



MATERIAL SAFETY DATA SHEET

1. Chemical Product and Company Identification

PRODUCT DESCRIPTION: Ventilation Smoke Tube

PRODUCT IDENTIFIER: P/N 458480, Tube, Ventilation Smoke, Pkg. Of 12
P/N 458481, Ventilation Smoke Tube Kit

COMPANY IDENTIFICATION: MINE SAFETY APPLIANCES COMPANY
P.O. Box 439
Pittsburgh, PA 15230
CUSTOMER SERVICE: 1-800-MSA-2222 (8:00 am – 5:00 pm, local US time)
EMERGENCY: 1-800-255-3924 (CHEM-TEL, INC.)

2. Composition/Information on Ingredients

Each tube contains two ampoules:

		%
Ampoule 1)	Acetic acid sorbed on silica gel.	
	Acetic Acid (CAS 64-19-7)	50
	Silica Gel (CAS 63231-67-4)	50
Ampoule 2)	1,2-diaminoethane (ethylenediamine) sorbed on pumice.	
	1,2 Diaminoethane (CAS 107-15-3)	50
	Pumice (CAS 1332-09-8)	50

3. Hazards Identification

EMERGENCY OVERVIEW: Each flexible tube contains two sealed glass ampoules, one white with approximately 0.4 gms acetic acid sorbed on silica gel and one black with approximately 0.3 gms ethylenediamine sorbed on pumice. When the ampoules are manually crushed, aspirated air flow causes mixing of the released vapors which react forming ethylenediamine acetate smoke. No TLV is listed for ethylenediamine acetate; however, avoid breathing the tube effluent. Tube effluent contains ethylenediamine acetate smoke and may contain residual vapors of acetic acid and ethylenediamine, either of which will cause irritation to eyes, mucous membranes and skin.

PHYSICAL HAZARD: Acetic Acid: Flammable Liquid (sorbed on inert solid)
Ethylenediamine: Flammable Liquid (sorbed on inert solid)

HEALTH HAZARDS: Acetic acid - Corrosive, toxic
Ethylenediamine - Irritant, toxic, sensitizer



4. First Aid Measures

As smoke puff generation is under manual control of the user by actuation of a squeeze bulb, overexposure is unlikely under intended conditions of use. First aid procedures follow should overexposure somehow occur.

INHALATION: Remove victim from exposure. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. **GET MEDICAL ATTENTION IMMEDIATELY IN BOTH CASES.**

EYES: Remove victim from exposure. Flush eyes with water for 15 minutes holding eyes open and raising eyelids to flush under lid areas. **SEE A PHYSICIAN IMMEDIATELY.**

INGESTION: If tube contents are somehow ingested and if victim is conscious, give two glasses of water to dilute chemical. **GET MEDICAL ATTENTION IMMEDIATELY.**

5. Fire Fighting Measures

EXTINGUISHING MEDIA: As needed for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Wear impervious covering and pressure demand self-contained breathing apparatus with full facepiece.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Ampoules may rupture and emit toxic fumes under fire conditions. See preceding item.

FLASH POINT: Acetic Acid	103° F	LEL 4%	UEL 19.9%
Ethylenediamine	93° F	LEL 2.6%	UEL 14.4%

6. Accidental Release Measures

PROCEDURES FOR SPILL OR LEAK CLEANUP: If contents of a tube are released, avoid skin contact with spilled material. Leave the immediate area if smoke is generated until smoke subsides. Fill a bucket 3/4 full of water. Put on rubber gloves and splashproof goggles. Sweep up spilled material and place sweepings in bucket. Examine the tube to be sure both ampoules within the tube are crushed. If both ampoules are crushed, place the tube with contents into the bucket so that the tube is immersed. If the tube contains an unbroken ampoule, crush it (within the tube) and immerse the tube and its contents in the bucket. If an unbroken ampoule has been released from the tube, replace it in the tube, crush it (within the tube), and immerse the tube with contents in the bucket. In all cases let the tube soak overnight. Dispose the material in the bucket in accordance with local, state, and federal regulations.

7. Handling and Storage

HYGIENIC PRACTICES: Wash hands after using product.

STORAGE: Store in a cool, dry location protected from crushing and impact forces.



8. Exposure Controls/Personal Protection

EXPOSURE LIMITS:

		<u>TLV</u>
Ampoule 1)	Acetic Acid (STEL 15 ppm) Silica Gel	10 ppm 10 mg/M ³
Ampoule 2)	1,2 diaminoethane Pumice	10 ppm 10 mg/M ³

PERSONAL PROTECTIVE EQUIPMENT: Due to the limited amount of chemicals in each tube and the slow release rate, use of personal protective equipment is not indicated under anticipated conditions of use. The user is cautioned to avoid breathing the tube emissions as they may cause irritation to eyes, mucous membranes, and skin.

ENGINEERING CONTROLS: Not Applicable

WORK PRACTICES: This product is for use in determination of direction and velocity of ventilation air currents. Avoid breathing emissions from tube.

PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT: N/A

9. Physical and Chemical Properties

APPEARANCE AND ODOR: Acetic Acid/Silica Gel Ampoule - White granules, vinegar odor.
Ethylenediamine/ pumice ampoule - Gray to black granules, ammonia odor.

THE FOLLOWING DATA REPRESENTS THE NATURE OF THE COMPONENTS THAT MAKE UP THE GRANULES:

- FORMULA: CH₃COOH sorbed on silica gel, NH₂CH₂ CH₂NH₂ sorbed on pumice
- BOILING POINT: Acetic Acid 118° C Ethylenediamine 117°
- SPECIFIC GRAVITY: (H₂O = 1) Acetic Acid 1.05
Ethylenediamine 0.90
- VAPOR PRESSURE: Acetic Acid 14.8 mmHg at 25° C
Ethylenediamine 10.0 mmHg at 20° C
- PERCENT VOLATILE BY VOLUME: Approx. 50%
- SOLUBILITY IN WATER: Acetic Acid - Soluble
Ethylenediamine - Soluble



10. Stability and Reactivity

CONDITIONS OR MATERIALS TO AVOID: Avoid acids, bases, oxidizers, carbon tetrachloride, and other chlorinated organic compounds.

Components are sorbed on inert solids. Total amount of combustible/flammable material is less than 1 gm. per tube. Ampoules are sealed until time of actual use.

11. Toxicological Information

Toxicity, Acetic Acid:

ORL-RAT	LD50	3310 mg/kg	ORL-MUS	LD50	4960 mg/kg
SKN-RBT	LD50	1060 mg/kg	INH-MUS	LC50	5620 ppm/1H
INH-RAT	LCLO	16,000 ppm/4H	HUNK-MAN	LCLO	308 mg/kg
INH-HMN	TCLO	816 ppm/3 min	ORL-HMN	LDLO	1470 ug-/kg

Skin and eye irritation data, Acetic Acid:

SKN-HMN	50 mg/24h	MLD	SKN-RBT	525 mg open	SEV
SKN-RBT	50 mg/24H	MLD	EYE-RBT	50 ug	SEV

Immediately dangerous to life or health concentration is 1000ppm

Toxicity, Ethylenediamine:

IHL-HMN	TCLO	200 ppm	ORL-GPG	LD50	470 mg/kg
IHL-RAT	LC100	4000 ppm/8H	SKN-RBT	LD50	730 mg/kg
ORL-RAT	LD50	1160 mg/kg			

Skin and eye irritation data, Ethylenediamine

SKN-RBT	450 mg	OPEN MOD
SKN-RBT	10 mg/24H	SEV
EYE-RBT	675 ug	SEV

Immediately dangerous to life or health concentration is 2000 ppm.

SIGNS AND SYMPTOMS OF EXPOSURE:

Acetic Acid: Irritation of eyes, mucous membranes, skin. Splashes produce eye and skin burns. Ingestion of 1cm³ glacial acid produced perforation of the esophagus.

Ethylenediamine: Irritation of eye, mucous membranes, skin.

PRIMARY ROUTES OF ENTRY: Inhalation, eyes & skin contact, skin absorption, ingestion.

TARGET ORGANS: Acetic Acid: Eyes, nose, throat, skin
Ethylenediamine: Eyes, nose, throat, skin, liver, kidneys.



MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE: No information.

EXPOSURE LIMITS: See Composition/Information on Ingredients.

CARCINOGENICITY DATA: Not listed by NIOSH RTECS, NTP, OSHA or IARC.

MUTAGENICITY DATA: See RTECS data for acetic acid.

12. Ecological Information

Acetic Acid Ecological Information

Ecotoxicity: Fish: Fathead Minnow: LC50 = 88 mg/L; 96 Hr; Static bioassay @ 18-22°C Fish: Bluegill/Sunfish: LC50 = 75 mg/L; 96 Hr; Unspecified Fish: Goldfish: LC50 = 423 mg/L; 24 Hr; Unspecified Water flea Daphnia: EC50 = 32-47 mg/L; 24-48 Hr; Unspecified Bacteria: Phytobacterium phosphoreum: EC50 = 8.86-11 mg/L; 5,15,25 min; Microtox test If released to water or soil, acetic acid will biodegrade readily. Evaporation from dry surfaces is likely to occur. When spilled on soil, the liquid will spread on the surface and penetrate into the soil at a rate dependent on the soil type and its water content. Acetic acid shows no potential for biological accumulation or food chain contamination.

Environmental: If released to the atmosphere, it is degraded in the vapor-phase by reaction with photochemically produced hydroxyl radicals (estimated typical half-life of 26.7 days). It occurs in atmospheric particulate matter in acetate form and physical removal from air can occur via wet and dry deposition.

Physical: Natural waters will neutralize dilute solutions to acetate salts.

Other: No information available.

Ethylenediamine Ecological Information

Ecotoxicity: Fish: Fathead Minnow: LC50 = 115.7 mg/L; 96 Hr.; Static Condition Fish: Rainbow trout: LC50 = 230.0 mg/L; 96 Hr.; Static Condition Water flea EC50 = 0.88 mg/L; 48 Hr.; Unspecified Bacteria: Phytobacterium phosphoreum: EC50 = 20.0 mg/L; 15 Minutes; Microtox test Chub (fresh water) 60ppm/24H (lethal) Rainbow trout LC50=230 mg/L/48H

Environmental: On soil, substance will leach and volatilize. In water, substance will form alkaline solution and will biodegrade. Bioconcentration is not predicted. In air, substance will react with hydroxyl radicals and carbon dioxide. Biological Oxygen Demand (BOD): 75% (theor.), 5 days.

Physical: No information available.

Other: No information available.

13. Disposal Information

WASTE DISPOSAL: Dispose in accordance with local, state and federal regulations.



14. Transport Information

This product is a U.S. Department of Transportation (DOT) Hazardous Material:

Proper Shipping Name:..... Corrosive solids, n.o.s. (acetic acid, silica gel, ethylenediamine, pumice)
Hazard Class or Division:..... 8
Identification Number: UN1759
Packing Group: III

15. Regulatory Information

This product contains acetic acid and ethylenediamine both of which are substances subject to the California, New Jersey, Minnesota, Massachusetts and Pennsylvania Worker and Community Right-To-Know Act.

SARA 313 INFORMATION: Ethylenediamine and acetic acid are not chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.

16. Other Information

WARNING: This is a hazardous chemical product. By following the directions and warnings provided with this product, the hazards associated with the use of this product can be greatly reduced but never entirely eliminated. Mine Safety Appliances Company makes no warranties, expressed or implied, with respect to this product and EXPRESSLY DISCLAIMS THE WARRANTY OF MERCHANTABILITY AND ANY WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. Users assume all risks in handling, using or storing this product.