HNS MARITIME SAFETY DATA SHEET

FILE NO.: 007 **DATE:** 2011

2-AMINO-2-METHYL-1-PROPANOL **CAS No: 124-68-5** **UN No: 1993** **EVAPORATOR/FLOATER**

Xi- Irritant,
N – Dangerous to Environment
R36/38, R52/53
S26, S36, S61

KEY POINTS

- White crystals or clear viscous liquid above 4°C. Slight amine (fish) odour
- Heavier than air. Miscible in water forming basic solutions.
- Harmful and irritant and solutions are corrosive. Combustible.
- Incompatible with strong oxidising substances, acids. Corrosive to some metals.
- Causes severe irritation to eyes and skin and via inhalation and ingestion. Can cause liver damage.
- Exposure to high concentrations may be potentially **fatal.**
- Chronic effects from repeated exposure. Suspected carcinogen and teratogen.

HUMAN HEALTH EXPOSURE ROUTES See Section 3

- Exposure by any route may be dangerous. Secondary contamination may occur.
- Inhalation may lead to irritation and lung damage
- Dermal exposure may cause irritation.
- Ocular exposure may lead to irritation.
- Ingestion may result in liver damage.

FIRE See Section 8

- Combusts.
- Generates harmful gases on combustion
- Leaking containers may explode
- protective clothing and breathing apparatus

ENVIRONMENT See section 11

- Dangerous to aquatic organisms.
- Dissolves in water forming basic solutions – pH 11.

MARITIME TRANSPORT

- Transported as solid, liquid or solutions

REACTIVITY WITH SEA WATER

- Miscible.

INCIDENT MANAGEMENT

- **Alert Emergency Services. Non-essential personnel to move at least 50 m away from the incident.**
- **There may be a public safety hazard outside the immediate area of the incident (See Table 1). Consider evacuation/shelter and set up of emergency rest centres for evacuees.**
- **Initiate real-time ambient monitoring, for use with meteorological and marine forecasts.**
- **Emergency department staff treating chemically contaminated casualties should be equipped with approved, gas-tight decontamination suits and breathing apparatus. Ventillate enclosed spaces.**
- **Secondary contamination may occur.**
- **Decontamination run-off should be prevented from entering drains and watercourses.**
- **Vent voids and confined spaces.**
- **Risk Communication strategy to advise members of the public on evacuation/sheltering**
- **Post-incident epedemiology / follow-up. Medical referrals.**
- **Effect biomarkers for 2-Amino-2-methyl-1-propanol are not defined.**

HUMAN HEALTH CONSIDERATIONS – See Section 3 to 6

ERG 2008 Table 1: Initial isolation and protective action distances

Chemical Name	Spill Size	Definition	Isolation Zone in all directions	DownWind Protection Zone	
				Day	Night
2-AMINO-2-METHYL-1-PROPANOL	Small	From small package or small leak form large package	50m (150ft)		
	Large	From a large package or from many small packages	300m (800ft)		
	Fire	If substance involved in fire	800 meters (1/2 mile)	consider evacuation for that distance in all directions	

Isolation Distance: All personnel to be directed in a cross wind direction this distance from the spill

Protective Action Zone: A square area down wind of the spill where protective action should be considered, starting with nearest receptors and working away from spill.

Such estimates should always be regarded with reservations and never be alternatives for monitoring.

Acute Health Hazards (Based upon US Dept Transport TEELs)

ppm	mg m^{-3}	Signs and symptoms
	0.075	Irritation
	0.6	Reversible effects
	500	Serious effects

Monitoring Strategy (Short & Long Term) & Equipment – See Section 6

Health and Safety	**Air** - Real-time electrochemical or photionisation detection or using quantitative colour change tubes (Seek specialist advice). **Water –** pH probes.
Environmental	Atmospheric fate and transport e.g. Aloha (immediate risk / first response), Calpuff (longer term)
Public Health	GP referrals, hospital admissions – numbers, symptomology, follow-up studies. (See Biomarkers)

OPERATIONAL EMERGENCY RESPONSE – See Section 8 & 9

Fire fighting measures	Use fine spry to control mitigation of vapours. Use CO_2 or dry chemical extinguishers for small fires, water spray or foam for large fires. Tanks may explode when exposed to high tempertures
Decontamination of responders	Decontamination should be performed using local protocols in designated areas with adequate ventilation. Water should be contained and disposed of at an appropriate waste facility.
Response & Clean up	Protect sensitive water courses. Harmful to aquatic organisms.
Waste Management	Dispose as hazardous waste. Wash contaminanted clothing thoroughly before re-use.

EMERGENCY CONTACTS

ORGANISATION	TELEPHONE
FIRE, AMBULANCE, POLICE	**999**
HEALTH PROTECTION AGENCY: Chemical Hazards Unit	**08448 920555**
ENVIRONMENT AGENCY: 24/7 Pollution	**0800 807060**

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SECTION 1: IDENTIFICATION

NAME:	**2-Amino-2-methyl-1-propanol**		**CHEMICAL FORMULA:**		**$C_4H_{11}NO$**
SYNONYMS:	Isobutanolamine, 2-Amino-2-methylpropanol, 2-Aminoisobutanol, 2-Aminodimethylethanol				
CAS No:	**124-68-5**	**UN No:**	**1993**	**EINECS :**	**204-709-8**

CLASSIFICATIONS	**Xi - Irritant, C – Corrosive, N – Dangerous to Environment**
RISK PHRASES	**R36/38** Irritating to eyes and skin **R52/53** Harmful to aquatic organisms
SAFETY PHRASES	**S26** Keep away from sources of ignition No Smoking **S36** Wear suitable protective clothing, gloves and eye/face protection **S61** Avoid release to the aquatic environment.

USES:

Uses include paints, waxes, coatings and dispersants.

Trade statistics 2007 for ammonia indicate annual UK import and export in the order of 400,000 tonnes. Ammonia is typically transported as liquefied gas or aqueous solution.

SECTION 2: PHYSICAL CHEMICAL PROPERTIES

SEBC CLASSIFICATION	**EF Evaporator floater**	**BOILING POINT**	165 ^{o}C
APPEARANCE	White crystals. Viscous clear liquid above 4^{o}C	**VAPOUR PRESSURE**	0.133 kPa at 20 °C
ODOUR	None	**SPECIFIC GRAVITY**(air = 1):	3 at 20 °C
FLAMMABILITY	Combustible	**SOLUBILITY IN WATER**	Miscible at 15 °C
STABILITY & REACTIVITY	Stable. Incompatible with strong oxidising substances and acids. Corrosive to some metals. Emits toxic fumes including oxides of nitrogen when heated to decomposition		

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SECTION 3: HUMAN HEALTH HAZARDS

Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

ROUTES OF ENTRY: Exposure by any route may be dangerous.

POTENTIAL HEALTH EFFECTS

INHALATION	Inhalation may result in irritation of the throat, coughing, and breathing difficulties. Oedema my follow.
EYES	Severe irritant.
SKIN	Dermal exposure may result in severe irritation.
INGESTION	Ingestion may cause irritation, vomiting and can cause liver damage.

ACUTE HEALTH HAZARDS: Causes severe irritation. Inhalation may be fatal as a result of spasm, inflammation, and edema of larynx and bronchii, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting.

CHRONIC HEALTH HAZARDS: Repeated exposure may lead to chronic respiritory effects, skin irritation and liver damage. Other organs may also be affected

CARCINOGENICITY: Suspected carcinogen and teratogen.

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SECTION 4: EXPOSURE GUIDELINES AND STANDARDS

ODOUR THRESHOLD: No data

TASTE THRESHOLD: No data

EU AIR QUALITY GUIDELINE: No guideline value specified

DRINKING WATER QUALITY GUIDELINE No data
(UK DWI 2000)

WORKPLACE EXPOSURE LIMITS

EMERGENCY RESPONSE PLANNING GUIDELINE (ERPG) VALUES - No data
(American Industrial Hygiene Association)

ACUTE EXPOSURE GUIDELINE LEVELS (AEGLs) (U.S. Environmental Protection Agency) **-** No data

TEELs (Temporary Level of concern) (U.S. Department of Energy)
designed to represent the predicted response of members of the general public to different concentrations of a chemical during an incident.

TEEL 1 : 0.075 mg/m^3 - irritation and other minor effects
TEEL 2: 0.6 mg/m^3 - irritating but reversible effects
TEEL 3: 500 mg/m^3 - serious impact, perhaps death of compromised individuals

Reference USEPA CAMEO

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SECTION 5: EXPOSURE CONTROLS / PERSONAL PROTECTION

CONTROLS:

- Use fine water spray.
- Spillages and decontamination run-off should be prevented from entering sensitive watercourses.
- Vent voids and structures

PERSONAL PROTECTIVE EQUIPMENT

EMERGENCY ACTION CODE	EAC 3YE
RESPIRATORY PROTECTION	Breathing apparatus *(BS EN 137)*
EYE PROTECTION	Chemical resistant goggles (*BS EN166)*
SKIN PROTECTION	Liquid-tight chemical protective clothing *(BS 8428)*
EMERGENCY RESPONDERS	Ambulance staff, paramedics and emergency department staff treating chemically contaminated casualties should be equipped with approved, gas-tight decontamination suits based on EN466:1995, EN12941:1998 and prEN943-1:2001, where appropriate with breathing apparatus*(BS EN 137).*
OTHER PROTECTIVE CLOTHING OR EQUIPMENT	

WORK HYGIENIC PRACTICES:

Decontamination should be performed using local protocols in designated areas such as a decontamination cubicle with adequate ventilation.

Secondary contamination is possible. Wash skin with soapy water for 10 – 15 minutes.

DECONTAMINATION OF RESPONDERS:

Decontamination should be performed using local protocols in designated areas such as a decontamination cubicle with adequate ventilation. Wash skin with water for 10 – 15 minutes.

NON ESSENTIAL PERSONNEL / PUBLIC

There may be a public safety hazard outside the immediate area of the incident. People should stay indoors with windows and doors closed, ignition sources should be eliminated and ventilation stopped.

Non-essential personnel should move at least 50 m away from the incident.

Risk communication via news media as well as internet / telephone advice lines should be initiated to inform local residents / public based upon forecast data or Table 1 estimates.

SECTION 6: MONITORING AND DETECTION

HEALTH AND SAFETY

- Use real-time monitoring by electrochemical sensors or photoionisation detector (PID), GCMS and / or quantitative detection tubes such as Draeger tubes. Consult specialist suppliers.
- Monitor for asphyxiant atmospheres (oxygen depletion) before entering confined spaces. Heavier than air so will accumulate in poorly ventilated areas, voids and other confined spaces.
- Use pH probes for aqueous liquids.

ENVIRONMENTAL HEALTH

- Miscible in water forming basic solutions.
- Fire and explosion may lead to particulates and other contaminants including oxides of nitrogen.
- Use monitoring data, marine and meteorological data to predict gas cloud / smoke plume movement using appropriate modeling software e.g. Aloha (immediate risk / first response), CALPUFF (longer term).
- In the absence of data refer to Table 1 below for potential isolation and protective distances

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Such estimates should always be regarded with reservations and never be alternatives for monitoring.

PUBLIC HEALTH FOLLOW-UP & EPIDEMIOLOGY

- Collate GP referrals, hospital admissions – numbers, symptomology, age, sex, pre-existing conditions
- Effect biomarkers are undefined.
- Follow-up studies where public health may have been impacted (see chronic effects Section 3)

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SECTION 7: FIRST AID MEASURES

Important Notes

- Ambulance staff, paramedics and emergency department staff treating chemicallycontaminated casualties should be equipped with Department of Health approved, gas-tight (Respirex) decontamination suits based on EN466:1995, EN12941:1998 and prEN943-1:2001, where appropriate.
- Decontamination should be performed using local protocols in designated areas such as a decontamination cubicle with adequate ventilation.
- Secondary contamination may occur.
- Delayed effects are possible (pulmonary oedema)

Dermal exposure

- Remove patient from exposure.
- The patient should remove all clothing and personal effects.
- Double-bag soiled clothing and place in a sealed container clearly labelled as a biohazard.
- Wash hair and all contaminated skin with copious amounts of water (preferably warm) and soap for at least 10-15 minutes.
- Decontaminate open wounds first and avoid contamination of unexposed skin.
- Pay special attention to skin folds, axillae, ears, fingernails, genital areas and feet.
- Burns totalling more than 15 % of body surface in adults (>10 % in children) will require standard fluid resuscitation as for thermal burns.
- Cover affected area with a clean non-adherent dressing.

Ocular exposure

- Remove patient from exposure.
- Remove contact lenses if necessary and immediately irrigate the affected eye thoroughly with water or 0.9% saline for at least 10-15 minutes.
- Patients with corneal damage or those whose symptoms do not resolve rapidly should be referred for urgent ophthalmological assessment.

Inhalation

- Remove patient from exposure. Ensure a clear airway and adequate ventilation.
- Give oxygen to patients with respiratory symptoms.
- Apply other supportive measures as indicated by the patient's clinical condition.

Ingestion

- Ensure a clear airway and adequate ventilation.
- Give oxygen to symptomatic patients.
- Apply other measures as indicated by the patient's clinical condition.

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SECTION 8: FIRE FIGHTING MEASURES

Incompatible with strong oxidising substances and acids. Corrosive to certain metals.

FLAMMABILITY: Combustible when ignited

LOWER EXPLOSIVE LIMIT: -

UPPER EXPLOSIVE LIMIT: -

EXTINGUISHING MEDIA: Small fire – Dry chemical or CO2 extinguisher. Large fires - water spray or foam.

SPECIAL FIRE FIGHTING PROCEDURES: Prevent spillages and decontamination run-off entering drains or water courses.

HAZARDOUS DECOMPOSITION PRODUCTS: Reacts with water to form basic solutions.

Emits toxic fumes of oxides of nitrogen when heated to decomposition

SECTION 9: RECOVERY RESPONSE AND CLEAN-UP

Special precautions: Incompatible with strong oxidising substances and acids. Corrosive to certain metals.

INCIDENT MANAGEMENT& RESPONSE
• Use fine water spray to control migration of vapors. • Avoid run-off entering sensitive water-courses. • There may be a public safety hazard outside the immediate area of the incident. People should stay indoors with windows and doors closed, ignition sources should be eliminated and ventilation stopped. • Non-essential personnel should move at least 50 m away from the incident.
CLEAN-UP/RECOVERY
• Mixes with water to form basic solutions. • Moisten spills of solid to prevent dust generation.

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SECTION 10: WASTE DISPOSAL

WASTE CATALOGUE CLASSIFICATION : 16-10-01 aqueous liquids containing dangerous substances. H4 Irritant

WASTE DISPOSAL METHOD	Dispose as hazardous waste. Mixes with water to form basic solutions. Neutralise with weak acid.
ENVIRONMENTAL	Harmful to aquatic organisms and environments. Mixes with water to form basic solutions. Neutralise with weak acid.
PATIENT CLOTHING	Double-bag soiled clothing and place in a sealed container clearly labelled as a biohazard. Wash soiled clothing thoroughly if not to be disposed as waste.

Handling & Storage: Typically stored as a liquid, or as an aqueous solution. Store in a cool, well-labelled, well-ventilated, fire-proof area, preferably away from all sources of ignition and heat as well as incompatible materials. Avoid storage with oxidising agents, acids halogenated organics, peroxides, phenols (acidic), epoxides, anhydrides, and acid halides, metal hydrides. May react with metals to produce hydrogen. Corrosive to certain metals.

Transport Information: Hazard Class 8 Packaging Code III.

SECTION 11: ECOLOGICAL INFORMATION

Toxicity Data: Harmful to aquatic organisms and environments. Mixes with water to form basic solutions. Neutralise with weak acid.

ACUTE TOXICITY						
Species	**Age/Size**	**Bioassay conditions/analysed parameters**				**Reference**
		Temperature (°C)	**Salinity ‰**	**LC50 -48h**	**LC50 96h**	
Daphnia magna (Water flea)	-	-	-	-	-	
Catfish	-	-	-	-	-	
Pimephales promela (fathead minnow)	-	-	-	-	-	

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SECTION 12: CASE STUDY – MARITIME INCIDENT

No specific incidents recorded for this chemical, but several minor spills and leaks of amines reported in UK waters by MCGA. Details of impacts unknown. One larger incident involving amines is reported for the *Sam Houston* in the Gulf of Mexico in 1982. Again details of impact are not known.

SECTION 13: CASE STUDY – REPORTED PUBLIC HEALTH EFFECTS

No reported studies for maritime incidents. Several land based incidents involving amines (see methylamine).

SECTION 14: SOURCES OF FURTHER INFORMATION

UK Health Protection Agency	http://www.hpa.org.uk/Topics/ChemicalsAndPoisons/CompendiumOfChemicalHazards/ne/
Emergency Response Guidebook	http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/ergmenu.aspx
TOXNET Hazardous Substances Database	http://toxnet.nlm.nih.gov/
ICSC	http://www.inchem.org/pages/about.html
CAMEO	http://cameochemicals.noaa.gov/
ALOHA	http://www.epa.gov/osweroe1/content/cameo/aloha.htm
CEDRE	http://www.cedre.fr/index-en.php
ARCOPOL	http://www.arcopol.eu/home.aspx
EMSA	http://www.emsa.europa.eu/