October 6, 1989

C. Purks
Avon Lake Tech Center

The attached DuPont MSDS's are returned for clarification. Your computer database indicates H-7 and H-8 are trimethylamine and dimethylamine with no indication of solution. Information previously provided by you indicates H-8 is a 40% solution of dimethylamine and H-7 is 100% trimethylamine.

Can you provide us the correct chemical identity of H-7 and H-8?

Harold W. Dietz

91006-3/jp

Attachment

2213100l

BFG18987

DU PONT

MATERIAL SAFETY DATA SHEET

H-8
954

IDENTIFICATION

NAME
Methylamine Solutions

GRADE
Monomethylamine = 40%,
Dimethylamine = 40%, 60%;
Trimethylamine = 25%

SYNONYMS
Monomethylamine = Methylamine, MMA;
Dimethylamine = DMA
Trimethylamine = TMA

CAS NAME
MMA Methanamine
DMA Methanamine, N-Methyl
TMA Methanamine, N,N-Dimethyl

TSCA INVENTORY STATUS
Reported/Included

NIOSH REGISTRY NO.
MMA PF6300000
DMA IP8750000
TMA YH2285000

MANUFACTURER/DISTRIBUTOR
E. I. du Pont de Nemours & Co. (Inc.)

ADDRESS
Wilmington, DE 19898

CHEMICAL FAMILY
Amine

FORMULA
MMA = CH_3NH_2
DMA = $(CH_3)_2NH$
TMA = $(CH_3)_3N$

CAS REGISTRY NO.
MMA = 74-89-5
DMA = 124-40-3
TMA = 75-50-3

SARA/TITLE III STATUS
See ADDITIONAL INFORMATION section

PRODUCT INFORMATION PHONE
(800) 441-9442

MEDICAL EMERGENCY PHONE
(800) 441-3637

TRANSPORTATION EMERGENCY PHONE
CHEMTREC (800) 424-9300

PHYSICAL DATA

BOILING POINT, 760 mm Hg
36° TO 54°C (97°F to 129°F)
MMA 48°C; 118°F
DMA 54°C; 36°C; 129°F; 97°F
TMA 43°C; 109°F

FREEZING POINT -75°C TO 6°C
(-103°F to 43°F)
MMA -38°C; -36°F
DMA -37°C, -75°C; -35°F, -103°F
TMA 6°C; 43°F

PHYSICAL DATA (cont'd)

SPECIFIC GRAVITY
0.83 to 0.93
MMA 0.90
DMA 0.89; 0.83
TMA 0.93

VAPOR PRESSURE
215 to 500 mmHg at 25°C
MMA 300
DMA 215; 500
TMA 340

VAPOR DENSITY
1.1 to 2.0 (Air-1)*;
MMA 1.1
DMA 1.6; 1.6
TMA 2.0

SOLUBILITY IN WATER
Completely soluble

pH INFORMATION
Alkaline

EVAPORATION RATE (butyl acetate = 1)
Not determined

FORM
Liquid

APPEARANCE
Clear

COLOR
Colorless

ODOR
Ammoniacal, fishy
(Odor Threshold: < 1 ppm as amine)

*For pure methylamine vapors without effects of water vapor.

HAZARDOUS COMPONENTS

MATERIAL(S)	CAS NO.	APPROXIMATE %
Monomethylamine	74-89-5	40%
or		
Dimethylamine	124-40-3	40% or 60%
or		
Trimethylamine	75-50-3	25%

NONHAZARDOUS COMPONENTS

Water	7732-18-5	40% to 75%

HAZARDOUS REACTIVITY

INSTABILITY
Stable

INCOMPATIBILITY
May react explosively with mercury. DMA and TMA may react with nitrosating agents, such as sodium nitrite, to form N-Nitrosodimethylamine, an OSHA regulated carcinogen

DECOMPOSITION
By reaction with mercury.

POLYMERIZATION
Will not occur.

2213100

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FIRE AND EXPLOSION DATA

FLASH POINT -52°C to 6°C
MMA -12°C; 10°F
DMA -18°C, -52°C; -1°F, -61°F
TMA 6°C; 42°F

AUTOIGNITION TEMPERATURE
190°C to 430°C
MMA 430°C; 806°F
DMA 400°C, 400°C, 752°F, 752°F
TMA 190°C, 374°F

FLAMMABLE LIMITS IN AIR, % BY VOL.
LOWER* 2.0 to 4.9
MMA 4.9
DMA 2.8; 2.8
TMA 2.0
UPPER* 11.6 to 20.7
MMA 20.7
DMA 14.4; 14.4
TMA 11.6
*For pure methylamine vapors without effects of water vapor.

AUTODECOMPOSITION TEMPERATURE
Not determined

FIRE AND EXPLOSION HAZARDS
MMA and DMA are extremely flammable.
TMA is flammable.

EXTINGUISHING MEDIA
Water spray, "Alcohol" foam, CO_2, dry chemical.

SPECIAL FIRE FIGHTING INSTRUCTIONS
Use water spray to cool containers.
Methylamine solutions will burn unless very dilute; dilute thoroughly using water spray.

HEALTH HAZARD INFORMATION

PRINCIPAL HEALTH HAZARDS (Including Significant Routes, Effects, Symptoms of Over-Exposure, and Medical Conditions Aggravated by Exposure)

Causes skin and eye burns. Vapor extremely irritating to eyes, skin, nose, throat, and lungs.

	MMA*	DMA*	TMA*
Inhalation LC_{50}	No info. found	--	--
6 hour LC_{50}	--	4,540 ppm in rats	--
4 hour ALC	--	--	3,500 ppm in rats
Oral LD_{50}:	100-200 mg/kg in rats	698 mg/kg in rats	No info. found

These compounds are corrosive to skin and eyes. Toxic effects described in animals from exposure by inhalation, ingestion, or skin contact include corrosion of mucous membranes, central nervous system effects, liver effects, and nonspecific effects such as weight loss, and irritation. Dimethylamine in tests in bacterial or mammalian cell cultures demonstrated no mutagenic activity.

*Inhalation, absorption, and ingestion data are for the amines on a 100% basis.

22131004

PHYSICAL DATA (cont'd)

Human health effects of overexposure may initially include: skin irritation with discomfort or rash on contact; eye irritation with discomfort, tearing, or blurring of vision on contact; or irritation of the upper respiratory passages on inhalation. Higher exposures may lead to these effects: skin burns or ulceration; eye corrosion with corneal or conjunctival ulceration on contact; or temporary lung irritation effects with cough, discomfort, difficulty breathing, or shortness of breath on inhalation. There are no reports of human sensitization.

CARCINOGENICITY

MMA, DMA, and TMA are not listed as carcinogens by IARC, NTP, OSHA, or ACGIH.

EXPOSURE LIMITS [PEL (OSHA), TLV (ACGIH), AEL (DU PONT), ETC.]

The OSHA 8-hour Time Weighted Average (TWA) and ACGIH TLV$^{(R)}$-TWA are:

MMA = 10 ppm or 12 mg/m^3; DMA = 10 ppm or 18 mg/m^3;
TMA = 10 ppm or 24 mg/m^3 (the OSHA and ACGIH Short Term Exposure Limit (STEL) for TMA is 15 ppm or 36 mg/m^3). The AIHA WEEL 8-hour TWA is 1 ppm; the Du Pont recommended 8- and 12-hour airborne exposure limit is 5 ppm, TWA. All limits are for amines on a 100% basis.

SAFETY PRECAUTIONS

Do not get in eyes, on skin, on clothing.
Do not breathe gas or vapors.
Wash thoroughly after handling.

FIRST AID

In case of contact: Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing and shoes before reuse.

If vapors are inhaled: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

If swallowed: Do not induce vomiting. Immediately give two glasses of water or activated charcoal slurry. Never give anything by mouth to an unconscious person. Call a physician.

Note: To prepare activated charcoal slurry, suspend 50 gms. activated charcoal in 400 mL of water in a bottle and shake well.

PROTECTION INFORMATION

GENERALLY APPLICABLE CONTROL MEASURES

Good general ventilation should be provided to keep vapor concentrations below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Have available and wear as appropriate: hard hat with brim; safety spectacles (side shields preferred); chemical splash goggles; full length face shield; rubber gauntlet gloves, apron, safety boots or boots over leather shoes; self-contained breathing apparatus or full face air-line respirator; complete rubber suit with hood and breathing air supply.

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DISPOSAL INFORMATION

AQUATIC TOXICITY
TLm 96: 100-10 ppm (on 100% amine basis)

SPILL, LEAK OR RELEASE
Evacuate area and keep upwind. Use water spray to reduce vapors. Do not flush into sewers. Dike spill. Flush area with plenty of water. Dilute solutions may be neutralized with 5% sulfuric acid. Comply with Federal, State, and local regulations on reporting releases.

WASTE DISPOSAL
Comply with Federal, State, and local regulations. If approved, may be incinerated in specially designed equipment. Do not flush to public sewer. Very dilute solutions are biodegradable by acclimated bacteria.

SHIPPING INFORMATION

DOT(172.101)	MMA	DMA	TMA
PROPER SHIPPING NAME	Monomethylamine, aqueous solution	Dimethylamine, aqueous solution	Trimethylamine, aqueous solution
HAZARD CLASS	Flammable Liquid	Flammable Liquid	Flammable Liquid
UN NO.	1235	1160	1297
DOT LABEL	Flammable Liquid	Flammable Liquid	Flammable liquid
DOT PLACARD	Flammable	Flammable	Flammable

DOT/IMO (172.102)			
PROPER SHIPPING NAME	Monomethylamine, aqueous solution	Dimethylamine, aqueous solution	Trimethylamine, aqueous solution
HAZARD CLASS	Flammable Liquid, 3.1	Flammable Liquid, 3.1	Flammable Liquid, 3.1
UN NO.	1235	1160	1297
FLASH POINT	-12°C	(DMA-40%) -18°C (DMA-60%) -52°C	6°C

REPORTABLE QUANTITY
MMA, TMA = 100 lb/45.4 kg; DMA = 1000 lb/454 kg.

SHIPPING CONTAINERS
Tank cars, tank trucks 55-gallon steel drums.

22131006

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DU PONT

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MATERIAL SAFETY DATA SHEET

SEP 21 1989
H-7
954

IDENTIFICATION

NAME
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GRADE
Monomethylamine = 40%,
Dimethylamine = 40%, 60%;
Trimethylamine = 25%

SYNONYMS
Monomethylamine = Methylamine, MMA;
Dimethylamine = DMA
Trimethylamine = TMA

CAS NAME
MMA Methanamine
DMA Methanamine, N-Methyl
TMA Methanamine, N,N-Dimethyl

TSCA INVENTORY STATUS
Reported/Included

NIOSH REGISTRY NO.
MMA PF6300000
DMA IP8750000
TMA YH2285000

MANUFACTURER/DISTRIBUTOR
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CAS REGISTRY NO.
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DMA = 124-40-3
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SARA/TITLE III STATUS
See ADDITIONAL INFORMATION section

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MEDICAL EMERGENCY PHONE
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TRANSPORTATION EMERGENCY PHONE
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PHYSICAL DATA

BOILING POINT, 760 mm Hg
36° TO 54°C (97°F to 129°F)
MMA 48°C; 118°F
DMA 54°C; 36°C; 129°F; 97°F
TMA 43°C; 109°F

FREEZING POINT -75°C TO 6°C
(-103°F to 43°F)
MMA -38°C; -36°F
DMA -37°C, -75°C; -35°F, -103°F
TMA 6°C; 43°F

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22131007

PHYSICAL DATA (cont'd)

SPECIFIC GRAVITY
0.83 to 0.93
MMA 0.90
DMA 0.89; 0.83
TMA 0.93

VAPOR PRESSURE
215 to 500 mmHg at 25°C
MMA 300
DMA 215; 500
TMA 340

VAPOR DENSITY
1.1 to 2.0 (Air-1)*;
MMA 1.1
DMA 1.6; 1.6
TMA 2.0

SOLUBILITY IN WATER
Completely soluble

pH INFORMATION
Alkaline

EVAPORATION RATE (butyl acetate = 1)
Not determined

FORM
Liquid

APPEARANCE
Clear

COLOR
Colorless

ODOR
Ammoniacal, fishy
(Odor Threshold: < 1 ppm as amine)

*For pure methylamine vapors without effects of water vapor.

HAZARDOUS COMPONENTS

MATERIAL(S)	CAS NO.	APPROXIMATE %
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HAZARDOUS REACTIVITY

INSTABILITY
Stable

INCOMPATIBILITY
May react explosively with mercury. DMA and TMA may react with nitrosating agents, such as sodium nitrite, to form N-Nitrosodimethylamine, an OSHA regulated carcinogen

DECOMPOSITION
By reaction with mercury.

POLYMERIZATION
Will not occur.

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FIRE AND EXPLOSION DATA

FLASH POINT -52°C to 6°C
MMA -12°C; 10°F
DMA -18°C, -52°C; -1°F, -61°F
TMA 6°C; 42°F

AUTOIGNITION TEMPERATURE
190°C to 430°C
MMA 430°C; 806°F
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MMA 20.7
DMA 14.4; 14.4
TMA 11.6
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6 hour LC_{50}	--	4,540 ppm in rats	--
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Oral LD_{50}:	100-200 mg/kg in rats	698 mg/kg in rats	No info. found

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Wash thoroughly after handling.

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If vapors are inhaled: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

If swallowed: Do not induce vomiting. Immediately give two glasses of water or activated charcoal slurry. Never give anything by mouth to an unconscious person. Call a physician.

Note: To prepare activated charcoal slurry, suspend 50 gms. activated charcoal in 400 mL of water in a bottle and shake well.

PROTECTION INFORMATION

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PERSONAL PROTECTIVE EQUIPMENT

Have available and wear as appropriate: hard hat with brim; safety spectacles (side shields preferred); chemical splash goggles; full length face shield; rubber gauntlet gloves, apron, safety boots or boots over leather shoes; self-contained breathing apparatus or full face air-line respirator; complete rubber suit with hood and breathing air supply.

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BFG18996

DISPOSAL INFORMATION

AQUATIC TOXICITY
TLm 96: 100-10 ppm (on 100% amine basis)

SPILL, LEAK OR RELEASE
Evacuate area and keep upwind. Use water spray to reduce vapors. Do not flush into sewers. Dike spill. Flush area with plenty of water. Dilute solutions may be neutralized with 5% sulfuric acid. Comply with Federal, State, and local regulations on reporting releases.

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SHIPPING INFORMATION

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UN NO.	1235	1160	1297
DOT LABEL	Flammable Liquid	Flammable Liquid	Flammable liquid
DOT PLACARD	Flammable	Flammable	Flammable

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PROPER SHIPPING NAME	Monomethylamine, aqueous solution	Dimethylamine, aqueous solution	Trimethylamine, aqueous solution
HAZARD CLASS	Flammable Liquid, 3.1	Flammable Liquid, 3.1	Flammable Liquid, 3.1
UN NO.	1235	1160	1297
FLASH POINT	-12°C	(DMA-40%) -18°C (DMA-60%) -52°C	6°C

REPORTABLE QUANTITY
MMA, TMA = 100 lb/45.4 kg; DMA = 1000 lb/454 kg.

SHIPPING CONTAINERS
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2213101

BFG18997