1. IDENTIFICATION

Product Name	**Methyl Isobutyl Ketone**
Other Names	4-Methyl-2-pentanone; Hexone; Isopropyl acetone; Methylisobutyl ketone; MIBK
Uses	Solvent for paints, varnishes, nitrocellulose, lacquers; manufacture of methyl amyl alcohol; extraction processes including extraction of uranium from fission products; organic synthesis; denaturant for alcohol.
Chemical Family	No Data Available
Chemical Formula	C6H12O
Chemical Name	2-Pentanone, 4-methyl-
Product Description	No Data Available

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Ltd	11 Mayo Road Wiri Auckland 2104 New Zealand	+64-9-2506222
Redox Inc.	3960 Paramount Boulevard Suite 107 Lakewood CA 90712 USA	+1-424-675-3200
Redox Chemicals Sdn Bhd	Level 2, No. 8, Jalan Sapir 33/7 Seksyen 33, Shah Alam Premier Industrial Park 40400 Shah Alam Sengalor, Malaysia	+60-3-5614-2111

Emergency Contact Details

For emergencies only; DO NOT contact these companies for general product advice.

Organisation	Location	Telephone
Poisons Information Centre	Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888
Chemcall	Malaysia	+64-4-9179888
Chemcall	New Zealand	0800-243622 +64-4-9179888
National Poisons Centre	New Zealand	0800-764766
CHEMTREC	USA & Canada	1-800-424-9300 CN723420 +1-703-527-3887

2. HAZARD IDENTIFICATION

Poisons Schedule (Aust) Schedule 5

Globally Harmonised System

Hazard Classification			Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)
Hazard Categories			Flammable Liquids - Category 2
			Acute Toxicity (Inhalation) - Category 4
			Serious Eye Damage/Irritation - Category 2A
			Specific Target Organ Toxicity (Single Exposure) - Category 3
Pictograms			
Signal Word			Danger
Hazard Statements		**H225**	Highly flammable liquid and vapour.
		H319	Causes serious eye irritation.
		H332	Harmful if inhaled.
		H335	May cause respiratory irritation.
		AUH066	Repeated exposure may cause skin dryness or cracking
Precautionary Statements	Prevention	**P210**	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
		P280	Wear protective gloves/protective clothing/eye protection/face protection.
		P261	Avoid breathing fumes/mists/vapours/spray.
		P240	Ground and bond container and receiving equipment.
		P241	Use explosion-proof electrical/ventilating/lighting and all other equipment.
		P242	Use non-sparking tools.
		P243	Take action to prevent static discharges.
		P235	Keep cool.
		P271	Use only outdoors or in a well-ventilated area.
	Response	**P370 + P378**	In case of fire: Alcohol resistant foam is the preferred fire-fighting medium but, if it is not available, normal foam can be used.
		P312	Call a POISON CENTER or doctor if you feel unwell.
		P337 + P313	If eye irritation persists: Get medical advice/attention.
		P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
		P304 + P340	IF INHALED: Remove victim to fresh air and keep 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.
	Storage	**P403 + P233**	Store in a well-ventilated place. Keep container tightly closed.
		P405	Store locked up.
	Disposal	**P501**	Dispose of contents/container in accordance with local / regional / national / international regulations.

National Transport Commission (Australia)
Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Environmental Protection Authority (New Zealand)
Hazardous Substances and New Organisms Amendment Act 2015

HSNO Classifications	Physical Hazards	**3.1B**	Flammable liquid - high hazard
	Health Hazards	**6.1D**	Substances that are acutely toxic - Harmful
		6.3B	Substances that are mildly irritating to the skin
		6.4A	Substances that are irritating to the eye
	Environmental Hazards	**9.3B**	Substances that are ecotoxic to terrestrial vertebrates

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Methyl isobutyl ketone	C6H12O	108-10-1	>99 - 100 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed IF SWALLOWED: Rinse mouth and give up to 200 ml water for dilution. Do NOT induce vomiting. Call a Poison Centre or doctor/physician for advice. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Never give anything by mouth to an unconscious person.

Eye IF IN EYES: Immediately flush eyes with running water for several minutes, holding eyelids open and occasionally lifting the upper and lower lids. Remove contact lenses if present and easy to do. Continue rinsing for at least 15 minutes. Get immediate medical advice/attention.

Skin IF ON SKIN (or hair): Remove contaminated clothing and shoes immediately. Flush skin and hair with running water for at least 15 minutes. Get immediate medical advice/attention. Wash contaminated clothing and shoes before reuse.

Inhaled IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a Poison Centre or doctor/physician for advice. Apply resuscitation if victim is not breathing - Do not use direct mouth-to-mouth method if victim ingested or inhaled the substance; use alternative respiratory method or proper respiratory device - Administer oxygen if breathing is difficult.

Advice to Doctor Keep victim calm and warm - Obtain immediate medical care. Ensure that attending medical personnel are aware of identity and nature of product(s) involved, and take precautions to protect themselves. Watch for signs of respiratory insufficiency and assist ventilation as necessary. Monitor and treat, where necessary, for pulmonary oedema. Monitor and treat, where necessary, for shock. Do not use emetics.

Medical Conditions Aggravated by Exposure No information available.

5. FIRE FIGHTING MEASURES

General Measures If safe to do so, move undamaged containers from fire area. Cool containers with water spray until well after fire is out. Avoid getting water inside containers.

Flammability Conditions HIGHLY FLAMMABLE LIQUID & VAPOUR: Low flashpoint – Will be easily ignited by heat, sparks or flame.

Extinguishing Media Use dry chemical, Carbon dioxide (CO2), foam or water spray for extinction - Do not use water jets. Alcohol resistant foam is the preferred firefighting medium but, if it is not available, normal foam can be used.
*Caution: Use of water spray when fighting fire may be inefficient.

Fire and Explosion Hazard Risk of violent reaction or explosion! Vapours will form explosive mixtures with air. Vapours may travel to source of ignition and flash back. Most vapours are heavier than air and will collect in low or confined areas. Many liquids are lighter than water. Containers may explode when heated.

Hazardous Products of Combustion Fire will produce irritating, toxic and/or corrosive gases, including Carbon oxides, other pyrolysis products typical of burning organic material.

Contain runoff from fire control or dilution water - Runoff may pollute waterways; Vapours from runoff may create an

Special Fire Fighting Instructions	explosion hazard.
Personal Protective Equipment	Wear self-contained breathing apparatus (SCBA) and chemical-protective clothing. SCBA and structural firefighting uniform provide VERY limited protection.
Flash Point	14 °C
Lower Explosion Limit	1.2 %
Upper Explosion Limit	8.0 %
Auto Ignition Temperature	448 °C
Hazchem Code	•3YE

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Ensure adequate ventilation - Ventilate enclosed spaces before entering. ELIMINATE all ignition sources - All equipment used when handling the product must be earthed. Do not touch or walk through spilled material. Avoid breathing vapours and contact with eyes, skin and clothing.
Clean Up Procedures	Large spill: Transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Absorb small spill/residues with earth, sand or other non-combustible material. Use clean, non-sparking tools to collect absorbed material and place it in suitable containers for later disposal (see SECTION 13).
Containment	Stop leak if safe to do so – Prevent entry into waterways, drains or confined areas. Vapour-suppressing foam may be used to control vapours - Water spray may be used to knock down or divert vapour clouds.
Decontamination	Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely.
Environmental Precautionary Measures	Spillages and decontamination runoff should be prevented from entering drains and watercourses. Local authorities should be advised if significant spillages cannot be contained.
Evacuation Criteria	Spill or leak area should be isolated immediately. Keep upwind and to higher ground. Keep unauthorised personnel away. Large spill: Immediately contact Police or Fire Brigade; Consider initial downwind evacuation of areas within at least 300 m.
Personal Precautionary Measures	SCBA and gas-tight suits should be worn when dealing with damaged or leaking containers and where there is no risk of ignition. SCBA and structural firefighting uniform provide VERY limited protection where there is a risk of ignition.

7. HANDLING AND STORAGE

Handling	Safety showers and eyewash facilities should be provided within the immediate work area for emergency use. Ensure adequate ventilation - Use only outdoors or in a well-ventilated area. Handle in accordance with good industrial hygiene and safety practice. Avoid breathing mist/vapours and contact with eyes, skin and clothing. Do not ingest. Wear protective gloves/protective clothing/eye protection/face protection (see SECTION 8). HIGHLY FLAMMABLE LIQUID & VAPOUR: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources - No smoking. Ground and bond container and receiving equipment. Use explosion-proof equipment. Use non-sparking tools. Take action to prevent static discharges. Avoid splash filling. Do NOT use compressed air for filling, discharging or handling operations.
Storage	Store in a cool, dry and well-ventilated place, out of direct sunlight. Keep container tightly closed. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources - No smoking. Keep away from foodstuffs and incompatible materials (see SECTION 10). Store locked up. Locate bulk storage outdoors. Bulk storage tanks should be diked (bunded).
Container	Keep in the original container or suitable storage material. Plastic containers may only be used if approved for flammable liquid.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	For Methyl isobutyl ketone (CAS No. 108-10-1): - Safe Work Australia Exposure Standard: TWA = 50 ppm (205 mg/m3); STEL = 75 ppm (307 mg/m3). - New Zealand Workplace Exposure Standard: TWA = 50 ppm (205 mg/m3); STEL = 75 ppm (307 mg/m3).

Exposure Limits	No Data Available
Biological Limits	No information available.
Engineering Measures	A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Use explosion-proof electrical/ventilating/lighting equipment.
Personal Protection Equipment	- Respiratory protection: In case of inadequate ventilation, wear respiratory protection. Recommended: Organic vapour (type A) filter of sufficient capacity or self-contained breathing apparatus (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to prevent eye contact. Recommended: Tightly fitting safety goggles. - Hand protection: Wear protective gloves. Recommended: PVC or butyl-rubber gloves. - Skin/body protection: Wear appropriate personal protective clothing to prevent skin contact. Recommended: Use solvent-resistant protective clothing. Safety shoes and boots should also be chemical resistant.
Special Hazards Precaustions	No information available.
Work Hygienic Practices	Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Remove contaminated clothing and shoes immediately.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Liquid
Odour	Characteristic
Colour	Colourless
pH	No Data Available
Vapour Pressure	2 kPa (@ 20 °C)
Relative Vapour Density	3.45 Air = 1
Boiling Point	117 °C
Melting Point	-84 °C
Freezing Point	No Data Available
Solubility	Immiscible with water
Specific Gravity	0.7978
Flash Point	14 °C
Auto Ignition Temp	448 °C
Evaporation Rate	No Data Available
Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	No Data Available
Specific Heat	No Data Available
Molecular Weight	100.15 g/mol
Net Propellant Weight	No Data Available
Octanol Water Coefficient	1.31
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	No Data Available
Viscosity	0.733 cSt (@ 20 °C)
Volatile Percent	No Data Available
VOC Volume	No Data Available
Additional Characteristics	No information available.
Potential for Dust Explosion	Not applicable.

Fast or Intensely Burning Characteristics	Risk of violent reaction or explosion!
Flame Propagation or Burning Rate of Solid Materials	No information available.
Non-Flammables That Could Contribute Unusual Hazards to a Fire	Use of water spray when fighting fire may be inefficient.
Properties That May Initiate or Contribute to Fire Intensity	HIGHLY FLAMMABLE LIQUID & VAPOUR: Low flashpoint – Will be easily ignited by heat, sparks or flame.
Reactions That Release Gases or Vapours	Fire/decomposition will produce irritating, toxic and/or corrosive gases, including Carbon oxides, other pyrolysis products typical of burning organic material.
Release of Invisible Flammable Vapours and Gases	Vapours will form explosive mixtures with air.

10. STABILITY AND REACTIVITY

General Information	Can form explosive peroxides on exposure to air. Reacts violently with strong oxidants and strong reducing agents. Dissolves some plastics, resins and rubber.
Chemical Stability	Considered stable.
Conditions to Avoid	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
Materials to Avoid	Incompatible/reactive with isocyanates, aldehydes, cyanides, peroxides, anhydrides, strong oxidisers, strong acids and reducing agents.
Hazardous Decomposition Products	Fire/decomposition will produce irritating, toxic and/or corrosive gases, including Carbon oxides, other pyrolysis products typical of burning organic material.
Hazardous Polymerisation	Hazardous polymerisation will not occur.

11. TOXICOLOGICAL INFORMATION

General Information

- Acute toxicity: Harmful if inhaled. Symptoms include abdominal pain, cough, diarrhoea, dizziness, headache, nausea, sore throat, unconsciousness, vomiting, weakness.
- Skin corrosion/irritation: Repeated exposure may cause skin dryness or cracking.
- Eye damage/irritation: Causes serious eye irritation.
- Respiratory/skin sensitisation: MIBK does not include any functional groups generally associated with skin sensitisation.
- Germ cell mutagenicity: MIBK and its metabolites are not considered to have mutagenic or genotoxic potential.
- Carcinogenicity: Limited evidence of a carcinogenic effect (under conditions of high dose repeated exposure). Methyl isobutyl ketone (CAS No. 108-10-1) is classified by the IARC Monographs as "Possibly carcinogenic to humans" (Group 2B).
- Reproductive toxicity: MIBK or its metabolites are not expected to be specific reproductive or developmental toxins.
- STOT (single exposure): May cause respiratory irritation. The substance may cause effects on the central nervous system at high concentrations. This may result in narcosis.
- STOT (repeated exposure): MIBK is not considered to cause serious damage to human health from repeated (oral) exposure. The major effects noted
following repeated exposures to high concentrations were in the liver and kidneys.
- Aspiration toxicity: If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

Acute

Ingestion	Acute toxicity (Oral): - LD50, Rat: >2,000 mg/kg bw.
Other	Acute toxicity (Dermal): - LD50, Rat: >2,000 mg/kg bw.
Carcinogen Category	None

12. ECOLOGICAL INFORMATION

Aquatic toxicity:

Ecotoxicity	- LC50, Fish: 69.808 mg/L (96 h). - EC50, Crustacea: 170 m/L (48 h). - EC50, Algae/aquatic plants: 25.488 mg/L (96 h).
Persistence/Degradability	Readily biodegradable. The main degradation pathway for MIBK in the atmosphere is via reactions hydroxyl radicals; the half-life for this reaction is estimated to be 16-17 hours. It is expected to be directly broken down by sunlight, with a half-life of 15 hours with acetone as the by-product.
Mobility	Expected to evaporate from moist/dry soil surfaces and be broken down by sunlight on soil surfaces. It is highly mobile and may be leached from the soil by water, and is susceptible to degradation by mixed populations of oxygen using microorganisms.
Environmental Fate	Discharge into environment must be avoided.
Bioaccumulation Potential	Expected to have a low potential for aquatic/sediment bioaccumulation. - Log Kow = 1.31 - BCF: 2-5
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Recover or recycle if possible, or dispose as hazardous waste in accordance with local/regional/national regulations. Do not dispose together with household waste. Do not dispose into the environment, in drains or in water courses.
Special Precautions for Land Fill	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Do not puncture, cut or weld unclean drums.

14. TRANSPORT INFORMATION

Land Transport (Australia)
ADG Code

Proper Shipping Name	METHYL ISOBUTYL KETONE
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
EPG	14 Liquids - Highly Flammable
UN Number	1245
Hazchem	•3YE
Pack Group	II
Special Provision	No Data Available

Land Transport (Malaysia)
ADR Code

Proper Shipping Name	METHYL ISOBUTYL KETONE
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
EPG	14 Liquids - Highly Flammable
UN Number	1245
Hazchem	3YE
Pack Group	II
Special Provision	No Data Available

Land Transport (New Zealand)
NZS5433

Proper Shipping Name	METHYL ISOBUTYL KETONE
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
EPG	14 Liquids - Highly Flammable
UN Number	1245
Hazchem	3YE
Pack Group	II
Special Provision	No Data Available

Land Transport (United States of America)
US DOT

Proper Shipping Name	METHYL ISOBUTYL KETONE
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
ERG	127 Flammable Liquids (Polar / Water-Miscible)
UN Number	1245
Hazchem	3YE
Pack Group	II
Special Provision	No Data Available

Sea Transport
IMDG Code

Proper Shipping Name	METHYL ISOBUTYL KETONE
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
UN Number	1245
Hazchem	3YE
Pack Group	II
Special Provision	No Data Available
EMS	F-E, S-D
Marine Pollutant	No

Air Transport
IATA DGR

Proper Shipping Name	METHYL ISOBUTYL KETONE
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
UN Number	1245
Hazchem	3YE
Pack Group	II
Special Provision	No Data Available

National Transport Commission (Australia)
Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

15. REGULATORY INFORMATION

General Information	METHYL ISOBUTYL KETONE
Poisons Schedule (Aust)	Schedule 5

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

Approval Code	HSR001194

National/Regional Inventories

Australia (AICS)	Listed
Canada (DSL)	Listed
Canada (NDSL)	Not Determined
China (IECSC)	Listed
Europe (EINECS)	203-550-1
Europe (REACh)	01-2119473980-30-XXXX
Japan (ENCS/METI)	Listed
Korea (KECI)	Listed
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed
Philippines (PICCS)	Listed
Switzerland (Giftliste 1)	Not Determined
Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Not Determined
USA (TSCA)	Listed

16. OTHER INFORMATION

Related Product Codes	MEISBU0900, MEISBU0905, MEISBU1000, MEISBU1001, MEISBU1002, MEISBU1003, MEISBU1004, MEISBU1005, MEISBU1006, MEISBU1007, MEISBU1008, MEISBU1009, MEISBU1010, MEISBU1011, MEISBU1012, MEISBU1013, MEISBU1014, MEISBU1015, MEISBU1016, MEISBU1017, MEISBU1018, MEISBU1019, MEISBU1020, MEISBU1800, MEISBU1801, MEISBU1802, MEISBU1803, MEISBU1804, MEISBU1900, MEISBU2000, MEISBU2001, MEISBU2002, MEISBU2100, MEISBU2101, MEISBU2110, MEISBU2165, MEISBU2200, MEISBU2201, MEISBU2202, MEISBU2300, MEISBU2400, MEISBU3000, MEISBU3010, MEISBU3020, MEISBU3021, MEISBU3022, MEISBU3023, MEISBU3024, MEISBU3025, MEISBU3026, MEISBU3027, MEISBU3030, MEISBU3500, MEISBU4000, MEISBU4001, MEISBU4100, MEISBU4200, MEISBU4202, MEISBU4205, MEISBU5000, MEISBU5005, MEISBU6000, MEISBU6001
Revision	5
Revision Date	21 Mar 2019
Reason for Issue	SDS Updated
	< Less Than

Key/Legend

> Greater Than
AICS Australian Inventory of Chemical Substances
atm Atmosphere
CAS Chemical Abstracts Service (Registry Number)
cm² Square Centimetres
CO2 Carbon Dioxide
COD Chemical Oxygen Demand
deg C (°C) Degrees Celcius
EPA (New Zealand) Environmental Protection Authority of New Zealand
deg F (°F) Degrees Farenheit
g Grams
g/cm³ Grams per Cubic Centimetre
g/l Grams per Litre
HSNO Hazardous Substance and New Organism
IDLH Immediately Dangerous to Life and Health
immiscible Liquids are insoluable in each other.
inHg Inch of Mercury
inH2O Inch of Water
K Kelvin
kg Kilogram
kg/m³ Kilograms per Cubic Metre
lb Pound
LC50 LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.
LD50 LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.
ltr or **L** Litre
m³ Cubic Metre
mbar Millibar
mg Milligram
mg/24H Milligrams per 24 Hours
mg/kg Milligrams per Kilogram
mg/m³ Milligrams per Cubic Metre
Misc or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present.
mm Millimetre
mmH2O Millimetres of Water
mPa.s Millipascals per Second
N/A Not Applicable
NIOSH National Institute for Occupational Safety and Health
NOHSC National Occupational Heath and Safety Commission
OECD Organisation for Economic Co-operation and Development
Oz Ounce
PEL Permissible Exposure Limit
Pa Pascal
ppb Parts per Billion
ppm Parts per Million
ppm/2h Parts per Million per 2 Hours
ppm/6h Parts per Million per 6 Hours
psi Pounds per Square Inch
R Rankine
RCP Reciprocal Calculation Procedure
STEL Short Term Exposure Limit
TLV Threshold Limit Value
tne Tonne
TWA Time Weighted Average
ug/24H Micrograms per 24 Hours
UN United Nations
wt Weight