

General Report

Title	PE optimization report of COAM3		
Document No.	RP-CDM-001491	Version	1.0, CURRENT
Department	Process Engineering	Status	Approved

ISMS class: Internal

1.0 MSDS SUMMARY SHEET

Basic information	Morpholine	Phenyl chloroformate	Sodium hydroxide	Toluene	n-Heptane
Chemical Formula	C ₄ H ₉ NO	C ₇ H ₅ ClO ₂	NaOH	C ₇ H ₈	C ₇ H ₁₆
Molecular Wt	87.122	156.57	39.9971	92	100.2
Physical properties					
a) Appearance	Colorless liquid	Light yellow color liquid	White, hard (when pure), opaque crystals	Clear, colorless, volatile liquid	Colorless Liquid
b) Specific gravity @ 20C / 4 C	1.007	1.24	2.13 g/cm	0.87	0.683
c) Boiling point (0C)	129 °C	188	NA	110	98 °C
d) Melting/Freezing point (0C)	-5 °C	-28	323 °C	-95°C	-91 °C
Hazard related information					
a) Eyes	Causes slight irritation to the eyes. Redness and possible itching and/or tearing of the eyes.	Causes serious eye irritation	Hazardous in case of eye contact (irritant)	Vapors are irritating to the eyes. Splashes may cause severe irritation, with stinging, tearing, redness and pain.	Vapors are irritating to the eyes. Splashes may cause severe irritation, with stinging, tearing, redness and pain.
b) Skin	Causes significant irritation to the skin. Redness and/or itching of the skin	May cause skin irritation.	Hazardous in case of skin contact (irritant, permeator)	Irritating due to defatting action on skin. Causes redness, pain, drying and cracking of the skin.	Irritating due to defatting action on skin. Causes redness, pain, drying and cracking of the skin.

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c) Inhalation	Causes significant irritation to the mucous membrane, respiratory tract and nose. Possible coughing, burning, tightness of chest and/or shortness of breath.	May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated.	Irritating to the respiratory tract	Inhalation of vapors irritates the respiratory tract. May cause coughing, dizziness, dullness, and headache. Higher concentrations can produce central nervous system depression, narcosis, and unconsciousness.	Inhalation of vapors irritates the respiratory tract. May cause coughing, dizziness, dullness, and headache. Higher concentrations can produce central nervous system depression, narcosis, and unconsciousness.
d) Ingestion:	Toxic if swallowed.	May cause gastrointestinal irritation with nausea, vomiting and diarrhea. The toxicological properties of this substance have not been fully investigated.	Toxic if swallowed.	Swallowing small amounts is not likely to produce harmful effects. Ingestion of larger amounts may produce abdominal pain, nausea and vomiting. Aspiration into lungs can produce severe lung damage and is a medical emergency.	May cause respiratory irritation.
Personal protection	Safety glasses with side-shields conforming to EN166	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.	Splash goggles. Lab coat. Vapor respirator	Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Use chemical safety goggles and maintain eye wash fountain and quick-drench facilities in work area.	Safety glasses, Rubber nitrile gloves & antistatic resistive clothing

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Handling information					
a) Handling	Use appropriate personal protective equipment. Handle in a Well-ventilated area. Handle and use in a manner consistent with good industrial / manufacturing techniques and practices.	Use only under a chemical fume hood. Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Do not allow contact with water. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance. Keep away from open flames, hot surfaces and sources of ignition. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Take precautionary measures against static di	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation. Keep away from heat, sparks and flame	Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.	Use only under a chemical fume hood. Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Do not breathe mist/vapors/spray. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools
b) storage	Keep container tightly closed. Keep container in a cool, well-ventilated area	Keep away from water or moist air. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep refrigerated. Keep away from heat, sparks and flame. Corrosives area. Incompatible Materials. Strong oxidizing agents. Amin	Keep container tightly closed. Keep container in a cool, well-ventilated area	Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Flammables area.

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Solubility	miscible in water	Decomposes in contact water	Soluble in Water	insoluble in water	Insoluble in water
Any other relevant information	NA	Water reactive. Moisture sensitive Contact with water liberates toxic gas	NA	Extremely flammable liquid and vapor. Vapor may cause flash fire. Harmful if swallowed or inhaled. Effects central nervous system.	Specific Hazards Arising from the Chemical Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Do not allow run-off from fire-fighting to enter drains or water courses
First aid measures					
a) Eyes	Immediately flush eyes with plenty of water for two to three minutes. Remove any contact lenses and continue flushing for 15 minutes. Get medical attention.	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required	Immediately flush the eyes with copious amounts of water for at least 10-15 minutes	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
b) skin	Remove contaminated clothing including shoes and immediately wash affected area with plenty of soap and water. Seek medical attention. Wash contaminated clothing and shoes before reuse.	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required	immediately flush skin with plenty of water. Cover the irritated skin with an emollient	Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.	Wash off with soap and plenty of water. Consult a physician.
c) Ingestion	Never give anything by mouth to an unconscious Person	Do NOT induce vomiting. Call a physician or poison control center immediately	Never give anything by mouth to an unconscious Person	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person	Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

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d) Inhalation	Remove from further exposure. Keep warm and at rest. If cough or other symptoms develop, seek medical attention.	Remove to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required	remove to fresh air. If not breathing, give artificial respiration	Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. Do not use mouth-to-mouth resuscitation.	If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
Flash point , °C	NA	NA	NA	6	-4 °C
Fire-fighting measures	CO 2, dry chemical, dry sand, alcohol-resistant foam. Water mist may be used to cool closed containers	CO 2, dry chemical, dry sand, alcohol-resistant foam. Water mist may be used to cool closed containers	Use alcohol-resistant foam, carbon dioxide (CO2) or dry chemical	For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water.	CO 2, dry chemical, dry sand, alcohol-resistant foam. Water mist may be used to cool closed containers.
IMDG code	NA	NA	NA	NA	NA
CAS Number	110-91-8	1885-14-9	1310-73-2	108-88-3	142-82-5
UN number	NA	UN2746	NA	UN1090	UN1206
Transport hazard	NA	NA	NA	3	NA