

# Material Safety Data Sheet

Material Name: ZAM Solution

MSDS ID: MRD-139

ZAM Solution

## \*\*\* Section 1 - Chemical Product and Company Identification \*\*\*

**Chemical Name:** ZAM

**Product Use:** Industrial use.

**Synonyms:** Zinc ammonium carbonate solution

**Manufacturer Information**

MINERAL RESEARCH AND DEVELOPMENT

5910 Pharr Mill Road

PO Box 1330

Harrisburg, NC 28075

Phone: 704-454-4811

Fax: 704-454-7390

Emergency # CHEMTREC: (800) 424-9300 / (703) 527-3887

**General Comments**

NOTE: Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

## \*\*\* Section 2 - Hazards Identification \*\*\*

**Emergency Overview**

DANGER! CORROSIVE! May be harmful or fatal if swallowed or inhaled. May cause severe irritation or burns to the eyes, skin, gastrointestinal tract, and respiratory system.

**Potential Health Effects: Eyes**

This product is severely irritating to the eyes which may cause eye burns or even blindness. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.

**Potential Health Effects: Skin**

This product is severely irritating to the skin and may cause burns. Depending on the duration of contact, symptoms will include reddening, discomfort, irritation, ulceration, and chemical burns.

**Potential Health Effects: Ingestion**

This product may be harmful or fatal if swallowed. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. Ingestion can cause gastrointestinal irritation, nausea, vomiting and diarrhea.

**Potential Health Effects: Inhalation**

This product can be harmful by inhalation. This product may cause corrosive damage to the respiratory tract. Symptoms may include severe irritation or burns to the nose, throat and lungs. Symptoms of overexposure can include shortness of breath, wheezing and breathing difficulties. Severe inhalation over-exposures can lead to pulmonary edema, chemical pneumonitis and death.

**Medical Conditions Aggravated by Exposure**

Pre-existing eye, respiratory system and skin conditions.

**HMIS Ratings: Health: 3 Fire: 0 Physical Hazard: 1 Pers. Prot.:** Splash goggles, gloves, apron, and vapor respirator

**Hazard Scale:** 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe \* = Chronic hazard

## \*\*\* Section 3 - Composition / Information on Ingredients \*\*\*

CAS #	Component	Percent
7732-18-5	Water	30-60
1336-21-6	Ammonium hydroxide	10-30
506-87-6	Ammonium carbonate	10-30
1314-13-2	Zinc oxide	10-30

**Component Information/Information on Non-Hazardous Components**

This product is considered hazardous under the criteria specified in 29 CFR 1910.1200 (Hazard Communication Standard) and the Canadian Workplace Hazardous Materials Information System (WHMIS).

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## \*\*\* Section 4 - First Aid Measures \*\*\*

### First Aid: Eyes

Immediately flush eyes with plenty of water for at least 15 minutes. Seek immediate medical attention.

### First Aid: Skin

For skin contact flush with large amounts of water while removing contaminated clothing. Seek immediate medical attention.

### First Aid: Ingestion

If the material is swallowed, get immediate medical attention or advice -- Do not induce vomiting. Give 1-2 glasses of water. Never give anything by mouth to a victim who is unconscious or is having convulsions.

### First Aid: Inhalation

If mist or vapor of this product is inhaled, remove person immediately to fresh air. Seek immediate medical attention. Do NOT perform mouth-to-mouth resuscitation.

### First Aid: Notes to Physician

Provide general supportive measures and treat symptomatically.

## \*\*\* Section 5 - Fire Fighting Measures \*\*\*

### General Fire Hazards

See Section 9 for Flammability Properties.  
Not a fire hazard.

### Hazardous Combustion Products

Combustion products include irritating vapors and toxic gases, zinc, ammonia and nitrogen oxides.

### Extinguishing Media

Dry chemical, foam, carbon dioxide, water spray.

### Specific Hazards Arising From the Chemical

This material is corrosive. Container may burst due to heat of fire.

### Fire Fighting Equipment/Instructions

Firefighters should wear full protective clothing including self contained breathing apparatus.

NFPA Ratings: Health: 3 Fire: 0 Reactivity: 1

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

## \*\*\* Section 6 - Accidental Release Measures \*\*\*

### Containment Procedures

Stop the flow of material, if this is without risk. Wear appropriate protective equipment and clothing during clean-up. Contain the discharged material and dike the spilled material where possible. Prevent entry into sewers, drains, underground or confined spaces, water intakes and waterways. Ventilate the contaminated area.

### Clean-Up Procedures

Avoid skin contact and inhalation of vapors. Ventilate the contaminated area. Wear appropriate protective equipment and clothing during clean-up. Collect spilled material with an inert absorbent such as sand or vermiculite. Place in properly labeled closed container.

### Evacuation Procedures

Isolate area. Keep unnecessary personnel away.

### Special Procedures

Wear appropriate personal protective equipment. Follow all Local, State, Federal and Provincial regulations for disposal.

## \*\*\* Section 7 - Handling and Storage \*\*\*

### Handling Procedures

Do not get this material in your eyes, on your skin, or on your clothing. Do not inhale vapors or mists of this product. Use this product with adequate ventilation. Wear appropriate protective clothing and equipment when handling this material. See Section 8 for appropriate protective clothing, equipment and air monitoring procedures. Do not eat, drink or use tobacco products when handling this material. Wash hands after handling and before eating. Open container carefully, as needed to relieve any build up of pressure. Do not reuse the empty container.

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## Storage Procedures

Store in a cool, dry, well-ventilated area. Store away from direct sunlight and any sources of heat. Do not freeze. Do not store this material in open or unlabeled containers. See product label for more information.

## \* \* \* Section 8 - Exposure Controls / Personal Protection \* \* \*

### Exposure Guidelines

#### A: General Product Information

Follow all applicable exposure limits. Components not listed below do not have exposure limits listed with ACGIH, OSHA or NIOSH. Exposure should be kept to a minimum.

#### B: Component Exposure Limits

##### Zinc oxide (1314-13-2)

ACGIH:	2 mg/m3 TWA (respirable fraction) 10 mg/m3 STEL (respirable fraction)
OSHA (Final):	5 mg/m3 TWA (fume); 15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
OSHA	5 mg/m3 TWA (fume); 10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
(Vacated):	10 mg/m3 STEL (fume)
NIOSH:	5 mg/m3 TWA (dust and fume) 10 mg/m3 STEL (fume) 15 mg/m3 Ceiling (dust)
Alberta:	10 mg/m3 TWA (dust); 5 mg/m3 TWA (fume) 10 mg/m3 STEL (fume)
British	2 mg/m3 TWA (respirable)
Columbia:	10 mg/m3 STEL (respirable)
Manitoba:	2 mg/m3 TWA (respirable fraction) 10 mg/m3 STEL (respirable fraction)
New Brunswick:	5 mg/m3 TWA (fume); 10 mg/m3 TWA (particulate matter containing no asbestos and < 1% crystalline silica, dust) 10 mg/m3 STEL (fume)
NW Territories:	5 mg/m3 TWA (fume); 5 mg/m3 TWA (dust, respirable mass); 10 mg/m3 TWA (dust, total mass) 10 mg/m3 STEL (fume)
Nova Scotia:	2 mg/m3 TWA (respirable fraction) 10 mg/m3 STEL (respirable fraction)
Nunavut:	5 mg/m3 TWA (fume); 5 mg/m3 TWA (dust, respirable mass); 10 mg/m3 TWA (dust, total mass) 10 mg/m3 STEL (fume)
Ontario:	2 mg/m3 TWAEV (respirable) 10 mg/m3 STEV (respirable)
Quebec:	5 mg/m3 TWAEV (fume); 10 mg/m3 TWAEV (total dust, containing no asbestos and less than 1% crystalline silica) 10 mg/m3 STEV (fume)
Saskatchewan:	2 mg/m3 TWA (dust and fume, respirable fraction) 10 mg/m3 STEL (dust and fume, respirable fraction)
Yukon:	5 mg/m3 TWA (fume); 30 mppcf TWA (dust); 10 mg/m3 TWA (dust) 10 mg/m3 STEL (fume); 20 mg/m3 STEL (dust)

### Engineering Controls

Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

### PERSONAL PROTECTIVE EQUIPMENT

#### Personal Protective Equipment: Eyes/Face

Wear chemical goggles, add face shield if splashing is possible.

#### Personal Protective Equipment: Skin

Recommended gloves include neoprene or rubber. Use of impervious apron and boots are recommended.

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## Personal Protective Equipment: Respiratory

If ventilation is not sufficient to effectively prevent buildup of vapors or mists, appropriate approved NIOSH respiratory protection must be provided (i.e. air-purifying respirator with an acid-gas cartridge). Respirators should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2-1992). A written respiratory protection program, including provisions for medical certification, training, fit testing, exposure assessments, maintenance, inspection, cleaning, and convenient, sanitary storage must be implemented.

## Personal Protective Equipment: General

Eyewash fountains and emergency showers are required.

### \*\*\* Section 9 - Physical & Chemical Properties \*\*\*

<b>Appearance:</b>	Clear, colorless	<b>Odor:</b>	Ammonia
<b>Physical State:</b>	Liquid	<b>pH:</b>	10-11.5
<b>Vapor Pressure:</b>	Not available	<b>Vapor Density:</b>	Not available
<b>Boiling Point:</b>	100°C	<b>Melting Point:</b>	Not available
<b>Solubility (H2O):</b>	Disperses	<b>Specific Gravity:</b>	1.15-1.25 at 15°C (59°F) (water = 1)
<b>Flash Point:</b>	Not applicable	<b>Flash Point Method:</b>	Not applicable
<b>Auto Ignition:</b>	Not applicable	<b>LFL:</b>	Not applicable
<b>UFL:</b>	Not applicable	<b>Viscosity:</b>	Thin liquid

### \*\*\* Section 10 - Chemical Stability & Reactivity Information \*\*\*

#### Chemical Stability

This is a stable material.

#### Chemical Stability: Conditions to Avoid

Avoid extreme heat and contact with incompatible materials.

#### Incompatibility

This product may react with strong acids.

#### Hazardous Decomposition

Decomposition products include irritating vapors and toxic gases, zinc, ammonia and nitrogen oxides.

#### Possibility of Hazardous Reactions

Will not occur.

### \*\*\* Section 11 - Toxicological Information \*\*\*

#### Acute Dose Effects

##### A: General Product Information

This product can be severely irritating and corrosive. A corrosive can cause severe irritation and burns to the eyes, skin and respiratory system. Ingestion of a corrosive may result in moderately severe burns to the mouth and esophagus, with more severe burns and damage to the stomach.

##### B: Component Analysis - LD50/LC50

###### Water (7732-18-5)

Oral LD50 Rat: >90 mL/kg

###### Ammonium hydroxide (1336-21-6)

Oral LD50 Rat: 350 mg/kg

###### Zinc oxide (1314-13-2)

Oral LD50 Rat: >5000 mg/kg

500 mg/m<sup>3</sup> IDLH

#### Carcinogenicity

##### A: General Product Information

No carcinogenicity data available for this product.

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## B: Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

## Mutagenicity

No data available for this product.

## Teratogenicity

No data available for this product.

## Sensitization

No information available for the product.

## \*\*\* Section 12 - Ecological Information \*\*\*

### Ecotoxicity

#### A: General Product Information

This product can be extremely harmful to both terrestrial and aquatic plant or animal life.

#### B: Component Analysis - Ecotoxicity - Aquatic Toxicity

##### Ammonium hydroxide (1336-21-6)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	8.2 mg/L
48 Hr EC50 water flea	0.66 mg/L
48 Hr EC50 Daphnia pulex	0.66 mg/L

##### Ammonium carbonate (506-87-6)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	37 mg/L

### Environmental Fate

The components of this product will slowly degrade in the environment to form a variety of organic and inorganic compounds.

## \*\*\* Section 13 - Disposal Considerations \*\*\*

### US EPA Waste Number & Descriptions

#### A: General Product Information

You must test your waste using methods described in 40 CFR Part 261 to determine if it meets applicable definitions of hazardous wastes. If discarded, this product may be considered a RCRA corrosive waste, D002.

#### B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

#### Disposal Instructions

Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations. See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

## \*\*\* Section 14 - Transportation Information \*\*\*

### US DOT Information

**Shipping Name:** Corrosive liquid, n.o.s. (Ammonium Hydroxide)

**UN/NA #:** UN1760 **Hazard Class:** 8 **Packing Group:** III

**Required Label(s):** CORROSIVE

**Additional Info.:** Emergency Response Guide # 154

### Canada Transportation of Dangerous Goods Information

**Shipping Name:** Corrosive liquid, n.o.s. (Ammonium Hydroxide)

**UN/NA #:** UN1760 **Hazard Class:** 8 **Packing Group:** III

## \*\*\* Section 15 - Regulatory Information \*\*\*

### US Federal Regulations

#### A: General Product Information

All components are on the U.S. EPA TSCA Inventory List.

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## B: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

### Ammonium hydroxide (1336-21-6)

CERCLA: 1000 lb final RQ; 454 kg final RQ

### Ammonium carbonate (506-87-6)

CERCLA: 5000 lb final RQ; 2270 kg final RQ

SARA 311/312: Acute Health Yes Chronic Health No Fire No Pressure No Reactive No

## State Regulations

### A: General Product Information

Other state regulations may apply. Check individual state requirements.

### B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Ammonium hydroxide	1336-21-6	Yes	Yes	No	Yes	Yes	No
Ammonium carbonate	506-87-6	Yes	Yes	No	Yes	Yes	No
Zinc oxide	1314-13-2	Yes	Yes	Yes	Yes	Yes	Yes

## Canadian WHMIS Information

### A: General Product Information

All components are on the Canadian Domestic Substances or Non-Domestic Substances Inventory Lists.

### B: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Ammonium hydroxide	1336-21-6	1 %
Zinc oxide	1314-13-2	1 %

WHMIS Classification: E - Corrosive Material

## Additional Regulatory Information

### A: General Product Information

No additional information available.

### B: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	NDSL	EINECS	AUST	MITI	PHIL	KOREA	ELINCS	CHINA
Water	7732-18-5	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes
Ammonium hydroxide	1336-21-6	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Ammonium carbonate	506-87-6	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Zinc oxide	1314-13-2	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes

## \*\*\* Section 16 - Other Information \*\*\*

### Other Information

Disclaimer: Supplier gives no warranty of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser will make his own tests to determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental and/or consequential property damage arising out of the use of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights. Read the Material Safety Data Sheet before handling product.

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## Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists. AICS = Australian Inventory of Chemical Substances. CAS = Chemical Abstract Service. CERCLA = Comprehensive Environmental Response, Compensation and Liability Act. CFR = Code of Federal Regulations. CHEMTREC = Chemical Transportation Emergency Center. DSL = Canadian Domestic Substance List. EINECS = European Inventory of New and Existing Chemical Substances. ELINCS = European List of Notified Chemical Substances. EPA = Environmental Protection Agency. FIFRA = Federal Insecticide, Fungicide, and Rodenticide Act; HEPA = High Efficiency Particulate Air. HMIS = Hazardous Material Information System. IARC = International Agency for Research on Cancer. IDLH = Immediately Dangerous to Life and Health. MITI = Japanese Ministry of International Trade and Industry. NDSL = Canadian Non-Domestic Substance List. NFPA = National Fire Protection Association. NIOSH = National Institute of Occupational Safety and Health. NJTSR = New Jersey Trade Secret Registry. NTP = National Toxicology Program. OSHA = Occupational Safety and Health Administration. NA = Not available or Not Applicable. SARA = Superfund Amendments and Reauthorization Act. TDG = Transportation of Dangerous Goods. TLV = Threshold Limit Value. TSCA = Toxic Substances Control Act. WHMIS = Workplace Hazardous Materials Information System.

End of Sheet MRD-139