TRIMETHYLAMINE

TMA

CAUTIONARY RESPONSE INFORMATION

Common Synonyms	Liquefied compressed gas Colorless Fish or ammonia odor Floats and mixes and boils on water. Poisonous, flammable visible vapor cloud is produced.

Evacuate.
Keep people away. Avoid contact with liquid and vapor.
Wear goggles and self-contained breathing apparatus.
Shut off ignition sources and call fire department.
Stay upwind and use water spray to ``knock down'' vapor.
Notify local health and pollution control agencies.
Protect water intakes.

Fire	FLAMMABLE. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear goggles and self-contained breathing apparatus. Stop flow of gas if possible. Cool exposed containers and protect men effecting shutoff with water. Let gas fires burn. Extinguish water solution fires with water spray, dry chemical, alcohol foam, or carbon dioxide.
Exposure	CALL FOR MEDICAL AID. VAPOR POISONOUS IF INHALED. Irritating to eyes, nose, and throat. Move to fresh air. IF IN EYES, hold eyelids open and flush with plenty of water. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. LIQUID Will burn skin and eyes. Harmful if swallowed. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
Water Pollution	Effect of low concentrations on aquatic life is unknown. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.

1. CORRECTIVE RESPONSE ACTIONS

Dilute and disperse
Stop discharge

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: Not listed.
2.2 Formula: $(CH_3)_3N$
2.3 IMO/UN Designation: 2.0/1083
2.4 DOT ID No.: 1083
2.5 CAS Registry No.: 75-50-3
2.6 NAERG Guide No.: 118
2.7 Standard Industrial Trade Classification: 51451

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Vapor-proof goggles and face shield; rubber gloves; air- supplied mask.
3.2 Symptoms Following Exposure: Vapor irritates eyes, nose, and throat; high concentrations can cause pulmonary edema. Liquid burns eyes and skin.
3.3 Treatment of Exposure: INHALATION: remove victim to fresh air and call a doctor; give artificial respiration and oxygen if needed. EYES: flush with water for at least 15 min.; consult an eye doctor. SKIN: flush with water, wash with soap and water.
3.4 TLV-TWA: 5 ppm
3.5 TLV-STEL: 15 ppm
3.6 TLV-Ceiling: Not listed.
3.7 Toxicity by Ingestion: Currently not available
3.8 Toxicity by Inhalation: Currently not available.
3.9 Chronic Toxicity: Currently not available
3.10 Vapor (Gas) Irritant Characteristics: Vapor is moderately irritating such that personnel will not usually tolerate moderate or high concentrations.
3.11 Liquid or Solid Characteristics: Causes smarting of the skin and first-degree burns on short exposure; may cause secondary burns on long exposure.
3.12 Odor Threshold: Less than 100 ppm
3.13 IDLH Value: Not listed.
3.14 OSHA PEL-TWA: Not listed.
3.15 OSHA PEL-STEL: Not listed.
3.16 OSHA PEL-Ceiling: Not listed.
3.17 EPA AEGL: Not listed

4. FIRE HAZARDS

4.1 Flash Point: Not pertinent (gas)
4.2 Flammable Limits in Air: 2.0%-11.6%
4.3 Fire Extinguishing Agents: Stop flow of gas. Use water, alcohol foam, dry chemical, or carbon dioxide on water solution fires.
4.4 Fire Extinguishing Agents Not to Be Used: Not pertinent
4.5 Special Hazards of Combustion Products: Not pertinent
4.6 Behavior in Fire: Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back.
4.7 Auto Ignition Temperature: 374°F
4.8 Electrical Hazards: I, C
4.9 Burning Rate: 8 mm/min.
4.10 Adiabatic Flame Temperature: Currently not available
4.11 Stoichometric Air to Fuel Ratio: 29.8 (calc.)
4.12 Flame Temperature: Currently not available
4.13 Combustion Molar Ratio (Reactant to Product): 8.5 (calc.)
4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

5. CHEMICAL REACTIVITY

5.1 Reactivity with Water: No reaction
5.2 Reactivity with Common Materials: No reaction
5.3 Stability During Transport: Stable
5.4 Neutralizing Agents for Acids and Caustics: Although water solutions may be neutralized with acetic acid, simple evaporation will remove all of the compound.
5.5 Polymerization: Not pertinent
5.6 Inhibitor of Polymerization: Not pertinent

6. WATER POLLUTION

6.1 Aquatic Toxicity: Currently not available
6.2 Waterfowl Toxicity: Currently not available
6.3 Biological Oxygen Demand (BOD): Currently not available
6.4 Food Chain Concentration Potential: None
6.5 GESAMP Hazard Profile:
Bioaccumulation: 0
Damage to living resources: 2
Human Oral hazard: 2
Human Contact hazard: II
Reduction of amenities: XXX

7. SHIPPING INFORMATION

7.1 Grades of Purity: Anhydrous, 98.5+%; also shipped as 25-30% solution in water.
7.2 Storage Temperature: Ambient
7.3 Inert Atmosphere: No requirement
7.4 Venting: Safety relief
7.5 IMO Pollution Category: C
7.6 Ship Type: 2
7.7 Barge Hull Type: Currently not available

8. HAZARD CLASSIFICATIONS

8.1 49 CFR Category: Flammable gas
8.2 49 CFR Class: 2.1
8.3 49 CFR Package Group: Not pertinent.
8.4 Marine Pollutant: No
8.5 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue).....	3
Flammability (Red).....	4
Instability (Yellow).....	0

8.6 EPA Reportable Quantity: 100 pounds
8.7 EPA Pollution Category: B
8.8 RCRA Waste Number: Not listed
8.9 EPA FWPCA List: Yes

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Physical State at 15° C and 1 atm: Gas
9.2 Molecular Weight: 59.11
9.3 Boiling Point at 1 atm: 37.2°F = 2.9°C = 276.1°K
9.4 Freezing Point: –178.8°F = –117.1°C = 156.1°K
9.5 Critical Temperature: 320.2°F = 160.1°C = 433.3°K
9.6 Critical Pressure: 591 psia = 40.2 atm = 4.07 MN/m^2
9.7 Specific Gravity: 0.633 at 20°C (liquid)
9.8 Liquid Surface Tension: 17.4 dynes/cm = 0.0174 N/m at –4°C
9.9 Liquid Water Interfacial Tension: Not pertinent
9.10 Vapor (Gas) Specific Gravity: 2.0
9.11 Ratio of Specific Heats of Vapor (Gas): 1.139
9.12 Latent Heat of Vaporization: 174 Btu/lb = 96.5 cal/g = 4.04 X 10^5 J/kg
9.13 Heat of Combustion: –17,660 Btu/lb = –9,810 cal/g = –410.7 X 10^5 J/kg
9.14 Heat of Decomposition: Not pertinent
9.15 Heat of Solution: –385 Btu/lb = –214 cal/g = –8.96 X 10^5 J/kg
9.16 Heat of Polymerization: Not pertinent
9.17 Heat of Fusion: 26.47 cal/g
9.18 Limiting Value: Currently not available
9.19 Reid Vapor Pressure: Currently not available *Physical properties apply to anydrous material.

NOTES

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
10	41.930	0	0.490		NOT PERTINENT		NOT PERTINENT
15	41.720	10	0.498				
20	41.510	20	0.506				
25	41.300	30	0.513				
30	41.100						
35	40.890						

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	MISCIBLE	-90	0.349	-90	0.00520	0	0.246
		-80	0.513	-80	0.00744	25	0.257
		-70	0.739	-70	0.01044	50	0.268
		-60	1.045	-60	0.01439	75	0.278
		-50	1.453	-50	0.01953	100	0.289
		-40	1.989	-40	0.02610	125	0.299
		-30	2.683	-30	0.03438	150	0.309
		-20	3.571	-20	0.04472	175	0.319
		-10	4.692	-10	0.05745	200	0.329
		0	6.092	0	0.07298	225	0.339
		10	7.823	10	0.09172	250	0.349
		20	9.941	20	0.11410	275	0.359
		30	12.510	30	0.14070	300	0.369
		40	15.600	40	0.17190	325	0.378
		50	19.280	50	0.20830	350	0.388
		60	23.640	60	0.25050	375	0.397
		70	28.770	70	0.29910	400	0.407
		80	34.750	80	0.35450	425	0.416
						450	0.425
						475	0.434
						500	0.443
						525	0.452
						550	0.461
						575	0.470
						600	0.479