--
Hydrogen Sulphide	SWA (AUS)	10	14	15	21

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls

Engineering controls Avoid inhalation by working upwind where possible. Use in well ventilated areas. Maintain vapour /fume levels below the recommended exposure standard.

PPE

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Eye / Face Hot material: to prevent thermal burns wear a helmet, full face visor and heat resistant neck flap / apron.
Cold material: wear safety glasses with side shields. Chemical splash goggles.

Hands Hot material: to prevent thermal burns wear heat resistant and impervious gauntlets/gloves.
Cold material: Wear chemical resistant gloves. Recommended: nitrile gloves.

Body Thermal resistant clothing will be required when handling hot products.

Respiratory Where an inhalation risk exists, wear a Type A-Class P1 (Organic gases/vapours and Particulate) respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	VISCOUS BLACK LIQUID
Odour	HYDROCARBON ODOUR
Flammability	COMBUSTIBLE

9.1 Information on basic physical and chemical properties

Flash point	> 230°C
Boiling point	NOT AVAILABLE
Melting point	NOT AVAILABLE
Evaporation rate	NOT AVAILABLE
pH	NOT AVAILABLE
Vapour density	NOT AVAILABLE
Specific gravity	NOT AVAILABLE
Solubility (water)	INSOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT AVAILABLE
Lower explosion limit	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization is not expected to occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g. hypochlorites) and acids (e.g. nitric acid).

10.6 Hazardous decomposition products

May evolve toxic gases (carbon/ sulphur/ nitrogen oxides, hydrogen sulphide, hydrocarbons) when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity No known toxicity data is available for this product. Based on available data, the classification criteria are not met. Inhalation may cause headache, nausea and respiratory tract irritation. Once cured, the inert solid material is considered non hazardous.

Information available for the ingredient(s):

Ingredient	Oral Toxicity (LD50)	Dermal Toxicity (LD50)	Inhalation Toxicity (LC50)
HYDROGEN SULPHIDE	--	--	712 ppm
RESIDUES, PETROLEUM, VACUUM	> 5 g/kg (rat)	> 2 g/kg (rabbit)	--

Skin Contact with hot material may cause skin burns. Exposure to asphalt fumes may cause dermatitis and photosensitisation. Once cured, the inert semi solid material is considered non hazardous.

Eye Contact with hot material may cause eye burns. Exposure to asphalt fumes may cause irritation, redness or pain. Once cured, the inert semi solid material is unlikely to penetrate the eye and considered non hazardous.

Sensitisation Not classified as causing skin or respiratory sensitisation.

Mutagenicity Insufficient data available to classify as a mutagen.

Carcinogenicity Bitumens, occupational exposure to straight-run bitumens and their emissions during road paving, are classified as possibly carcinogenic to humans (IARC Group 2B).

Reproductive Insufficient data available to classify as a reproductive toxin.

STOT - single exposure	Not classified as causing organ damage from single exposure. However, inhalation of bitumen fumes may cause headache, nausea and respiratory tract irritation. This material may release trace quantities of hydrogen sulphide within storage facilities.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure.
Aspiration	Not expected to present an aspiration hazard.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

The bulk of the bitumen dispersed in asphalt is fairly inert when set, and should not present an environmental hazard under normal conditions.

12.2 Persistence and degradability

This product is not readily biodegradable.

12.3 Bioaccumulative potential

This product is not expected to bioaccumulate through food chains in the environment.

12.4 Mobility in soil

Spillages are unlikely to penetrate the soil.

12.5 Other adverse effects

Avoid contamination of drains and waterways.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal	For small amounts dispose of to an approved landfill site. Contact the manufacturer for additional information if larger amounts are involved. Prevent contamination of drains and waterways as aquatic life may be threatened and environmental damage may result.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	3257	3257	3257
14.2 Proper Shipping Name	ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100°C and below its flash point (including molten metals, molten salts, etc.)	ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100°C and below its flash point (including molten metals, molten salts, etc.)	ELEVATED TEMPERATURE LIQUID, N.O.S., at or above 100°C and below its flash point (including molten metals, molten salts, etc.)
14.3 Transport hazard class	9	9	9
14.4 Packing Group	III	III	III

14.5 Environmental hazards

No information provided.

14.6 Special precautions for user

Hazchem code	2W
GTEPG	9A1
EMS	F-A, S-P

15. REGULATORY INFORMATION

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

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.

The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].

Hazard codes None allocated.

Risk phrases None allocated.

Safety phrases None allocated.

Inventory listing(s) **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)**
All components are listed on AICS, or are exempt.

16. OTHER INFORMATION

Additional information

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
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mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
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[End of SDS]

SAFETY DATA SHEET

Automotive Diesel Fuel

Section 1. Identification

GHS product identifier Automotive Diesel Fuel

Other means of identification C10, BP 10 ppm diesel fuel, Ultra Low Sulphur diesel fuel, Automotive Diesel fuel, AD20, AD40, Alpine Diesel and Biodiesel up to B5.

Product code 0000002718

SDS no. 0000002718

Historic SDS no. AD0K1

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

Use of the substance/ mixture Fuel for compression ignition diesel engines.

Manufacturer

Supplier

BP Australia Pty Ltd
Level 17, 717 Bourke Street
Docklands, Victoria 3008
ABN 53 004 085 616

www.bp.com.au

Technical Helpline Number: 1300 139 700

EMERGENCY TELEPHONE NUMBER 1800 638 556

Section 2. Hazard(s) identification

Classification of the substance or mixture

FLAMMABLE LIQUIDS - Category 4
ACUTE TOXICITY (inhalation) - Category 4
SKIN CORROSION/IRRITATION - Category 2
CARCINOGENICITY - Category 2
SPECIFIC TARGET ORGAN TOXICITY - REPEATED EXPOSURE (bone marrow, liver, thymus) - Category 2
ASPIRATION HAZARD - Category 1

GHS label elements

Hazard pictograms

Signal word DANGER

Hazard statements

H227 - Combustible liquid.
H332 - Harmful if inhaled.
H315 - Causes skin irritation.
H351 - Suspected of causing cancer.
H304 - May be fatal if swallowed and enters airways.
H373 - May cause damage to organs through prolonged or repeated exposure. (bone marrow, liver, thymus)

Precautionary statements

General

P103 - Read label before use.
P102 - Keep out of reach of children.
P101 - If medical advice is needed, have product container or label at hand.

Section 2. Hazard(s) identification

Prevention

P201 - Obtain special instructions before use.
P260 - Do not breathe vapour.
P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P240 - Ground/bond container and receiving equipment.
P273 - Avoid release to the environment.

Response

P314 - Get medical attention if you feel unwell.
P308 + P313 - IF exposed or concerned: Get medical attention.
P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.
P301 + P310 + P331 - IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting.
P302 + P352 + P362 + P363 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse.
P332 + P313 - If skin irritation occurs: Get medical attention.

Storage

P405 - Store locked up.
P403 - Store in a well-ventilated place.
P235 - Keep cool.

Disposal

P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental label elements

Not applicable.

Other hazards which do not result in classification

This material may contain significant quantities of polycyclic aromatic hydrocarbons, some of which have been shown by experimental studies to induce skin cancer.
Note: High Pressure Applications
Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency.
See 'Notes to physician' under First-Aid Measures, Section 4 of this Safety Data Sheet.

Section 3. Composition and ingredient information

Substance/mixture Mixture

May contain Fatty Acid Methyl Esters (FAME). May also contain small quantities of proprietary performance additives. Contains small quantities of polycyclic aromatic hydrocarbons (PAHs).

Ingredient name	% (w/w)	CAS number
Fuels, diesel	> 95	68334-30-5
Alkanes, C10-20-branched and linear	0 - 20	928771-01-1

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.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Check for and remove any contact lenses. Get medical attention.

Inhalation

If inhaled, remove to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention.

Section 4. First aid measures

Skin contact

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Drench contaminated clothing with water before removing. This is necessary to avoid the risk of sparks from static electricity that could ignite contaminated clothing. Contaminated clothing is a fire hazard. Contaminated leather, particularly footwear, must be discarded. Clean shoes thoroughly before reuse. Get medical attention.

Ingestion

Do not induce vomiting. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Aspiration hazard if swallowed. Can enter lungs and cause damage. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

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

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician

Treatment should in general be symptomatic and directed to relieving any effects. Product can be aspirated on swallowing or following regurgitation of stomach contents, and can cause severe and potentially fatal chemical pneumonitis, which will require urgent treatment. Because of the risk of aspiration, induction of vomiting and gastric lavage should be avoided. Gastric lavage should be undertaken only after endotracheal intubation. Monitor for cardiac dysrhythmias.

Note: High Pressure Applications
Injections through the skin resulting from contact with the product at high pressure constitute a major medical emergency. Injuries may not appear serious at first but within a few hours tissue becomes swollen, discoloured and extremely painful with extensive subcutaneous necrosis.
Surgical exploration should be undertaken without delay. Thorough and extensive debridement of the wound and underlying tissue is necessary to minimise tissue loss and prevent or limit permanent damage. Note that high pressure may force the product considerable distances along tissue planes.

Specific treatments

No specific treatment.

Protection of first-aiders

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Section 5. Firefighting measures

Extinguishing media

Suitable extinguishing media

In case of fire, use water fog, foam, dry chemical or carbon dioxide extinguisher or spray.

Unsuitable extinguishing media

Do not use water jet.

Specific hazards arising from the chemical

Combustible liquid. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products

Combustion products may include the following:
carbon oxides (CO, CO_2) (carbon monoxide, carbon dioxide)
other hazardous substances.

Special protective actions for fire-fighters

No action shall be taken involving any personal risk or without suitable training. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Section 5. Firefighting measures

Special protective equipment for fire-fighters Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

Hazchem code 3z

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Put on appropriate personal protective equipment. Floors may be slippery; use care to avoid falling. Eliminate all ignition sources.

For emergency responders Entry into a confined space or poorly ventilated area contaminated with vapour, mist or fume is extremely hazardous without the correct respiratory protective equipment and a safe system of work. Wear self-contained breathing apparatus. Wear a suitable chemical protective suit. Chemical resistant boots. See also the information in "For non-emergency personnel".

Environmental precautions Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and material for containment and cleaning up

Small spill Eliminate all ignition sources. Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. The method and equipment used must be in conformance with appropriate regulations and industry practice on explosive atmospheres.

Large spill Eliminate all ignition sources. Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Dike spill area and do not allow product to reach sewage system and surface or ground water. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Use spark-proof tools and explosion-proof equipment. Contaminated absorbent material may pose the same hazard as the spilt product. The method and equipment used must be in conformance with appropriate regulations and industry practice on explosive atmospheres. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

Precautions for safe handling

Protective measures Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not swallow. Aspiration hazard if swallowed. Can enter lungs and cause damage. Never siphon by mouth. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not reuse container. Avoid contact of spilt material and runoff with soil and surface waterways.

Section 7. Handling and storage

Advice on general occupational hygiene

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidising materials. Keep container tightly closed and sealed until ready for use. Store and use only in equipment/containers designed for use with this product. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

Take precautions to avoid static electrical discharge and all ignition sources during filling, ullaging and sampling from storage tanks. Do not enter storage tanks. If entry to vessels is necessary, follow permit to work procedures. When the product is pumped (e.g. during filling, discharge or ullaging) and when sampling, there is a risk of static discharge. Ensure equipment used is properly earthed or bonded to the tank structure. Use of explosion-protected electrical, ventilating, lighting and all material-handling equipment should be considered. Explosive air/vapour mixtures may form at ambient temperatures on contact with hot surfaces. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.

Product contaminated rags, paper or material used to absorb spillages, represent a fire hazard, and should not be allowed to accumulate. Dispose of safely immediately after use. Entry into a confined space or poorly ventilated area contaminated with vapour, mist or fume is extremely hazardous without the correct respiratory protective equipment and a safe system of work.

Classified as a C1 (COMBUSTIBLE LIQUID) for the purpose of storage and handling, in accordance with the requirements of AS 1940. Refer to State Regulations for storage and transport requirements.

Section 8. Exposure controls and personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Fuels, diesel	**ACGIH TLV (United States). Absorbed through skin.** TWA: 100 mg/m³, (measured as total hydrocarbons) 8 hours. Issued/Revised: 1/2007 Form: Inhalable fraction and vapor

Appropriate engineering controls

All activities involving chemicals should be assessed for their risks to health, to ensure exposures are adequately controlled. Personal protective equipment should only be considered after other forms of control measures (e.g. engineering controls) have been suitably evaluated. Personal protective equipment should conform to appropriate standards, be suitable for use, be kept in good condition and properly maintained.
Your supplier of personal protective equipment should be consulted for advice on selection and appropriate standards. For further information contact your national organisation for standards.
Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits.

Section 8. Exposure controls and personal protection

The final choice of protective equipment will depend upon a risk assessment. It is important to ensure that all items of personal protective equipment are compatible.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

Chemical splash goggles.

Skin protection

Hand protection

Wear chemical resistant gloves.

Protective gloves must give suitable protection against mechanical risks (i.e. abrasion, blade cut and puncture). Protective gloves will deteriorate over time due to physical and chemical damage. Inspect and replace gloves on a regular basis. The frequency of replacement will depend upon the circumstances of use.

Recommended: Nitrile gloves.

Skin protection

Recommended: overall
Use of protective clothing is good industrial practice.
Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Cotton or polyester/cotton overalls will only provide protection against light superficial contamination that will not soak through to the skin. Overalls should be laundered on a regular basis. When the risk of skin exposure is high (e.g. when cleaning up spillages or if there is a risk of splashing) then chemical resistant aprons and/or impervious chemical suits and boots will be required.
Wear suitable protective clothing.
Footwear highly resistant to chemicals.
When there is a risk of ignition wear inherently fire resistant protective clothes and gloves.
When there is a risk of ignition from static electricity, wear anti-static protective clothing. For greatest effectiveness against static electricity, overalls, boots and gloves should all be anti-static.
When the risk of skin exposure is high (from experience this could apply to the following tasks: cleaning work, maintenance and service, filling and transfer, taking samples and cleaning up spillages) then a chemical protective suit and boots will be required.
Work clothing / overalls should be laundered on a regular basis. Laundering of contaminated work clothing should only be done by professional cleaners who have been told about the hazards of the contamination. Always keep contaminated work clothing away from uncontaminated work clothing and uncontaminated personal clothes.

Other skin protection

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

Use with adequate ventilation.
If there is a requirement for the use of a respiratory protective device, but the use of breathing apparatus (independent of ambient atmosphere) is not required, then a suitable filtering device must be worn.
The filter class must be suitable for the maximum contaminant concentration (gas/ vapour/aerosol/particulates) that may arise when handling the product.

Recommended: If ventilation is inadequate, use respirator that will protect against organic vapour and dust/mist.

Section 8. Exposure controls and personal protection

Refer to standards: Respiratory protection:AS/NZS 1715 and AS/NZS 1716
Gloves:AS/NZS 2161.1
Eye protection:AS/NZS 1336 and AS/NZS 1337

Section 9. Physical and chemical properties

Appearance

Physical state Liquid.

Colour Water white to straw including fluorescent green, blue or yellow.

Odour Mild

Odour threshold 0.7 ppm (Based on Fuels, diesel)

pH Not applicable. Based on Solubility in Water (Very slightly soluble in water)

Melting point -29 to -18°C (-20.2 to -0.4°F) (Based on Fuels, diesel)

Boiling point 180 to 380°C (356 to 716°F)

Flash point Closed cup: >61.5°C (>142.7°F) [Pensky-Martens.]

Evaporation rate Not relevant/applicable due to nature of the product. Based on low volatility

Flammability (solid, gas) Not applicable. Based on - Physical state

Lower and upper explosive (flammable) limits Lower: 0.5%
Upper: 7.5%

Vapour pressure 0.1 kPa (0.755 mm Hg) (Based on Concawe Category: Vacuum Gas Oils, Hydrocracked Gas Oils & Distillate Fuels (VHGO))

Vapour density Not available.

Relative density 0.83

Density 820 to 850 kg/m³ (0.82 to 0.85 g/cm³) at 15°C

Solubility Very slightly soluble in water

Partition coefficient: n-octanol/water Not applicable. Based on Fuels, diesel - Substance is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance.

Auto-ignition temperature 240°C (464°F) (Based on Fuels, diesel)

Decomposition temperature Not observed to decompose by final boiling point: 380°C (716°F)

Viscosity Kinematic: 2 to 4.5 mm^2/s (2 to 4.5 cSt) at 40°C

Section 10. Stability and reactivity

Reactivity No specific test data available for this product. Refer to Conditions to avoid and Incompatible materials for additional information.

Chemical stability The product is stable.

Possibility of hazardous reactions Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerisation will not occur.

Conditions to avoid Avoid all possible sources of ignition (spark or flame). Avoid excessive heat.

Incompatible materials Reactive or incompatible with the following materials: oxidising materials.

Hazardous decomposition products Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure

Section 11. Toxicological information

Fuels, diesel	LC50 Inhalation Dusts and mists	Rat	4.1 mg/l	4 hours
	LD50 Dermal	Rabbit	>4300 mg/kg	-
	LD50 Dermal	Rabbit	>4300 mg/kg	-
	LD50 Oral	Rat	17900 mg/kg	-
	LD50 Oral	Rat	7600 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Fuels, diesel	Skin - Irritation	Rabbit	-	-	-
	Skin - Irritation	Rabbit	-	-	-
	Eyes - Non-irritating to the eyes.	Rabbit	-	-	-
	Eyes - Non-irritating to the eyes.	Rabbit	-	-	-

Skin Causes skin irritation.

Sensitisation

Product/ingredient name	Route of exposure	Species	Result
Fuels, diesel	skin	Guinea pig	Not sensitising
	skin	Guinea pig	Not sensitising

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Fuels, diesel	OECD 471	Experiment: In vitro Subject: Non-mammalian species	Positive
	Equivalent to OECD 476	Experiment: In vitro Subject: Mammalian-Animal Cell: Germ	Negative
	not guideline	Experiment: In vivo Subject: Unspecified Cell: Somatic	Negative

Conclusion/Summary Not classified. Based on available data, the classification criteria are not met.

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Fuels, diesel	Positive - Dermal - Unspecified	Mouse	-	2 years

Conclusion/Summary Suspected of causing cancer.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Developmental toxin	Species	Dose	Exposure
Fuels, diesel	-	-	Negative	Rat	Dermal	20 days
	-	-	Negative	Rat	Dermal	10 days
	-	-	Negative	Rat	Dermal	10 days

Conclusion/Summary Development: Not classified. Based on available data, the classification criteria are not met.
Fertility: Not classified. Based on available data, the classification criteria are not met.
Effects on or via lactation: Not classified. Based on available data, the classification criteria are not met.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs

Fuels, diesel	Category 2	Not determined	bone marrow, liver and thymus

Aspiration hazard

Name	Result
Fuels, diesel	ASPIRATION HAZARD - Category 1
Alkanes, C10-20-branched and linear	ASPIRATION HAZARD - Category 1

Information on likely routes of exposure Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact No known significant effects or critical hazards.

Inhalation Harmful if inhaled.

Skin contact Causes skin irritation.

Ingestion Irritating to mouth, throat and stomach. Aspiration hazard if swallowed -- harmful or fatal if liquid is aspirated into lungs.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation Adverse symptoms may include the following:
nausea or vomiting
headache
drowsiness/fatigue
dizziness/vertigo
unconsciousness

Skin contact Adverse symptoms may include the following:
irritation
redness

Ingestion Adverse symptoms may include the following:
nausea or vomiting

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Eye contact Vapour, mist or fume may cause eye irritation. Exposure to vapour, mist or fume may cause stinging, redness and watering of the eyes.

Inhalation Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. Vapour, mist or fume may irritate the nose, mouth and respiratory tract.

Skin contact As with all such products containing potentially harmful levels of polycyclic aromatic hydrocarbons, prolonged or repeated skin contact may eventually result in dermatitis or more serious irreversible skin disorders including cancer.

Ingestion If swallowed, may irritate the mouth, throat and digestive system. If swallowed, may cause abdominal pain, stomach cramps, nausea, vomiting, diarrhoea, dizziness and drowsiness.

General May cause damage to organs through prolonged or repeated exposure. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer. Vapour, mists or fumes may contain polycyclic aromatic hydrocarbons some of which are known to produce skin cancer.

Carcinogenicity Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity No known significant effects or critical hazards.

Teratogenicity No known significant effects or critical hazards.

Section 11. Toxicological information

Developmental effects No known significant effects or critical hazards.

Fertility effects No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Inhalation (dusts and mists)	1.89 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Fuels, diesel	EL50 >1000 mg/l Nominal Fresh water	Micro-organism	40 hours
	NOELR 3.217 mg/l Nominal Fresh water	Micro-organism	40 hours
	Acute EL50 22 mg/l Nominal Fresh water	Algae	72 hours
	Acute EL50 210 mg/l Nominal Fresh water	Daphnia	48 hours
	Acute EL50 68 mg/l Nominal Fresh water	Daphnia	48 hours
	Acute ErL50 78 mg/l Nominal Fresh water	Algae	72 hours
	Acute LL50 65 mg/l Nominal Fresh water	Fish	96 hours
	Acute LL50 21 mg/l Nominal Fresh water	Fish	96 hours
	Acute NOELR 10 mg/l Nominal Fresh water	Algae	72 hours
	Acute NOELR 1 mg/l Nominal Fresh water	Algae	72 hours
	Acute NOELR 46 mg/l Nominal Fresh water	Daphnia	48 hours
	Chronic NOEL 0.083 mg/l Nominal Fresh water	Fish	14 days
	Chronic NOELR 0.2 mg/l Nominal Fresh water	Daphnia	21 days

Conclusion/Summary Toxic to aquatic life with long lasting effects.

Persistence and degradability

Expected to be biodegradable.

Product/ingredient name	Test	Result	Dose	Inoculum
Fuels, diesel	OECD 301 F	60 % - Readily - 28 days	30 mg/l	-
	OECD 301 F	57.5 % - Not readily - 28 days	25 mg/l	-
	Equivalent to EPA OTS 796.3100	35 % - Not readily - 28 days	5 mg/l	-

Conclusion/Summary Non-persistent per IMO criteria

Bioaccumulative potential

This product is not expected to bioaccumulate through food chains in the environment.

Section 12. Ecological information

Mobility in soil

Soil/water partition coefficient (K_{OC}) Not available.

Mobility Spillages may penetrate the soil causing ground water contamination. This material may accumulate in sediments.

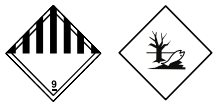
Other ecological information Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired.

Section 13. Disposal considerations

Disposal methods The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapour from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Special Precautions for Landfill or Incineration Empty packages may contain some remaining product. Hazard warning labels are a guide to the safe handling of empty packaging and should not be removed.

Section 14. Transport information

	ADG	IMDG	IATA
UN number	Not regulated.	UN3082	UN3082
UN proper shipping name	-	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuels, diesel). Marine pollutant	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fuels, diesel)
Transport hazard class(es)	-	9 	9 
Packing group	-	III	III
Environmental hazards	No.	Yes.	Yes.
Additional information	**Remarks** Combustible liquid Class C1 (AS 1940). **Hazchem code** 3Z **Initial emergency response guide** 47	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. **Emergency schedules** F-A, S-F	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

Section 14. Transport information

Special precautions for user Not available.

Transport in bulk according to Annex II of Marpol and the IBC Code

Proper shipping name MARPOL Annex 1 rules apply for bulk shipments by sea.
Category: gas oils, including ship's bunkers

Section 15. Regulatory information

Standard Uniform Schedule of Medicine and Poisons

Not scheduled

Consumer products - This product is exempt per Appendix A of the SUSMP.
Industrial Products - Labelling requirements for SUSMP do not apply to a poison that is packed and sold solely for industrial, laboratory or manufacturing use. However, this product is labelled in accordance with NOSHC National Code of Practice for labelling of workplace substances.

Model Work Health and Safety Regulations - Scheduled Substances

No listed substance

Montreal Protocol (Annexes A, B, C, E)

Ingredient name	List name	Status
Not listed.		

Stockholm Convention on Persistent Organic Pollutants

Ingredient name	List name	Status
Not listed.		

Rotterdam Convention on Prior Informed Consent (PIC)

Ingredient name	List name	Status
Not listed.		

International lists

National inventory

REACH Status	For the REACH status of this product please consult your company contact, as identified in Section 1.
Australia inventory (AICS)	All components are listed or exempted.
Canada inventory	All components are listed or exempted.
China inventory (IECSC)	Not determined.
Japan inventory (ENCS)	Not determined.
Korea inventory (KECI)	Not determined.
Philippines inventory (PICCS)	Not determined.
Taiwan Chemical Substances Inventory (TCSI)	All components are listed or exempted.
United States inventory (TSCA 8b)	All components are active or exempted.

Section 16. Any other relevant information

History

Date of printing	8/6/2019
Date of issue/Date of revision	8/6/2019
Date of previous issue	5/25/2016
Version	3
Prepared by	Product Stewardship

Key to abbreviations

ADG = Australian Dangerous Goods
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
NOHSC = National Occupational Health and Safety Commission
REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation [Regulation (EC) No. 1907/2006]
STEL = Short term exposure limit
SUSMP = Standard Uniform Schedule of Medicine and Poisons
UN = United Nations
TWA = Time weighted average
VOC = Volatile Organic Compound
SADT = Self-Accelerating Decomposition Temperature
Varies = may contain one or more of the following 64741-88-4, 64741-89-5, 64741-95-3, 64741-96-4, 64742-01-4, 64742-44-5, 64742-45-6, 64742-52-5, 64742-53-6, 64742-54-7, 64742-55-8, 64742-56-9, 64742-57-0, 64742-58-1, 64742-62-7, 64742-63-8, 64742-65-0, 64742-70-7, 72623-85-9, 72623-86-0, 72623-87-1

Procedure used to derive the classification

Classification	Justification
Flam. Liq. 4, H227	On basis of test data
Acute Tox. 4, H332	Calculation method
Skin Irrit. 2, H315	Calculation method
Carc. 2, H351	Calculation method
STOT RE 2, H373 (bone marrow, liver, thymus)	Calculation method
Asp. Tox. 1, H304	Calculation method

Indicates information that has changed from previously issued version.

Notice to reader

All reasonably practicable steps have been taken to ensure this data sheet and the health, safety and environmental information contained in it is accurate as of the date specified below. No warranty or representation, express or implied is made as to the accuracy or completeness of the data and information in this data sheet.

The data and advice given apply when the product is sold for the stated application or applications. You should not use the product other than for the stated application or applications without seeking advice from BP Group.

It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The BP Group shall not be responsible for any damage or injury resulting from use, other than the stated product use of the material, from any failure to adhere to recommendations, or from any hazards inherent in the nature of the material. Purchasers of the product for supply to a third party for use at work, have a duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet. Employers have a duty to tell employees and others who may be affected of any hazards described in this sheet and of any precautions that should be taken. You can contact the BP Group to ensure that this document is the most current available. Alteration of this document is strictly prohibited.

BOC
A Member of The Linde Group

SAFETY DATA SHEET

 # 087

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **PROPANE**

Synonyms 087 - SDS NUMBER ● DIMETHYLMETHANE ● LIQUEFIED PETROLEUM GAS ● LPG ● N-PROPANE ● PRODUCT CODES: 152, 153 ● PROPYL HYDRIDE ● PROPYLHYDRIDE

1.2 Uses and uses advised against

Uses FUEL

1.3 Details of the supplier of the product

Supplier name **BOC LIMITED (AUSTRALIA)**

Address 10 Julius Avenue, North Ryde, NSW, 2113, AUSTRALIA

Telephone 131 262, (02) 8874 4400

Fax 132 427 (24 hours)

Website http://www.boc.com.au

1.4 Emergency telephone numbers

Emergency 1800 653 572 (24/7) (Australia only)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Flammable Gases: Category 1A
Gases Under Pressure: Liquefied gas

Health Hazards

Not classified as a Health Hazard

Environmental Hazards

Not classified as an Environmental Hazard

2.2 GHS Label elements

Signal word **DANGER**

Pictograms

Hazard statements

H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.

Prevention statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response statements

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage, eliminate all ignition sources.

Storage statements

P403 Store in a well-ventilated place.

Disposal statements

None allocated.

2.3 Other hazards

Asphyxiant. Effects are proportional to oxygen displacement.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content (v/v)
PROPANE	74-98-6	200-827-9	>99%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.

Inhalation If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available. For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. It is recommended that warm water is applied to clothing before removing it so as to prevent further skin damage. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.

Ingestion Due to product form and application, ingestion is considered unlikely.

First aid facilities Eye wash facilities and safety shower should be available.

4.2 Most important symptoms and effects, both acute and delayed

In high concentrations may cause asphyxiation. Direct contact with the liquefied material or escaping compressed gas may cause frostbite injury.

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve.

5.2 Special hazards arising from the substance or mixture

Extremely flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

5.3 Advice for firefighters

Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. This material is capable of forming explosive mixtures in air.

5.4 Hazchem code

2YE

2 Fine Water Spray.

Y Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Contain spill and run-off.

E Evacuation of people in and around the immediate vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS. Ventilate area where possible and eliminate ignition sources.

6.2 Environmental precautions
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up
Stop the flow of material, if this is without risk. If the leak is irreparable, move the cylinder to a safe and well ventilated area, and allow to discharge. Keep area evacuated and free from ignition sources until any leaked or spilled liquid has evaporated.

6.4 Reference to other sections
See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

7.2 Conditions for safe storage, including any incompatibilities
Do not store near incompatible substances and sources of ignition. Cylinders should be stored: upright, prevented from falling, in a secure area; below 65°C, in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

7.3 Specific end uses
No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters
Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
Propane	SWA [AUS]	Asphyxiant			

Biological limits
No biological limit values have been entered for this product.

8.2 Exposure controls
Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended.

PPE

Eye / Face	Wear safety glasses.
Hands	Wear leather or insulated gloves.
Body	Wear coveralls.
Respiratory	Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS GAS
Odour	SLIGHT ODOUR
Flammability	EXTREMELY FLAMMABLE

9.1 Information on basic physical and chemical properties

Flash point	-105°C
Boiling point	-42°C
Melting point	-190°C
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	1.55 (Air = 1)
Relative density	NOT APPLICABLE
Solubility (water)	SLIGHTLY SOLUBLE
Vapour pressure	871 kPa @ 20°C
Upper explosion limit	9.5 %
Lower explosion limit	2.1 %
Partition coefficient	NOT AVAILABLE
Autoignition temperature	450°C
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	100 %

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Incompatible with oxidising agents (e.g. hypochlorites), acids (e.g. nitric acid), heat and ignition sources. Do not use natural rubber flexible hoses. Also incompatible (potentially violently) with oxygen, halogens and metal halides. Compatible with most common metals.

10.6 Hazardous decomposition products

May evolve toxic gases if heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity No known toxicological effects from this product. Based on available data, the classification criteria are not met.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
PROPANE	Study not feasible	Study not feasible	> 800000 ppm/15M (rat)

Skin Not classified as a skin irritant. Contact with the liquefied material or escaping compressed gas may cause frostbite injury.

Eye Not classified as an eye irritant. Contact with the liquefied material or escaping compressed gas may cause frostbite injury.

Sensitisation Not classified as causing skin or respiratory sensitisation.

Mutagenicity Not classified as a mutagen.

Carcinogenicity Not classified as a carcinogen.

Reproductive Not classified as a reproductive toxin.

STOT - single exposure	Asphyxiant. Effects are proportional to oxygen displacement. Over exposure may result in dizziness, drowsiness, weakness, fatigue, breathing difficulties and unconsciousness.
STOT - repeated exposure	Not classified as causing organ damage from repeated exposure.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No information provided.

12.2 Persistence and degradability
No information provided.

12.3 Bioaccumulative potential
No information provided.

12.4 Mobility in soil
No information provided.

12.5 Other adverse effects
Gas at standard temperature and pressure and is expected to partition primarily to air.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1978	1978	1978
14.2 Proper Shipping Name	PROPANE	PROPANE	PROPANE
14.3 Transport hazard class	2.1	2.1	2.1
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards
No information provided.

14.6 Special precautions for user

Hazchem code	2YE
GTEPG	2A2
EmS	F-D, S-U
Other information	Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.

15. REGULATORY INFORMATION

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

Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Safe Work Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals (GHS Revision 7).

Inventory listings **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**
All components are listed on AIIC, or are exempt.

16. OTHER INFORMATION

Additional information

The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders.

ASPHYXIANTS (1): When present in the atmospheres in high concentrations, asphyxiants reduce the oxygen concentration by displacement. Atmospheres deficient in oxygen do not provide adequate sensory warning of danger and most simple asphyxiants are odourless. Therefore it is not appropriate to recommend an exposure standard for each asphyxiant, but to maintain oxygen concentrations. However, some asphyxiants may be given an exposure standard due to the potential for narcotic effects at high concentrations or an explosion hazard.

ASPHYXIANTS (2): There is a significant hazard associated with workers entering poorly ventilated areas (e.g. tanks) where oxygen may be deficient. An air supplied breathing apparatus may be required if adequate ventilation is not ensured.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

Prepared by

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[End of SDS]

BOC
A Member of The Linde Group

SAFETY DATA SHEET

 # 076

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name **OXYGEN, COMPRESSED**

Synonyms 076 - SDS NUMBER ● BOC OXYGEN, COMPRESSED ● CPG401205E, CPG402819G - MATERIAL NUMBER(S) ● OXYGEN ● OXYGEN COMPRESSED ● PRODUCT CODES: 020, 024, 025, 026, 027, 028, 128, 224, 226

1.2 Uses and uses advised against

Uses CHEMICAL REAGENT ● COMBUSTION AID ● FUEL ADDITIVE ● INDUSTRIAL APPLICATIONS ● LASER APPLICATIONS

1.3 Details of the supplier of the product

Supplier name **BOC LIMITED (AUSTRALIA)**

Address 10 Julius Avenue, North Ryde, NSW, 2113, AUSTRALIA

Telephone 131 262, (02) 8874 4400

Fax 132 427 (24 hours)

Website http://www.boc.com.au

1.4 Emergency telephone numbers

Emergency 1800 653 572 (24/7) (Australia only)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

Physical Hazards

Oxidizing Gases: Category 1
Gases Under Pressure: Compressed gas

Health Hazards

Not classified as a Health Hazard

Environmental Hazards

Not classified as an Environmental Hazard

2.2 GHS Label elements

Signal word **DANGER**

Pictograms

Hazard statements

H270 May cause or intensify fire; oxidizer.
H280 Contains gas under pressure; may explode if heated.

Prevention statements

P220 Keep away from clothing and other combustible materials.
P244 Keep valves and fittings free from oil and grease.

Response statements

P370 + P376 In case of fire: Stop leak if safe to do so.

Storage statements

P403 Store in a well-ventilated place.

Disposal statements

None allocated.

2.3 Other hazards

No information provided.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content (v/v)
OXYGEN	7782-44-7	231-956-9	>99.5%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye Adverse effects not expected from this product.

Inhalation If inhaled, remove from contaminated area. Apply artificial respiration if not breathing. For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor.

Skin Adverse effects not expected from this product.

Ingestion Due to product form and application, ingestion is considered unlikely.

First aid facilities None allocated.

4.2 Most important symptoms and effects, both acute and delayed

Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion.

4.3 Immediate medical attention and special treatment needed

Treatment for hyperoxia.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Use water fog to cool containers from protected area.

5.2 Special hazards arising from the substance or mixture

Non flammable - oxidising agent. Supports combustion and may cause fire/explosion in contact with incompatible substances, strong acids, reducing agents, combustibles and flammables. Materials which burn in air, will burn more vigorously in oxygen enriched atmospheres.

5.3 Advice for firefighters

Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. Remove cool cylinders from the path of the fire if safe to do so. Ensure working area is well ventilated before re-use. Notify the manufacturer that you will be returning a faulty cylinder. Residual product will be disposed of when the cylinder is returned.

5.4 Hazchem code

2S

2 Fine Water Spray.

S Risk of violent reaction or explosion. Wear full fire kit and breathing apparatus. Dilute spill and run-off.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS.

6.2 Environmental precautions
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up
Carefully move material to a well ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.

6.4 Reference to other sections
See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Use of safe work practices are recommended to avoid inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement.

7.2 Conditions for safe storage, including any incompatibilities
Do not store near sources of ignition or incompatible materials. Cylinders should be stored below 65°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

7.3 Specific end uses
No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters
Exposure standards

No exposure standards have been entered for this product.

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls
Engineering controls No special precautions are normally required when handling this product.

PPE

Eye / Face	Wear safety glasses.
Hands	Wear leather gloves.
Body	Wear safety boots.
Respiratory	Not required under normal conditions of use.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS GAS
Odour	ODOURLESS
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	-183°C
Melting point	NOT AVAILABLE
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	NOT AVAILABLE
Relative density	NOT APPLICABLE
Solubility (water)	0.032 cm^3/cm^3

9.1 Information on basic physical and chemical properties

Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	OXIDISING GAS
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	100 %
Critical pressure	5,043 kPa
Critical temperature	-118.6°C (Permanent gas)
Cylinder pressure (when full)	Refer to Product Manuals
Density	1.105 (Air = 1)

10. STABILITY AND REACTIVITY

10.1 Reactivity

Unreactive under normal conditions.

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

Combustible materials such as oil and grease can spontaneously ignite at low temperatures in oxygen enriched atmospheres. Materials which burn in air, will burn more vigorously in oxygen enriched atmospheres. Metals can be ignited and will continue to burn in pure oxygen atmospheres under specific conditions of temperature and pressure.

10.6 Hazardous decomposition products

This material will not decompose to form hazardous products other than that already present.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity	Based on available data, the classification criteria are not met.
Skin	Not classified as a skin irritant.
Eye	Not classified as an eye irritant.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT - single exposure	Not classified as causing organ damage from single exposure.
STOT - repeated exposure	Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No ecological damage caused by this product.

12.2 Persistence and degradability
Not applicable.

12.3 Bioaccumulative potential
Not applicable.

12.4 Mobility in soil
The substance is a gas, not applicable.

12.5 Other adverse effects
No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Waste disposal Cylinders should be returned to the manufacturer or supplier for disposal of contents.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1072	1072	1072
14.2 Proper Shipping Name	OXYGEN, COMPRESSED	OXYGEN, COMPRESSED	OXYGEN, COMPRESSED
14.3 Transport hazard classes	2.2 (5.1)	2.2 (5.1)	2.2 (5.1)
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards
No information provided.

14.6 Special precautions for user
Hazchem code 2S

GTEPG 2C6

EmS F-C, S-W

Other information Ensure cylinder is separated from driver and foodstuffs. Refer to Commonwealth, State and Territory Dangerous Goods Legislation which contain requirements which affect gas storage and transport.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Poison schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Classifications Safe Work Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals (GHS Revision 7).

Inventory listings **AUSTRALIA: AIIC (Australian Inventory of Industrial Chemicals)**
All components are listed on AIIC, or are exempt.

16. OTHER INFORMATION

Additional information

The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders.

APPLICATION METHOD: Gas regulator of suitable pressure and flow rating fitted to cylinder or manifold with low pressure gas distribution to equipment.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
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HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m^3	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

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It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

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[End of SDS]

SAFETY DATA SHEET

Revision Date: *03-Aug-2018* **Revision Number:** *2*

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	**FRESH START MULTI-PURPOSE OIL BASED PRIMER WHITE**
Product Code	**02400**
Alternate Product Code	02400
Product Class	SOLVENT THINNED PAINT
Color	White
Recommended use	Primers
Restrictions on use	No information available

Manufacturer
Benjamin Moore & Co.
101 Paragon Drive
Montvale, NJ 07645
Phone: 1-866-708-9180
www.benjaminmoore.com

Emergency Telephone
CHEMTREC (US): 800-424-9300
CHEMTREC (outside US): (703)-527-3887

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Carcinogenicity	Category 1A
Specific target organ toxicity (repeated exposure)	Category 1
Aspiration toxicity	Category 1
Flammable liquids	Category 3

Label elements

Danger

Hazard statements
May cause cancer
Causes damage to organs through prolonged or repeated exposure
May be fatal if swallowed and enters airways
Flammable liquid and vapor

Appearance liquid **Odor** solvent

Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge

Precautionary Statements - Response
IF exposed or concerned: Get medical advice/attention
Skin
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction

Precautionary Statements - Storage
Store locked up
Store in a well-ventilated place. Keep cool

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Rags, steel wool or waste soaked with this product may spontaneously catch fire if improperly discarded

Other information
No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	CAS No.	Weight-%
Limestone	1317-65-3	45

Solvent naphtha, petroleum, medium aliphatic	64742-88-7	20
Titanium dioxide	13463-67-7	15
Hydrotreated heavy naphtha, petroleum	64742-48-9	10
Silica, crystalline	14808-60-7	0.5
Ethyl benzene	100-41-4	0.5

4. FIRST AID MEASURES

General Advice If symptoms persist, call a physician. Show this safety data sheet to the doctor in attendance.

Eye Contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Inhalation Move to fresh air. If symptoms persist, call a physician.
If not breathing, give artificial respiration. Call a physician immediately.

Ingestion Clean mouth with water and afterwards drink plenty of water. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician.

Protection Of First-Aiders Use personal protective equipment.

Most Important Symptoms/Effects No information available.

Notes To Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Foam, dry powder or water. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Protective Equipment And Precautions For Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Specific Hazards Arising From The Chemical Combustible material. Closed containers may rupture if exposed to fire or extreme heat. Keep product and empty container away from heat and sources of ignition. Thermal decomposition can lead to release of irritating gases and vapors.

Sensitivity To Mechanical Impact No

Sensitivity To Static Discharge Yes

Flash Point Data

Flash Point (°F)	113
Flash Point (°C)	45
Method	PMCC

Flammability Limits In Air

Lower flammability limit:	Not available
Upper flammability limit:	Not available

NFPA **Health:** 1 **Flammability:** 2 **Instability:** 0 **Special:** Not Applicable

NFPA Legend
0 - Not Hazardous
1 - Slightly
2 - Moderate
3 - High
4 - Severe

The ratings assigned are only suggested ratings, the contractor/employer has ultimate responsibilities for NFPA ratings where this system is used.

Additional information regarding the NFPA rating system is available from the National Fire Protection Agency (NFPA) at www.nfpa.org.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Use personal protective equipment. Remove all sources of ignition.

Other Information Prevent further leakage or spillage if safe to do so. Do not allow material to contaminate ground water system. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system. Local authorities should be advised if significant spillages cannot be contained.

Environmental precautions See Section 12 for additional Ecological Information.

Methods for Cleaning Up Dam up. Soak up with inert absorbent material. Pick up and transfer to properly labeled containers. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Handling Use only in area provided with appropriate exhaust ventilation. Do not breathe vapors or spray mist. Wear personal protective equipment. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep away from open flames, hot surfaces and sources of ignition.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Keep away from open flames, hot surfaces and sources of ignition. Keep in properly labeled containers. Keep out of the reach of children.

DANGER - Rags, steel wool or waste soaked with this product may spontaneously catch fire if improperly discarded. Immediately after use, place rags, steel wool or waste in a sealed water-filled metal container.

Incompatible Materials Incompatible with strong acids and bases and strong oxidizing agents.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits

Chemical name	ACGIH TLV	OSHA PEL
Limestone	N/E	15 mg/m³ - TWA 5 mg/m³ - TWA
Titanium dioxide	10 mg/m³ - TWA	15 mg/m³ - TWA
Silica, crystalline	0.025 mg/m³ - TWA	-
Ethyl benzene	20 ppm - TWA	100 ppm - TWA 435 mg/m³ - TWA

Legend
ACGIH - American Conference of Governmental Industrial Hygienists Exposure Limits
OSHA - Occupational Safety & Health Administration Exposure Limits
N/E - Not Established

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/Face Protection Safety glasses with side-shields.
Skin Protection Long sleeved clothing. Protective gloves.
Respiratory Protection In operations where exposure limits are exceeded, use a NIOSH approved respirator that has been selected by a technically qualified person for the specific work conditions. When spraying the product or applying in confined areas, wear a NIOSH approved respirator specified for paint spray or organic vapors.

Hygiene Measures Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. Wash thoroughly after handling. When using do not eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	liquid
Odor	solvent
Odor Threshold	No information available
Density (lbs/gal)	11.75 - 11.85
Specific Gravity	1.41 - 1.43
pH	No information available
Viscosity (cps)	No information available
Solubility(ies)	No information available
Water solubility	No information available
Evaporation Rate	No information available
Vapor pressure @20 °C (kPa)	No information available
Vapor density	No information available
Wt. % Solids	70 - 80
Vol. % Solids	50 - 60
Wt. % Volatiles	20 - 30
Vol. % Volatiles	40 - 50
VOC Regulatory Limit (g/L)	<350
Boiling Point (°F)	275

Boiling Point (°C)	135
Freezing Point (°F)	No information available
Freezing Point (°C)	No information available
Flash Point (°F)	113
Flash Point (°C)	45
Method	PMCC
Flammability (solid, gas)	Not applicable
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Autoignition Temperature (°F)	No information available
Autoignition Temperature (°C)	No information available
Decomposition Temperature (°F)	No information available
Decomposition Temperature (°C)	No information available
Partition coefficient	No information available

10. STABILITY AND REACTIVITY

Reactivity	Not Applicable
Chemical Stability	Stable under normal conditions. Hazardous polymerisation does not occur.
Conditions to avoid	Keep away from open flames, hot surfaces, static electricity and sources of ignition.
Incompatible Materials	Incompatible with strong acids and bases and strong oxidizing agents.
Hazardous Decomposition Products	Thermal decomposition can lead to release of irritating gases and vapors.
Possibility of hazardous reactions	None under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Product Information

Information on likely routes of exposure

Principal Routes of Exposure Eye contact, skin contact and inhalation.

Acute Toxicity

Product Information Repeated or prolonged exposure to organic solvents may lead to permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling vapors may be harmful or fatal.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Eye contact	Contact with eyes may cause irritation.
Skin contact	May cause skin irritation and/or dermatitis. Prolonged skin contact may defat the skin and produce dermatitis.
Ingestion	Ingestion may cause irritation to mucous membranes. Small amounts of this product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, possibly progressing to death.
Inhalation	High vapor / aerosol concentrations are irritating to the eyes, nose, throat and lungs and may cause headaches, dizziness, drowsiness, unconsciousness, and other central nervous system effects.
Sensitization	No information available.
Neurological Effects	No information available.
Mutagenic Effects	No information available.
Reproductive Effects	No information available.
Developmental Effects	No information available.
Target organ effects	No information available.
STOT - repeated exposure	Causes damage to organs through prolonged or repeated exposure if inhaled.
STOT - single exposure	No information available.
Other adverse effects	No information available.
Aspiration Hazard	May be harmful if swallowed and enters airways. Small amounts of this product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, possibly progressing to death.

Numerical measures of toxicity

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	17951 mg/kg
ATEmix (dermal)	13465 mg/kg

Component Information

Acute Toxicity

Solvent naphtha, petroleum, medium aliphatic
LD50 Oral: > 6240 mg/kg (Rat)
LD50 Dermal: > 3120 mg/kg (Rabbit)
LC50 Inhalation (Vapor): 1400 ppm (Rat, 4 hr.)
Titanium dioxide
LD50 Oral: > 10000 mg/kg (Rat)
Hydrotreated heavy naphtha, petroleum
LD50 Oral: > 5,000 mg/kg (Rat) vendor data
LD50 Dermal: > 3,160 mg/kg (Rabbit)
Silica, crystalline
LD50 Oral: 500 mg/kg (Rat)
Ethyl benzene
LD50 Oral: mg/kg (Rat)
LD50 Dermal: > mg/kg (Rabbit)
LC50 Inhalation (Vapor): mg/m^3 (Rat, 2 hr.)

Carcinogenicity
The information below indicates whether each agency has listed any ingredient as a carcinogen:.

Chemical name	IARC	NTP	OSHA

Titanium dioxide	2B - Possible Human Carcinogen		Listed
Silica, crystalline	1 - Human Carcinogen	Known Human Carcinogen	Listed
Ethyl benzene	2B - Possible Human Carcinogen		Listed

• Crystalline Silica has been determined to be carcinogenic to humans by IARC (1) when in respirable form. Risk of cancer depends on duration and level of inhalation exposure to spray mist or dust from sanding the dried paint.
• Although IARC has classified titanium dioxide as possibly carcinogenic to humans (2B), their summary concludes: "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium dioxide is bound to other materials, such as paint."

Legend
IARC - International Agency for Research on Cancer
NTP - National Toxicity Program
OSHA - Occupational Safety & Health Administration

12. ECOLOGICAL INFORMATION

Ecotoxicity Effects
The environmental impact of this product has not been fully investigated.

Product Information

Acute Toxicity to Fish
No information available

Acute Toxicity to Aquatic Invertebrates
No information available

Acute Toxicity to Aquatic Plants
No information available

Persistence / Degradability
No information available.

Bioaccumulation
There is no data for this product.

Mobility in Environmental Media
No information available.

Ozone
No information available

Component Information

Acute Toxicity to Fish

Titanium dioxide
LC50: > 1000 mg/L (Fathead Minnow - 96 hr.)
Ethyl benzene

LC50: 12.1 mg/L (Fathead Minnow - 96 hr.)

Acute Toxicity to Aquatic Invertebrates

Ethyl benzene
EC50: 1.8 mg/L (Daphnia magna - 48 hr.)

Acute Toxicity to Aquatic Plants

Ethyl benzene
EC50: 4.6 mg/L (Green algae (Scenedesmus subspicatus), 72 hrs.)

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method Dispose of in accordance with federal, state, and local regulations. Local requirements may vary, consult your sanitation department or state-designated environmental protection agency for more disposal options.

Empty Container Warning Emptied containers may retain product residue. Follow label warnings even after container is emptied. Residual vapors may explode on ignition.

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name	PAINT
Hazard class	3
UN-No.	UN1263
Packing Group	III
Description	UN1263, PAINT, 3, III, Marine Pollutant (Solvent naphtha, petroleum, medium aliphatic,Hydrotreated heavy naphtha, petroleum)

In the US this material may be reclassified as a Combustible Liquid and is not regulated in containers of less than 119 gallons (450 liters) via surface transportation (refer to 49CFR173.120(b)(2) for further information).

ICAO / IATA Contact the preparer for further information.

IMDG / IMO Contact the preparer for further information.

15. REGULATORY INFORMATION

International Inventories

TSCA: United States	Yes - All components are listed or exempt.
DSL: Canada	Yes - All components are listed or exempt.

Federal Regulations

SARA 311/312 hazardous categorization

Acute health hazard	Yes

Chronic Health Hazard	Yes
Fire hazard	Yes
Sudden release of pressure hazard	No
Reactive Hazard	No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical name	CAS No.	Weight-%	CERCLA/SARA 313 (de minimis concentration)
Ethyl benzene	100-41-4	0.5	0.1

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following HAPs:

Chemical name	CAS No.	Weight-%	Hazardous Air Pollutant (HAP)
Ethyl benzene	100-41-4	0.5	Listed

US State Regulations

California Proposition 65

WARNING: Cancer and Reproductive Harm– www.P65warnings.ca.gov

State Right-to-Know

Chemical name	Massachusetts	New Jersey	Pennsylvania
Limestone	X	X	X
Solvent naphtha, petroleum, medium aliphatic		X	
Titanium dioxide	X	X	X
Silica, crystalline	X	X	X

Legend

X - Listed

16. OTHER INFORMATION

HMIS - **Health:** 1* **Flammability:** 2 **Reactivity:** 0 **PPE:** -

HMIS Legend

0 - Minimal Hazard
1 - Slight Hazard
2 - Moderate Hazard
3 - Serious Hazard
4 - Severe Hazard

* - Chronic Hazard
X - Consult your supervisor or S.O.P. for "Special" handling instructions.
Note: The PPE rating has intentionally been left blank. Choose appropriate PPE that will protect employees from the hazards the material will present under the actual normal conditions of use.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer, has chosen to provide them. HMIS® ratings are to be used only in conjunction with a fully implemented HMIS® program by workers who have received appropriate HMIS® training. HMIS® is a registered trade and service mark of the NPCA. HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

WARNING! If you scrape, sand, or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead.

Prepared By	Product Stewardship Department Benjamin Moore & Co. 101 Paragon Drive Montvale, NJ 07645 800-225-5554
Revision Date:	03-Aug-2018
Revision Summary	Not available

Disclaimer

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, provincial, and local laws and regulations.

END OF SAFETY DATA SHEET

Infosafe No™	1CH72	Issue Date : April 2018	RE-ISSUED by CHEMSUPP

Product Name : **SULFURIC ACID 52-98%**

Classified as hazardous

1. Identification

GHS Product Identifier: SULFURIC ACID 52-98%

Company Name: CHEM-SUPPLY PTY LTD (ABN 19 008 264 211)

Address: 38 - 50 Bedford Street GILLMAN
SA 5013 Australia

Telephone/Fax Number: Tel: (08) 8440-2000
Fax: (08) 8440-2001

Emergency phone number: CHEMCALL 1800 127 406 (Australia) / +64-4-917-9888 (International)

Recommended use of the chemical and restrictions on use: Manufacture of phosphate and ammonium sulfate fertilizers; production of rayon and other textile fibres, film, inorganic pigments, nitrate explosives, alcohols, plastics, dyes, drugs, synthetic detergents, natural and synthetic rubber, pulp and paper, cellulosics and catalysts; manufacture of hydrochloric and hydrofluoric acids, aluminium and copper sulfate and chromium chemicals; petroleum refining; pickling iron, steel and other metals; leaching agent for ores; electroplating baths; alkylation catalyst; component of lead storage batteries and laboratory reagent.

Other Names

Name	Product Code
Oil of vitriol	
SULFURIC ACID 95 - 98% TG	ST008
SULFURIC ACID 95 - 98% LR	SL008
SULFURIC ACID 90% TG	ST009
SULFURIC ACID S.G. 1.72 - 1.74 LR	SL137
SULFURIC ACID 67% TG (1580 Grade)	ST067
SULFURIC ACID 95 - 98% AR	SA008
SULFURIC ACID 90 - 91% w/w	SL419
SULFURIC ACID 50% v/v AR	SA491
SULFURIC ACID 73% TG	ST637

Other Information

Chem-Supply Pty Ltd does not warrant that this product is suitable for any use or purpose. The user must ascertain the suitability of the product before use or application intended purpose. Preliminary testing of the product before use or application is recommended. Any reliance or purported reliance upon Chem-Supply Pty Ltd with respect to any skill or judgement or advice in relation to the suitability of this product of any purpose is disclaimed. Except to the extent prohibited at law, any condition implied by any statute as to the merchantable quality of this product or fitness for any purpose is hereby excluded. This product is not sold by description. Where the provisions of Part V, Division 2 of the Trade Practices Act apply, the liability of Chem-Supply Pty Ltd is limited to the replacement of supply of equivalent goods or payment of the cost of replacing the goods or acquiring equivalent goods.

2. Hazard Identification

GHS classification of the substance/mixture: Skin Corrosion/Irritation: Category 1A
Corrosive to Metals: Category 1

Signal Word (s): DANGER

Hazard Statement (s): H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Pictogram (s): Corrosion

Precautionary statement – Prevention: P234 Keep only in original container.
P260 Do not breathe fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statement – Response: P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

	breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 Immediately call a POISON CENTER or doctor/physician.
Precautionary statement – Storage	P405 Store locked up. P406 Store in corrosive resistant container with a resistant inner liner.
Precautionary statement – Disposal	P501 Dispose of contents/container to an approved waste disposal plant.

3. Composition/information on ingredients

Chemical Characterization Liquid

Ingredients

Name	CAS	Proportion	Hazard Symbol	Risk Phrase
Sulfuric acid	7664-93-9	52-98 %		
Water	7732-18-5	2-48 %		

4. First-aid measures

Inhalation	If inhaled, remove from contaminated area to fresh air immediately. Apply artificial respiration if not breathing. If breathing is difficult, give oxygen. Immediately obtain medical aid if cough or other symptoms appear.
Ingestion	Rinse mouth thoroughly with water immediately, repeat until all traces of product have been removed. DO NOT INDUCE VOMITING. Seek immediate medical advice.
Skin	Immediately remove contaminated clothing and wash affected area with water for at least 15 minutes. Ensure contaminated clothing is washed before re-use. Seek medical advice /attention depending on the severity.
Eye contact	If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. Take care not to rinse contaminated water into the non-affected eye. Seek immediate medical assistance.
First Aid Facilities	Maintain eyewash fountain and drench facilities and normal washroom in work area.
Advice to Doctor	Treat symptomatically as for strong acids.
Protection for First Aiders	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing or wear gloves.
Other Information	For advice, contact a Poisons Information Centre (Phone eg Australia 13 1126; New Zealand 0800 764 766) or a doctor.

5. Fire-fighting measures

Hazards from Combustion Products	Highly irritating/toxic gases and fumes, including toxic oxides of sulfur (SOx). Will react with water or steam to produce toxic and corrosive fumes and heat. Reacts with carbonates to generate carbon dioxide gas. Reacts with cyanides and sulfides to form poisonous hydrogen cyanide and hydrogen sulfide respectively. Hydrogen may form upon contact with metals (danger of explosion!).
Specific Methods	Use extinguishing media most appropriate for the surrounding fire. When material is not involved in fire: Do not use water on material itself.
Specific hazards arising from the chemical	Does not burn but may produce poisonous and/or corrosive fumes upon heating. Heat of reaction may be enough to ignite combustible materials. Will react with water (some violently) releasing flammable, poisonous and/or corrosive gases and runoff. Contact with metals may evolve flammable hydrogen gas. Fire may produce irritating, poisonous and/or corrosive gases. Runoff may pollute waterways. May be transported in a molten form. Containers may explode when heated or contaminated with water.
Hazchem Code	2P
Decomposition Temp.	340 °C (100%).
Precautions in connection with Fire	Wear SCBA and acid-resistant chemical splash suit. Structural firefighter's uniform is NOT effective for these materials.

6. Accidental release measures

Spills & Disposal	Neutralise with lime or sodium carbonate, adjust the pH to 6-10. For larger spills notify Emergency Services.

Personal Precautions	Evacuate the area of all non-essential personnel. Avoid inhalation, contact with skin, eyes and clothing. Use personal protective equipment listed in Section 8.
Clean-up Methods - Small Spillages	Absorb or contain liquid with sand, earth or spill control material. Shovel up using non sparking tools and place in a labelled, sealable container for subsequent safe disposal. Put leaking containers in a labelled drum or overdrum. Absorb or contain liquid with sand, earth or spill control material, or neutralise with sodium carbonate or other alkali material.
Clean-up Methods - Large Spillages	Seek expert advice on handling and disposal.
Environmental Precautions	Do not discharge into drains, surface water or ground water. Do not discharge to subsoil/soil.

7. Handling and storage

Precautions for Safe Handling	Avoid ingestion and inhalation of gas/fumes/vapour/spray mist. Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure. Keep locked up. Keep containers closed when not in use. Use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Wear suitable protective clothing. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Inform laundry personnel of contaminant's hazards. Discard contaminated shoes. Ensure a high level of personal hygiene is maintained when using this product, that is, always wash hands before eating, drinking, smoking or using the toilet facilities. Contact with water will generate heat. When diluting, always add the acid to water; never add water to the acid. Do not allow water to get into the container because of violent reaction. Keep away from incompatibles such as oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis, moisture.
Conditions for safe storage, including any incompatabilities	Ideally, sulfuric acid should be stored in isolation from all other chemicals in an approved acid or corrosives safety cabinet. Accessible only for authorized persons. Store in tightly closed containers, in a cool, dry, well-ventilated area with acid resistant floors and good drainage. Hygroscopic. Do not allow contact with water. Reacts violently with water. Protect against physical damage, freezing, direct sunlight and moisture. Store away from incompatible materials and water. May corrode metallic surfaces. Separate from acids, alkalis, oxidizing agents, reducing agents, combustibles, sources of ignition and heat. Do not wash out container and use it for other purposes. Containers of this material may be hazardous when empty since they retain product residues (vapours, liquid); observe all warnings and precautions listed for the product. Inspect regularly for deficiencies such as damage or leaks.
Corrosiveness	Very corrosive to most metals including cast iron, steel, stainless steel, brass, aluminium, titanium, nickel and some alloys. The corrosivity of sulfuric acid solutions depends on factors such as concentration, temperature and acid impurities. The resistance of alloys to sulfuric acid corrosion increases with increasing chromium, molybdenum, copper and silicon content. Many plastics do not resist concentrated acid well (greater than 50-60%). Teflon is the only common plastic that resists all acid concentrations.
Storage Regulations	Refer Australian Standard AS 3780-1994 'The storage and handling of corrosive substances'.
Storage Temperatures	Store at room temperature (15 to 23 °C recommended).

8. Exposure controls/personal protection

Occupational exposure limit values

Name	STEL		TWA		
	mg/m3	ppm	mg/m3	ppm	Footnote
Sulfuric acid	3		1		

Other Exposure Information

A time weighted average (TWA) has been established for Sulphuric acid (Safe Work Australia) of 1 mg/m³. The corresponding STEL level is 3 mg/m³. The STEL (Short Term Exposure Limit) is an exposure value that should not be exceeded for more than 15 minutes and should not be repeated for more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week.

Appropriate engineering controls

Provide sufficient ventilation to ensure that the working environment is below the TWA (time weighted average).In industrial situations maintain the concentrations values below the TWA. This may be achieved by process modification, use of local exhaust ventilation, capturing substances at the source, or other methods.

Respiratory Protection	Where ventilation is not adequate, respiratory protection may be required. Avoid breathing vapours or mists. Select and use respirators in accordance with AS 1716 - Respiratory Protective Devices and be selected in accordance with AS 1715 - Selection, Use and Maintenance of Respiratory Protective Devices. When mists or vapours exceed the exposure standards then the use of the following is recommended: Approved respirator with organic vapour and dust/mist filters. Filter capacity and respirator type depends on exposure levels.
Eye Protection	The use of a face shield, chemical goggles or safety glasses with side shield protection as appropriate. Must comply with Australian Standards AS 1337 and be selected and used in accordance with AS 1336.
Hand Protection	Hand protection should comply with AS 2161, Occupational protective gloves - Selection, use and maintenance. Recommendation: Excellent: Vinyl gloves. Good: Neoprene or nitrile rubber gloves. Fair: NR latex. (52-75%) Avoid skin contact when removing gloves from hands, do not touch the gloves outer surface. Dispose of gloves as hazardous waste. Fair: Nitrile gloves. Poor: NR latex, vinyl, or neoprene gloves. (75-98%)
Personal Protective Equipment	Final choice of personal protective equipment will depend on individual circumstances and/or according to risk assessments undertaken.
Footwear	Safety boots in industrial situations is advisory, foot protection should comply with AS 2210, Occupational protective footwear - Guide to selection, care and use.
Body Protection	Clean clothing or protective clothing should be worn, preferably with an apron. Clothing for protection against chemicals should comply with AS 3765 Clothing for Protection Against Hazardous Chemicals.
Hygiene Measures	Always wash hands before smoking, eating or using the toilet. Wash contaminated clothing and other protective equipment before storing or re-using.

9. Physical and chemical properties

Form	Liquid
Appearance	Clear, colourless, viscous (thick oily) liquid when pure, but yellowish to brownish when impure.
Odour	Odourless, but has a choking odour if heated.
Decomposition Temperature	340 °C (100%).
Melting Point	-32.3 °C (52%); -29.5 °C (60%); -38 °C (67%); -4.5 °C (79%); 3 °C (81%); -6.5 °C (90%); -11.5 °C (91%); -1.1 °C (98%).
Boiling Point	126 °C (52%); 140 °C (60%); 156 °C (67%); 197 °C (79%); 207 °C (81%); 255 °C (90%); 262 °C (91%); 327.2 °C (98%).
Solubility in Water	Miscible (Soluble) in all proportions. CAUTION: Always add the acid to water. Exothermic reaction with water. Addition to water generates significant heat. Addition of water can generate localised boiling and spattering.
Solubility in Organic Solvents	Soluble in all proportions in ethanol (decomposes).
Specific Gravity	1.42 (52%); 1.5 (60%); 1.58 (67%); 1.72 (79%); 1.74 (81%); 1.82 (90%); 1.826 (91%); 1.8437 (98%).
pH	Strongly acidic. 1 N solution (~5% w/w) = 0.3; 0.1 N solution (~0.5% w/w) = 1.2; 0.01 N solution (~0.05% w/w) = 2.1.
Vapour Pressure	<0.04 kPa (0.3 mmHg) at 25 °C (100%).
Vapour Density (Air=1)	The highest known value is 3.4 (Air = 1 at boiling point of sulfuric acid) (100% Sulfuric acid). Weighted average: 2.71 (Air = 1) (75% (v/v)); 2.92 (Air = 1) (82.6%).
Evaporation Rate	Probably very slow.
Odour Threshold	>1 ppm (Sulfuric acid 100%).
Viscosity	25 centipoises (25 mPa.s) at 25 °C (100%).
Surface Tension	50 dynes/cm at 25 °C (100%).
Flammability	Non combustible material. This material increases the risk of fire and may aid combustion. Strong dehydrating agent which may cause ignition of combustible/organic/finely divided/other materials on contact. Contact with moisture/water, or with strong alkalies may generate heat. Flammable hydrogen gas may be produced on prolonged contact with metals such as aluminium, tin, lead and zinc.
Explosion Properties	Contact with most metals causes formation of flammable and explosive hydrogen gas. Exothermic reaction with water. Containers may explode when heated or if contaminated with water. Slightly explosive in presence of oxidizing materials. Mixtures of sulfuric acid and any of the following can explode: p-nitrotoluene, pentasilver trihydroxydiaminophosphate, perchlorates, alcohols with strong hydrogen peroxide, ammonium tetraperoxychromate, mercuric nitrite, potassium chlorate, potassium permanganate with potassium chloride, carbides, nitro compounds, nitrates, carbides, phosphorous, iodides, picrates, fulminates, dienes, alcohols (when heated). Nitramide decomposes explosively on

	contact with concentrated sulfuric acid. 1,3,5-Trinitrosohexahydro-1,3,5-triazine + sulfuric acid causes explosive decomposition.
Molecular Weight	98.08
Saturated Vapour Concentration	< 395 ppm (0.04%) at 25 °C (calculated) (100% sulfuric acid).
Other Information	Taste: Strong, marked acid taste. Conversion Factor: 1 ppm = 4 mg/m³; 1 mg/m³ = 0.25 ppm at 25 °C (calculated). Critical Temperature: Approx. 670 °C (93%); approx. 655 °C (100%).

10. Stability and reactivity

Chemical Stability	Stable under normal temperatures pressures and conditions of storage and handling. Concentrated solutions (>90%) react violently with water, spattering and liberating heat.
Conditions to Avoid	Exposure to moist air, moisture, or water (Note: Use great caution in mixing with water due to heat evolution that causes explosive spattering. Always add the acid to water, never the reverse.), metals, excess heat, combustible materials, organic materials, oxidizers, amines, bases and incompatible materials.
Incompatible Materials	Water, combustible materials, oxidizing agents, reducing agents, metals as powders, metals as non powders (yields hydrogen gas), metal alloys, metal compounds, acids, alkalis, organic materials, organic solvents, alkali metals, alkaline earth metals, alkaline earth compounds, alkali hydroxides solutions, chlorates, perchlorates, permanganates, carbides, cyanides, nitrides, sulfides, fulminates, picrates, nitrates, nitriles, halogens, halogen-halogen compounds, salts of oxyhalogenic acids, acetylides, oxides and hydrides, anilines, organic nitro compounds, peroxi compounds, acetic anhydride, acetone cyanhydrin, acetone + nitric acid, acetone + potassium dichromate, acrolein, allyl alcohol, allyl chloride, 2-aminoethanol, ammonia, ammonium triperchromate, n-butyraldehyde, diisobutylene, epichlorohydrin, ethylene cyanohydrin, ethylene diamine, ethylene glycol, ethylenimine, isoprene, lithium silicide, pentasilver trihydroxydiaminophosphate, phosphorus, phosphorus isocyanate, beta-propiolactone, and pyridine.
Hazardous Decomposition Products	Irritating and highly toxic fumes and gases, including oxides of sulfur. Reaction with water or steam may generate much heat which will increase the concentration of fumes in the air, and may produce toxic and corrosive fumes. Contact with most metals causes formation of flammable and explosive hydrogen gas.
Possibility of hazardous reactions	Very reactive substance. Concentrated solutions (>90%) react violently with water, spattering and liberating heat. Corrosively attacks most metals liberating flammable hydrogen gas, (potential explosion). The concentrated acid oxidizes, dehydrates, or sulfonates most organic compounds. Sulfuric acid reacts vigorously, violently or explosively with many organic and inorganic chemicals including water, acrylonitrile, alkali solutions, carbides, chlorates, fulminates, nitrates, perchlorates, permanganates, picrates, powdered metals, metal acetylides or carbides, epichlorohydrin, aniline, ethylenediamine, alcohols with strong hydrogen peroxide, chlorosulfonic acid, cyclopentadiene, hydrofluoric acid, nitromethane, 4-nitrotoluene, phosphorus (III) oxide, potassium, sodium, ethylene glycol, isoprene, styrene. Acetaldehyde and allyl chloride may polymerize violently in the presence of sulfuric acid. Many plastics do not resist concentrated acid well (greater than 50-60%). Hazardous gases, such as hydrogen cyanide, hydrogen sulfide and acetylene, are evolved on contact with chemicals such as cyanides, sulfides and carbides. Reacts with carbonates to generate carbon dioxide gas.
Hazardous Polymerization	Acetaldehyde and allyl chloride may polymerize violently in the presence of sulfuric acid.

11. Toxicological Information

Ingestion	Corrosive. Harmful if swallowed. Ingestion can cause severe burns to the mouth, throat, oesophagus and stomach and permanent damage to the digestive tract, resulting in discomfort and severe pain, extensive tissue damage, the danger of perforation of esophagus and stomach, gastrointestinal bleeding, oedema of the glottis, necrosis and scarring, and in severe cases, collapse and death. Symptoms may include sore throat, difficulty swallowing, intense thirst, general feeling of sickness, nausea, vomiting, diarrhoea, severe swelling of the larynx and skeletal paralysis affecting the ability to breathe, circulatory collapse, with clammy skin, weak and rapid pulse, shallow respiration, scanty urine, circulatory shock and convulsions and subsequent death. Circulatory shock is often the immediate cause of death. It may also cause systemic toxicity with acidosis. Small amounts of acid which may enter the lungs during ingestion or vomiting (aspiration) can cause serious lung injury and death. After a latency period of several weeks, possibly pyloric stenosis.
Inhalation	Corrosive. Harmful if inhaled. Because its vapour pressure is negligible, it exists in the air only as a mist or spray. Inhalation of mists, aerosols or sprays can cause severe irritation or corrosive damage to the respiratory tract and mucous membranes with sore throat, burning pain in the nose and throat, coughing,

	wheezing, laryngitis, bronchitis, shortness of breath, laboured breathing, dental erosion, headache, nausea, and vomiting. Exposure may impair lung function and cause mucostasis (reduced mucous clearance). The degree and severity of respiratory effects are influenced by factors such as the physical state and particle size of the aerosol, deposition site, concentration and humidity. Long term lung damage may result from a severe short term exposure. Inhalation may be fatal as a result of spasm, inflammation, oedema of the larynx and bronchi, chemical pneumonitis, and delayed pulmonary oedema. The symptoms of pulmonary oedema, including coughing and shortness of breath, can be delayed until hours or days after the exposure and are aggravated by physical exertion. May affect cardiovascular system (hypotension, depressed cardiac output, bradycardia). Circulatory collapse with clammy skin, weak and rapid pulse, shallow respiration, and scanty urine may follow. Circulatory shock is often the immediate cause of death.
Skin	Corrosive. Causes severe skin irritation and burns, which may result in permanent scarring. Burns may be 2nd or 3rd degree. Extensive acid burns can result in death. Symptoms of redness, irritation, pain, blistering, tissue destruction, scabs, sloughs, local necrosis, and membrane ulceration can occur. Continued contact can cause tissue necrosis. High mist or aerosol concentrations may cause redness, irritation and burns to the skin if contact is prolonged. The severity of injury depends on the concentration of the solution and the duration of exposure. May be harmful if absorbed through the skin. May cause circulatory collapse with clammy skin, weak and rapid pulse, shallow respirations, and scanty urine. Circulatory shock is often the immediate cause of death.
Eye	Corrosive. Causes severe eye irritation and severe eye burns. Contact can cause blurred vision, redness, swelling, pain, corneal lesions, permanent corneal opacification and irreversible eye injury, including blindness. Risk of serious damage to eyes. The severity of injury depends on the concentration of the solution and the duration of exposure. Sulfuric acid mists and aerosols are expected to be irritating.
Carcinogenicity	Occupational exposure to strong-inorganic-acid mists containing sulfuric acid is evaluated in the IARC Monographs (Vol. 54; 1992) as Group 1: Carcinogenic to humans.
Chronic Effects	Prolonged or repeated inhalation may affect behaviour (muscle contraction or spasticity), urinary system (kidney damage), and cardiovascular system, heart (chest pain, ischemic heart lesions), and respiratory system/lungs (nosebleeds, nasal congestion, perforation of the nasal septum, bronchial hyperreactivity, bronchitis, pulmonary oedema, lung damage), teeth (dental discoloration, erosion). Exposures to high concentrations (reportedly up to 16 mg/m³) cause dental erosion. Etching of teeth may occur after a few weeks exposure, progressing to erosion after a few months exposure. Dental etching and erosion occurred about 4 times as frequently in a high exposure group (over 0.3 mg/m³) compared to a low exposure group (below 0.07 mg/m³). Prolonged or repeated exposure to sulfuric acid mists may cause various lesions of the skin, tracheobronchitis, stomatitis, conjunctivitis, or gastritis. Prolonged or repeated skin contact may cause dermatitis (red, itchy, dry skin), an allergic skin reaction. Prolonged or repeated eye contact may cause conjunctivitis. Effects may be delayed. Occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to humans.
Respiratory Irritation	Human volunteers exposed to sulfuric acid for 5-15 minutes noticed no odour, or irritation below 1 mg/m³. All volunteers noticed the exposure at 3 mg/m³ and at 5 mg/m³ some people found it objectionable. A deep breath usually produced coughing and respiratory changes were reported. Tolerance to sulfuric acid can occur. In another study, volunteers exposed to high levels (39 mg/m³ dry mist and 21 mg/m³ wet mist sulfuric acid) for 1/2-1 hour reported severe symptoms of irritation of the upper airways and signs of bronchial obstruction. These symptoms persisted for several days in two volunteers. Occupational exposure to sulfuric acid fumes in a closed space, produced injury to the upper airways, and fluid accumulation and bleeding in the lungs to one worker. Most lung function tests had returned to normal after 6 weeks.

12. Ecological information

Ecotoxicity	Harmful effect on aquatic organisms. Harmful effect due to pH shift. Toxic effect on fish and algae. Does not cause biological oxygen deficit. Endangers drinking-water supplies if allowed to enter soil and/or waters in large quantities. Neutralization possible in waste water treatment plants.
Persistence and degradability	Methods for the determination of biodegradability are not applicable to inorganic substances.
Environmental Protection	Do not allow to enter waters, waste water, or soil!
Acute Toxicity - Fish	L. macrochirus LC50: 16-29 mg/l/ 96 h.
Acute Toxicity - Daphnia	Daphnia magna EC50: 29 mg/l /24 h (calculated on the pure substance).

Infosafe No™	1CH72	Issue Date : April 2018	RE-ISSUED by CHEMSUPP

Product Name : **SULFURIC ACID 52-98%**

Classified as hazardous

13. Disposal considerations

Disposal Considerations	Dispose of according to relevant local, state and federal government regulations.
Waste Disposal	Neutralise remaining product with lime or soda ash, adjusting pH to 6-10. Flush to sewer as a greatly diluted solution.

14. Transport information

Transport Information	Dangerous goods of Class 8 (Corrosive) are incompatible in a placard load with any of the following: Class 1, Class 4.3, Class 5, Class 6, if the Class 6 dangerous goods are cyanides and the Class 8 dangerous goods are acids, Class 7; and are incompatible with food and food packaging in any quantity.
U.N. Number	1830
UN proper shipping name	SULFURIC ACID
Transport hazard class(es)	8
Hazchem Code	2P
Packaging Method	3.8.8RT8
Packing Group	II
EPG Number	8A2
IERG Number	40

15. Regulatory information

Regulatory Information	Listed in the Australian Inventory of Chemical Substances (AICS). Not listed under WHS Regulation 2011, Schedule 10 - Prohibited carcinogens, restricted carcinogens and restricted hazardous chemicals.
Poisons Schedule	S6

16. Other Information

Literature References	'Standard for the Uniform Scheduling of Medicines and Poisons .', Commonwealth of Australia. Lewis, Richard J. Sr. 'Hawley's Condensed Chemical Dictionary 13th. Ed.', Rev., John Wiley and Sons, Inc., NY, 1997. National Road Transport Commission, 'Australian Code for the Transport of Dangerous Goods by Road and Rail 7th. Ed.', 2007. Safe Work Australia, 'National Code of Practice fot the Preparation of Safety Data Sheets for Hazardous Chemicals', 2011. Standards Australia, 'SAA/SNZ HB 76:2010 Dangerous Goods - Initial Emergency Response Guide', Standards Australia/Standards New Zealand, 2010. Safe Work Australia, 'Approved Criteria for Classifying Hazardous Substances [NOHSC:1008 (2004)]'. Safe Work Australia, 'Hazardous Chemical Information System, 2005'. Safe Work Australia, 'National Code of Practice for the Labelling of Safe Work Hazardous Substances (2011)'. Safe Work Australia, 'National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995) 3rd Edition]'.
Contact Person/Point	Paul McCarthy Ph. (08) 8440 2000 DISCLAIMER STATEMENT: All information provided in this data sheet or by our technical representatives is compiled from the best knowledge available to us. However, since data, safety standards and government regulations are subject to change and the conditions of handling and use, or misuse, are beyond our control, we make no warranty either expressed or implied, with respect to the completeness or accuracy to the information contained herein. Chem-Supply accepts no responsibility whatsoever for its accuracy or for any results that may be obtained by customers from using the data and disclaims all liability for reliance on information provided in this data sheet or by our technical representatives.
Empirical Formula & Structural Formula	H_2SO_4 (pure substance)

...End Of MSDS...

GHD Advisory

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