SAFETY DATA SHEET

Issue Date No data available **Revision Date** 29-May-2015 **Version** 1

1. IDENTIFICATION

Product identifier

Product Name Ventilation Smoke Tube

Other means of identification

Formula CH_3COOH sorbed on silica gel, NH_2CH_2 CH_2NH_2 sorbed on pumice
UN/ID No. UN1759
Synonyms P/N 458480, Tube, Ventilation Smoke, Pkg. Of 12
P/N 458481, Ventilation Smoke Tube Kit
SDS011

Recommended use of the chemical and restrictions on use

Recommended Use Ventilation Flow Patterns
Uses advised against No information available.

Details of the supplier of the safety data sheet

Manufacturer Address
Mine Safety Appliances Company
1000 Cranberry Woods Drive
Cranberry Township, PA 16066
Phone: (724) 776-8900

Emergency telephone number Customer Service: (800) MSA-2222 (8:30 a.m. – 5:00 p.m., USA local time)
(800) 255-3924 (Chem-Tel, Inc.)

2. HAZARDS IDENTIFICATION

Classification

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 gray / 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.

OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Skin corrosion/irritation	Category 1 Sub-category B
Serious eye damage/eye irritation	Category 1
Respiratory sensitization	Category 1
Skin sensitization	Category 1

2. HAZARDS IDENTIFICATION - Continued

Label elements

Emergency Overview

Danger

Hazard statements
Causes severe skin burns and eye damage
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction

Appearance Acetic acid / silica gel ampoule - White granules, vinegar odor.
Ethylenediamine / pumice ampoule
Gray to black granules, ammonia odor.

Physical state Solid

Odor Acetic acid: vinegar odor
Ethylenediamine: ammonia odor
Smoke:

Precautionary Statements - Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace

Precautionary Statements - Response
Immediately call a POISON CENTER or doctor/physician
Specific treatment (see Section 4)

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician

Wash contaminated clothing before reuse
If skin irritation or rash occurs: Get medical advice/attention

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician

IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

Precautionary Statements - Storage
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Other Information

Unknown Acute Toxicity	75% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms P/N 458480, Tube, Ventilation Smoke, Pkg. Of 12
P/N 458481, Ventilation Smoke Tube Kit.

Each tube contains two (2) ampoules:

Ampoule 1) Acetic Acid sorbed on Silica gel

Chemical Name	CAS No.	Weight-%
Acetic acid	64-19-7	20
Silica Gel	63231-67-4	80

Ampoule 2) 1,2 – Diaminoethane (Ethylene Diamine) sorbed on Pumice

Chemical Name	CAS No.	Weight-%
Ethylinediamine	107-15-3	40
Pumice	1332-09-8	60

4. FIRST AID MEASURES

First aid measures

General advice 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 occur.

Eye contact 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.

Skin Contact Wash skin with soap and water.

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.

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

Most important symptoms and effects, both acute and delayed

Symptoms Acetic Acid: Irritation of eyes, mucous membranes, skin. Fumes may cause eye and skin irritation. Ingestion of 1 cm^3 glacial acid produced perforation of the esophagus.

Ethylenediamine: Irritation of eye, mucous membranes, skin.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media No information available.

5. FIRE-FIGHTING MEASURES - Continued

Specific hazards arising from the chemical

Ampoules may rupture and emit toxic fumes under fire conditions.

Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions If contents of a tube are released, avoid skin contact with spilled material. Leave the immediate area if smoke is generated until smoke subsides. Wear rubber gloves and splashproof goggles.

Environmental precautions

Environmental precautions See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Fill a bucket 3/4 full of water. 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

Precautions for safe handling

Advice on safe handling Wash hands after using product.

Conditions for safe storage, including any incompatibilities

Storage Conditions Store in a cool, dry location protected from crushing and impact forces.

Incompatible materials Acids, bases, oxidizers, carbon tetrachloride, and other chlorinated organic compounds.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Acetic acid 64-19-7	STEL: 15 ppm TWA: 10 ppm	TWA: 10 ppm TWA: 25 mg/m^3 (vacated) TWA: 10 ppm (vacated) TWA: 25 mg/m^3	IDLH: 50 ppm TWA: 10 ppm TWA: 25 mg/m^3 STEL: 15 ppm STEL: 37 mg/m^3
Ethylenediamine 107-15-3	TWA: 10 ppm S*	TWA: 10 ppm TWA: 25 mg/m^3 (vacated) TWA: 10 ppm (vacated) TWA: 25 mg/m^3	IDLH: 1000 ppm TWA: 10 ppm TWA: 25 mg/m^3

Appropriate engineering controls

Engineering Controls Not applicable.

Individual protection measures, such as personal protective equipment

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.

Eye/face protection No special technical protective measures are necessary.

Skin and body protection No special technical protective measures are necessary.

Respiratory protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Solid

Appearance Acetic acid / silica gel ampoule – White granules, vinegar odor. Ethylenediamine / pumice ampoule - Gray to black granules, ammonia odor.

Odor Acetic acid: vinegar odor Ethylenediamine: ammonia odor

Color Silica gel: white Pumice: gray to black

Odor threshold No information available

Property	Values	Remarks
pH	No information available	The following data represents the nature of the components that make up the granules.
Melting point/freezing point	No information available	
Boiling point / boiling range	Acetic acid: 118ºC Ethylenediamine: 117ºC	

9. PHYSICAL AND CHEMICAL PROPERTIES – Continued

Flash point	Acetic acid: 103ºF Ethylenediamine: 93ºF
Evaporation rate	No information available
Flammability (solid, gas)	No information available
Flammability Limit in Air	
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor pressure	Acetic acid: 14.8 mmHg @ 25ºC Ethylenediamine: 10.0 mmHg @ 20ºC
Vapor density	No information available
Water solubility	Soluble (acetic acid, ethylenediamine)
Solubility in other solvents	No information available
Partition coefficient	No information available
Autoignition temperature	No information available
Decomposition temperature	No information available
Kinematic viscosity	No information available
Dynamic viscosity	No information available
Explosive properties	Acetic acid: LEL 4%, UEL 19.9% Ethylenediamine: LEL 2.6%, UEL 14.4%
Oxidizing properties	No information available

Other Information

Softening point	No information available
Molecular weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Reactivity

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.

Chemical stability

Stable under recommended storage conditions.

Possibility of Hazardous Reactions

None under normal processing.

Conditions to avoid

Avoid acids, bases, oxidizers, carbon tetrachloride, and other chlorinated organic compounds.

Incompatible materials

Acids, bases, oxidizers, carbon tetrachloride, and other chlorinated organic compounds.

Hazardous Decomposition Products

None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information **Primary Routes of Entry:** Inhalation, eyes & skin contact, skin absorption, ingestion

Inhalation No data available.

Eye contact No data available.

Skin Contact No data available.

Ingestion No data available.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Acetic acid 64-19-7	= 3310 mg/kg (Rat)	= 1060 mg/kg (Rabbit)	= 11.4 mg/L (Rat) 4 h
Ethylene diamine 107-15-3	= 637 mg/kg (Rat)	= 560 mg/kg (Rabbit)	-

Information on toxicological effects

Symptoms Acetic Acid: Irritation of eyes, mucous membranes, skin. Fumes may cause eye and skin irritation. Ingestion of 1 cm^3 glacial acid produced perforation of the esophagus. Ethylenediamine: Irritation of eye, mucous membranes, skin.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.

Germ cell mutagenicity See RTECS data for acetic acid.

Carcinogenicity This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Target Organ Effects Eyes, nose, throat, skin, liver, kidney.

Aspiration hazard No information available.

Numerical measures of toxicity - Product Information

Unknown Acute Toxicity 75% of the mixture consists of ingredient(s) of unknown toxicity

12. ECOLOGICAL INFORMATION

Ecotoxicity

75% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Acetic acid 64-19-7	-	79: 96 h Pimephales promelas mg/L LC50 static 75: 96 h Lepomis macrochirus mg/L LC50 static	EC50 = 8.8 mg/L 15 min EC50 = 8.8 mg/L 25 min EC50 = 8.8 mg/L 5 min	65: 48 h Daphnia magna mg/L EC50 Static 47: 24 h Daphnia magna mg/L EC50
Ethylenediamine 107-15-3	645: 72 h Pseudokirchneriella subcapitata mg/L EC50 151: 96 h Pseudokirchneriella subcapitata mg/L EC50	98.6 - 131.6: 96 h Pimephales promelas mg/L LC50 static 180 - 560: 96 h Poecilia reticulata mg/L LC50 semi-static 191 - 254: 96 h Pimephales promelas mg/L LC50 flow-through 115.7: 96 h Pimephales promelas mg/L LC50 semi-static	EC50 = 20 mg/L 15 min EC50 = 29 mg/L 17 h	17: 48 h Daphnia magna mg/L EC50

Persistence and degradability

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. 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 and physical removal from air can occur via wet and dry deposition. Natural waters will neutralize dilute solutions to acetate salts.

On soil, ethylenediamine 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.

Bioaccumulation

Acetic acid shows no potential for biological accumulation or food chain contamination.

Chemical Name	Partition coefficient
Acetic acid 64-19-7	-0.31
Ethylene diamine 107-15-3	-1.221

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging Do not reuse container.

Chemical Name	California Hazardous Waste Status
Acetic acid 64-19-7	Toxic Corrosive Ignitable
Ethylenediamine 107-15-3	Toxic

14. TRANSPORT INFORMATION

Note: This material can be shipped under limited quantity rules if shipping less than the applicable limited quantity maximum. When shipping limited quantity by air, IATA Packing Instruction Y845 applies. However, check with the transporter prior to shipping for transporter specific restrictions.

DOT Regulated

UN/ID No.	UN1759
Proper shipping name	Corrosive solids, n.o.s. (acetic acid, ethylenediamine)
Hazard Class	8
Packing Group	III

IATA

May be shipped "limited quantity". When shipping by air and using the limited quantity exception. Both the corrosive label and the air limited quantity diamond are required. Packing Instruction Y845. Max quantity per package: 1 kg per inner package, 5 kg net quantity per package.

IMDG Not regulated

RID Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	All ingredients are on the inventory or exempt from listing
DSL/NDSL	All ingredients are on the inventory or exempt from listing
EINECS/ELINCS	Not evaluated
ENCS	Not evaluated
IECSC	All ingredients are on the inventory or exempt from listing
KECL	All ingredients are on the inventory or exempt from listing
PICCS	All ingredients are on the inventory or exempt from listing
AICS	All ingredients are on the inventory or exempt from listing

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

15. REGULATORY INFORMATION - Continued

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Acetic acid 64-19-7	5000 lb	-	-	X
Ethylene diamine 107-15-3	5000 lb	-	-	X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Acetic acid 64-19-7	5000 lb	-	RQ 5000 lb final RQ RQ 2270 kg final RQ
Ethylene diamine 107-15-3	5000 lb	5000 lb	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Acetic acid 64-19-7	X	X	X
Ethylene diamine 107-15-3	X	X	X
Silica Gel 63231-67-4	-	X	X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.

WHMIS Hazard Class

E - Corrosive material

16. OTHER INFORMATION

Revision Date 29-May-2015

Revision Note Conversion to SDS

Disclaimer

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 WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Users assume all risks in handling, using or storing this product.

PREPARED BY:	Comprehensive Safety Compliance, Inc. (CSC) Occupational Health and Safety Consultant (412) 826-5480	**VERSION NO.: 1**	**APPROVAL DATE:** 5/29/15
CONTACT:	Mine Safety Appliances Company 1000 Cranberry Woods Drive Cranberry Township, PA 16066 (724) 776-8900	**SUPERSEDES MSDS DATED:** 8/8/2013	

End of Safety Data Sheet