MATERIAL SAFETY DATA SHEET (MSDS)

SECTION 1: Identification

1.1 Product identifiers

Product Name : **Benzyl chloride**

Cat No.: **AC180850000; AC180850010; AC180850025; AC180850100**

CAS No. : 100-44-7

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

Recommended uses : Laboratory chemicals

Uses advised against: Food, drug, pesticide or biocidal product use.

1.3 Details of the supplier of the safety data sheet

Company : Krishna Solvechem Limited.
B/503, Sahayog, S. V. Road,
Kandivali (West), Mumbai – 400067. India.

Telephone : +91-22-6123 0222

Email : exports@kscl.co.in

1.4 Emergency telephone number

Emergency Phone : +91-8657457330

SECTION 2: Hazards identification

2.1 Classification

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

Flammable liquids	(Category 4)
Skin Corrosion/Irritation	(Category 2)
Serious Eye Damage/Eye Irritation	(Category 1)
Specific target organ toxicity (single exposure)	(Category 3)
Target Organs - Respiratory system, Central nervous system(CNS)	
Specific target organ toxicity (repeated exposure)	(Category 2)
Target organs - Liver	

2.2 Label elements

Pictogram :

Signal word Danger

Hazard statement (s) Harmful if swallowed. Combustible liquid

	Causes skin irritation. May be corrosive to metal Causes serious eye damage May cause an allergic skin reaction. Toxic if inhaled May cause respiratory irritation, drowsiness or dizziness May cause cancer and genetic defects May cause damage to organs through prolonged or repeated exposure
Precautionary statement (s) **Prevention**	Wash face, hands and any exposed skin thoroughly after handling Wear protective gloves Avoid breathing dust/fume/gas/mist/vapors/spray Use only outdoors or in a well-ventilated area Keep away from heat/sparks/open flames/hot surfaces. - No smoking Keep container tightly closed Contaminated work clothing should not be allowed out of the workplace Keep only in original container Use personal protective equipment as required Keep cool **Inhalation :** IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing Call a POISON CENTER or doctor/physician if you feel unwell **IF ON SKIN (or hair):** If skin irritation occurs: Get medical advice/attention IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower Wash contaminated clothing before reuse **Eyes:** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing If eye irritation persists: Get medical advice/attention **Ingestion:** IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth **Fire** In case of fire: Use CO2, dry chemical, or foam for extinction **Storage:** Store locked up Store in a well-ventilated place. Keep container tightly closed

	Store in corrosive resistant polypropylene container with a resistant in liner. Store in a dry place **Disposal:** Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)	WARNING Cancer

SECTION 3: Composition / information on ingredients

3.1

Component	CAS-No	Weight %
Benzyl chloride	100-44-7	>95
Propylene oxide	75-56-9	0.25

SECTION 4: First aid measures

4.1	**Description of first aid measures**	
	General Advice:	If symptoms persist, call a physician.
	If inhalation :	Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of apocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
	In case of skin contact :	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
	In case of eye contact :	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
	Ingestion :	Clean mouth with water and drink afterwards plenty of water.
4.2	**Most important symptoms and effects :**	Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
4.3	**Notes to Physician :**	Treat symptomatically

SECTION 5: Firefighting effects

5.1	**Extinguishing media**	
	Suitable extinguishing media :	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
	Unsuitable Extinguishing Media: :	No information available
5.2	**Flash Point :** **Method :**	67 °C / 152.6 °F No information available

	Autoignition Temperature:	No information available
	Explosion Limits:	
	Upper	14 vol%
	Lower	1.1 vol%
	Sensitivity to Mechanical Impact	No information available
	Sensitivity to Static Discharge	No information available
	Specific Hazards Arising from the Chemical :	Combustible material. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition. Risk of ignition.
	Hazardous Combustion Products :	Carbon monoxide (CO). Carbon dioxide (CO_2). Hydrogen chloride gas
5.4	**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.

NFPA:

Health	Flammability	Instability	Physical hazards
3	2	1	N/A

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Remove all sourcesof ignition. Take precautionary measures against static discharges.

6.2 Environmental precautions

Should not be released into the environment. Do not flush into surface water or sanitary sewer system

6.3 Methods and materials for containment and cleaning up

Keep in suitable, closed containers for disposal. Soak up with inert absorbent material. Remove all sources of ignition.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance. Keep away from open flames, hot surfaces and sources of ignition.

7.2 Conditions for safe storage

Keep away from heat, sparks and flame. Flammables area. Keep container tightly closed in a dry and well-ventilated place. Incompatible Materials. Strong oxidizing agents. Bases. Metals.

SECTION 8: Exposure controls/personal protection

8.1 Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Benzyl chloride	TWA: 1 ppm	(Vacated) TWA: 1 ppm (Vacated) TWA: 5 mg/m^3 TWA: 1 ppm TWA: 5 mg/m^3	IDLH: 10 ppm Ceiling: 1 ppm Ceiling: 5 mg/m^3	TWA: 1 ppm
Propylene oxide	TWA: 2 ppm	(Vacated) TWA: 20 ppm (Vacated) TWA: 50 mg/m^3 TWA: 100 ppm TWA: 240 g/m^3	IDLH: 400 ppm	TWA: 2 ppm

Engineering Measures

Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use only under a chemical fume hood

8.2 Exposure controls

Personal protective equipment -

Eye / Face protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin protection and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European StandardEN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice..

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Colorless – Amber Liquid
b) Odour	Pungent
c) Odour Threshold	No information available
d) pH	No information available
e) Melting point / freezing point	-39 °C / -38.2 °F
f) Initial boiling point and	179 °C / 354.2 °F @ 760 mmHg

boiling range	
g) Flash point	67 °C / 152.6 °F
h) Evaporation rate	No information available
i) Flammability (solid, gas)	Not applicable
j) Upper/lower flammability or explosive limits	Upper : 14 vol% Lower : 1.1 vol%
k) Vapour pressure	1.2 mbar @ 20 °C
l) Vapour density	4.36 (Air = 1.0)
m) Specific Gravity	1.100
n) Solubility	No information available
o) Partition coefficient: n octanol/water	No data available
p) Auto-ignition temperature	585 °C / 1085 °F
q) Decomposition temperature	No information available
r) Viscosity	1.380 mPa.s @ 20°C
s) Molecular formula	C7 H7 Cl
t) Molecular Weight	126.59

SECTION 10: Stability and Reactivity

10.1	**Reactive Hazard :**	None known, based on information available
10.2	**Chemical stability :**	No information available
10.3	**Possibility of hazardous reactions :**	None under normal processing.
10.4	**Conditions to avoid :**	Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Incompatible products.
10.5	**Incompatible materials:**	Strong oxidizing agents, Strong bases, Metals
10.6	**Hazardous decomposition products :**	Carbon monoxide (CO), Carbon dioxide (CO2), Hydrogen chloride gas
10.7	**Hazardous Polymerization**	Hazardous polymerization does not occur

SECTION 11: Toxicological information

11.1

Information on toxicological effects

Acute toxicity:

Product Information:

Oral LD50	Category 4. ATE = 300 - 2000 mg/kg.
Dermal LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Vapor LC50	Category 2. ATE = 0.5 - 2 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Benzyl chloride	LD50 = 625 mg/kg (Rat)	Not listed	LC50 = 0.74 mg/L (Rat) 2 h
Propylene oxide	LD50 = 520 mg/kg (Rat)	LD50 = 1244 mg/kg (Rabbit)	9.48 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

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

Irritation : Causes burns by all exposure routes

Sensitization: May cause sensitization by skin contact

Carcinogenicity : Possible cancer hazard. May cause cancer based on animal data. The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Benzyl chloride	100-44-7	Group 2A	Not listed	A3	X	A3
Propylene oxide	75-56-9	Group 2B	Reasonably Anticipated	A3	X	A3

Mutagenic Effects: Animal experiments showed mutagenic and teratogenic effects

Reproductive Effects: No information available.

Developmental Effects : No information available.

Teratogenicity: No information available.

STOT - single exposure : Respiratory system, Central nervous system (CNS)

STOT - repeated exposure: Liver

Aspiration hazard : No information available.

Symptoms / effects,both acute and delayed: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information : No information available

Other Adverse Effects : The toxicological properties have not been fully investigated.

SECTION 12: Ecological information

12.1

Ecotoxicity:

Do not empty into drains. Do not flush into surface water or sanitary sewer system. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Benzyl chloride	Not listed	LC50: 4.4 - 5.6 mg/L, 96h static (Pimephales promelas) LC50: = 4 mg/L, 96h static (Brachydanio rerio)	EC50 = 1.92 mg/L 5 min EC50 = 2.25 mg/L 15 min EC50 = 2.97 mg/L 30 min	Not listed
Propylene oxide	EC50: = 240 mg/L, 96h(Pseudokirchneriella subcapitata)	LC50: = 215 mg/L,96h static(Lepomis macrochirus)	EC50 = 3300 mg/L 160 min	EC50: = 350 mg/L, 48h (Daphnia magna)

12.2 Persistence and degradability: May persist based on information available

Bioaccumulation/ Accumulation No information available

12.3 Mobility: Is not likely mobile in the environment due to its low water Solubility.

SECTION 13: Disposal considerations

13.1 Waste treatment methods: Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

SECTION 14: Transport information

14.1 UN number :

DOT : UN1738 TDG : UN1738

IATA : UN1738 IMDG : UN1738

14.2 UN proper shipping name

DOT : Benzyl chloride **TDG :** BENZYL CHLORIDE

IMDG : BENZYL CHLORIDE **IATA :** BENZYL CHLORIDE

14.3 Transport hazard class(es) DOT: 6.1 TDG: 6.1 IMDG: 6.1 IATA: 6.1

14.4 Packaging group: DOT: II TDG: II IMDG: II IATA: II

SECTION 15: Regulatory information

15.1 United states of America Inventory:

Component	CAS No	TSCA	TSCA Inventory notification -	TSCA - EPA RegulatoryFlags
Benzyl chloride	100-44-7	X	ACTIVE	-
Propylene oxide	75-56-9	X	ACTIVE	-

Legend:

TSCA - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories:

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia(AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Benzyl chloride	100-44-7	X	-	202-853-6	X	X	X	X	X	KE-05729
Propylene oxide	75-56-9	X	-	200-879-2	X	X	X	X	X	KE-24565

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Benzyl chloride	100-44-7	>95	1.0
Propylene oxide	75-56-9	0.25	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzyl chloride	X	100 lb	-	-
Propylene oxide	X	100 lb	-	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Benzyl chloride	X		-
Propylene oxide	X		-

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and LiabilityAct (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzyl chloride	100 lb	100 lb
Propylene oxide	100 lb	100 lb

California Proposition 65 This product contains the following Proposition 65chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Benzyl chloride	100-44-7	Carcinogen	4 µg/day	Carcinogen
Propylene oxide	75-56-9	Carcinogen	-	Carcinogen

15.2 U.S. State Right-to-Know Regulations:

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzyl chloride	X	X	X	X	X
Propylene oxide	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

U.S. Department of Homeland Security - T his product contains the following DHS Chemicals.

Component	DHS Chemical Facility Anti-Terrorism Standard
Propylene oxide	Release STQs - 10000lb

Other International Regulation

Mexico – Grade Moderate risk, Grade 2

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

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Benzyl chloride	100-44-7	Listed	Not applicable	Not applicable	Not applicable
Propylene oxide	75-56-9	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantitiesfor Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantitiesfor Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Benzyl chloride	100-44-7	Not applicable	Not applicable	Not applicable	Not applicable
Propylene oxide	75-56-9	5 tonne	50 tonne	Not applicable	Not applicable

SECTION 16: Other information

16.1	**Prepared By:**	Regulatory affairs Krishna Solvechem Limited
	Email:	exports@kscl.co.in
	Creation Date:	23-Mar-2012
	Revision Date:	19-Jan-2023
	Print Date:	19-Jan-2023
	Revision Summary:	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under29 C F R 1910.1200 to align with the Globally Harmonized System ofClassification and Labeling of Chemicals (GHS).

16.2 Disclaimer:

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