

# Safety Data Sheet

ZAM Solution

SDS ID: MRD-224

## \*\*\* Section 1 - IDENTIFICATION\*\*\*

### Product Identifier:

ZAM – Zinc Ammonium Carbonate Solution

### Recommended Use

Industrial Use

### Restrictions on Use

None known.

### Manufactured for:

MINERAL RESEARCH & DEVELOPMENT  
5910 Pharr Mill Road  
Harrisburg, NC 28075

Phone: 704-454-4811  
Fax: 704-454-7390  
Emergency # CHEMTREC: (800) 424-9300  
US and Canadian Shipping only – 1-703-527-3887

### 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 - HAZARD(S) IDENTIFICATION\*\*\*

### Classification in accordance with 29 CFR 1910.1200.

Skin Corrosion/Irritation, Category 1A  
Serious Eye damage/irritation, Category 1  
Hazardous to Aquatic Life - Acute, Category 1  
Hazardous to Aquatic Life - Chronic, Category 1  
Specific Target Organ Toxicity - Single Exposure – Respiratory, Category 3  
Acute Toxicity - Oral, Category 4

### GHS LABEL ELEMENTS

#### Symbol(s)



#### Signal Word

DANGER

#### Hazard Statement(s)

Causes severe skin burns and eye damage.  
Harmful if swallowed.  
Causes serious eye damage.

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May cause respiratory irritation.  
Very toxic to aquatic life.  
Very toxic to aquatic life with long lasting effects.

## Precautionary Statement(s)

### Prevention

Wear protective gloves/protective clothing/eye protection/face protection. Do not breathe dust/fume/gas/mist/vapor/spray. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment.

### Response

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.

IF ON SKIN (OR HAIR): Rinse skin with water/shower. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.

IF INHALED: If inhaled, remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.

IF SWALLOWED: Rinse mouth. Do not induce vomiting. Immediately call a POISON CENTER or doctor/physician.

### Storage

Store locked up.

### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

## \* \* \* 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 has been evaluated using criteria specified in 29CFR 1910.1200 (Hazard Communication Standard) and the Canadian Controlled Product Regulations. 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\*\*\*

### Description of Necessary Measures

#### Inhalation

IF INHALED: 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.

#### Skin Contact

IF ON SKIN (or hair): For skin contact flush with large amounts of water while removing contaminated clothing. If irritation persists, get medical attention. Wash contaminated clothing before reuse.

#### Eye Contact

IF IN EYES: Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Immediately call a POISON CENTER or doctor/physician.

#### Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. 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.

## \*\*\* Section 5 - FIRE-FIGHTING MEASURES\*\*\*

### Suitable Extinguishing Media

Use Dry chemical, foam, carbon dioxide, water spray.

### Unsuitable Extinguishing Media

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

### Specific Hazards Arising from the Chemical

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

### Hazardous Decomposition Products

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

### Special Protective Equipment and Precautions for Firefighters

Fire fighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. Fire fighters should avoid inhaling any combustion products. Do not point high pressure water stream directly into burning material to avoid spreading. Prevent run-off from firefighting from entering sewers or open waterways.

### Fire Fighting Measures

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

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

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



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## \*\*\* Section 6 - ACCIDENTAL RELEASE MEASURES\*\*\*

### Personal Precautions, Protective Equipment and Emergency 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. Isolate area and keep unnecessary personnel away.

### Methods and Materials for Containment

Avoid release to the environment. Keep runoff from getting into sewers and waterways.

### Methods and Materials for Containment and Cleaning Up

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.

## \*\*\* Section 7 - HANDLING AND STORAGE\*\*\*

### Precautions for Safe Handling

Do not get this material in your eyes, on your skin, or on your clothing. Do not breathe gas/fumes/vapor/spray. 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.

### Conditions for Safe Storage, including any Incompatibilities

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.

### Incompatibilities

This product may react with strong oxidizing agents and materials that are not compatible with water.

## \*\*\* Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION\*\*\*

### Component Exposure Limits

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.

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

ACGIH:	2 mg/m <sup>3</sup> TWA (respirable fraction) 10 mg/m <sup>3</sup> STEL (respirable fraction)
OSHA (Final):	5 mg/m <sup>3</sup> TWA (fume); 15 mg/m <sup>3</sup> TWA (total dust); 5 mg/m <sup>3</sup> TWA (respirable fraction)
OSHA	5 mg/m <sup>3</sup> TWA (fume); 10 mg/m <sup>3</sup> TWA (total dust); 5 mg/m <sup>3</sup> TWA (respirable fraction)
(Vacated):	10 mg/m <sup>3</sup> STEL (fume)
NIOSH:	5 mg/m <sup>3</sup> TWA (dust and fume) 10 mg/m <sup>3</sup> STEL (fume) 15 mg/m <sup>3</sup> Ceiling (dust)
Alberta:	10 mg/m <sup>3</sup> TWA (dust); 5 mg/m <sup>3</sup> TWA (fume) 10 mg/m <sup>3</sup> STEL (fume)
British	2 mg/m <sup>3</sup> TWA (respirable)
Columbia:	10 mg/m <sup>3</sup> STEL (respirable)
Manitoba:	2 mg/m <sup>3</sup> TWA (respirable fraction)

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	10 mg/m <sup>3</sup> STEL (respirable fraction)
New Brunswick:	5 mg/m <sup>3</sup> TWA (fume); 10 mg/m <sup>3</sup> TWA (particulate matter containing no asbestos and < 1% crystalline silica, dust) 10 mg/m <sup>3</sup> STEL (fume)
NW Territories:	5 mg/m <sup>3</sup> TWA (fume); 5 mg/m <sup>3</sup> TWA (dust, respirable mass); 10 mg/m <sup>3</sup> TWA (dust, total mass) 10 mg/m <sup>3</sup> STEL (fume)
Nova Scotia:	2 mg/m <sup>3</sup> TWA (respirable fraction) 10 mg/m <sup>3</sup> STEL (respirable fraction)
Nunavut:	5 mg/m <sup>3</sup> TWA (fume); 5 mg/m <sup>3</sup> TWA (dust, respirable mass); 10 mg/m <sup>3</sup> TWA (dust, total mass) 10 mg/m <sup>3</sup> STEL (fume)
Ontario:	2 mg/m <sup>3</sup> TWAEV (respirable) 10 mg/m <sup>3</sup> STEV (respirable)
Quebec:	5 mg/m <sup>3</sup> TWAEV (fume); 10 mg/m <sup>3</sup> TWAEV (total dust, containing no asbestos and less than 1% crystalline silica) 10 mg/m <sup>3</sup> STEV (fume)
Saskatchewan:	2 mg/m <sup>3</sup> TWA (dust and fume, respirable fraction) 10 mg/m <sup>3</sup> STEL (dust and fume, respirable fraction)
Yukon:	5 mg/m <sup>3</sup> TWA (fume); 30 mppcf TWA (dust); 10 mg/m <sup>3</sup> TWA (dust) 10 mg/m <sup>3</sup> STEL (fume); 20 mg/m <sup>3</sup> STEL (dust)

## Appropriate Engineering Controls

Whenever possible, engineering controls should be used to minimize the need for personal protective equipment.

## Individual Protection Measures, such as Personal Protective Equipment

### Eyes/Face Protection

Wear safety glasses; chemical goggles and face shield (if splashing is possible).

### Skin Protection

Wear chemical resistant clothing to prevent skin contact. Wear chemical resistant apron if splash potential is minimal. If splash potential is great, as during maintenance activities, wear impervious clothing and chemical resistant footwear.

### Respiratory Protection

If ventilation is not sufficient to effectively prevent buildup of large quantities of vapors or mists or prolonged exposure is possible, appropriate approved NIOSH respiratory protection must be provided. Respirators should be selected by and used under the direction of a trained health and safety professional following the requirements found in OSHA's respirator standard (29 CFR 1901.134) and ANSI's standard for respiratory protection (Z88.2-1992), applicable U.S. regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. 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.

### PPE Pictograms:



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

<b>Appearance:</b>	Clear, colorless	<b>Odor:</b>	Odorless
<b>Physical State:</b>	Liquid	<b>Odor Threshold:</b>	Not Applicable
<b>Vapor Pressure:</b>	Not available	<b>pH:</b>	10-11.5
<b>Vapor Density:</b>	Not available	<b>Specific Gravity:</b>	1.20 @ 15 °C (59 °F)
<b>Boiling Point / Boiling Range:</b>	100°C	<b>Evaporation Rate:</b>	Not available
<b>Melting Point / Freezing Point:</b>	Not available	<b>Relative Density:</b>	Not available
<b>Solubility (H<sub>2</sub>O):</b>	Disperses	<b>Auto-ignition Temperature:</b>	Not available
<b>Flash Point:</b>	Not Flammable	<b>Decomposition Temperature:</b>	Not available
<b>Upper Flammable Limit (UFL):</b>	Not Applicable	<b>Lower Flammable Limit (LFL):</b>	Not Applicable
<b>Viscosity:</b>	Not available	<b>Partition Coefficient (n-octanol / water):</b>	Not available
<b>Flammability:</b>	Not available		

## \*\*\* Section 10 - STABILITY AND REACTIVITY\*\*\*

### Chemical Stability

This is a stable material under normal conditions of temperature and pressure.

### Possibility of Hazardous Reactions

Will not occur.

### Conditions to Avoid

Avoid extreme heat and contact with incompatible materials.

### Incompatible Materials

This product may react with strong acids.

### Hazardous Decomposition Products

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

## \*\*\* Section 11 - TOXICOLOGICAL INFORMATION\*\*\*

### Acute Toxicity

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.

### 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

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## Information on Likely Routes of Exposure

### 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.

### 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.

### Skin Contact

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.

### Eye Contact

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.

### Immediate Effects

May cause severe irritation or burns to the eyes, skin, gastrointestinal tract, and respiratory system.

### Delayed Effects

No data available.

### Medical Conditions Aggravated by Exposure

No data Available.

### Irritation/Corrosivity Data

Irritating to eyes, respiratory system and skin.

### Respiratory Sensitization

No data available.

### Dermal Sensitization

May cause an allergic skin reaction

### Germ Cell Mutagenicity

No data available for the mixture.

### Carcinogenicity

### Component Carcinogenicity

This product not listed as carcinogens by ACGIH, NIOSH, or IARC.

### Reproductive Toxicity

No information available for the product.

### Specific Target Organ Toxicity - Single Exposure

No information available for the product.

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## Specific Target Organ Toxicity - Repeated Exposure

No information available for this product.

## Aspiration Hazard

No information available for the product.

## \* \* \* Section 12 - ECOLOGICAL INFORMATION \* \* \*

### Ecotoxicity

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

### Component Analysis - Aquatic Toxicity

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

##### Test & Species

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

##### Conditions

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

##### Test & Species

96 Hr LC50 Pimephales promelas	37 mg/L
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##### Conditions

### Persistence and Degradability

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

### Bioaccumulation Potential

No information available for the product.

### Mobility in Soil

No information available for the product.

## \* \* \* Section 13 - DISPOSAL CONSIDERATIONS \* \* \*

### Disposal Methods

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.

### Disposal of Contaminated Packaging

#### Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.



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## \*\*\* Section 14 - TRANSPORT 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  
**EMG#:** 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  
**Required Label(s):** CORROSIVE



### International Maritime Dangerous Goods Information

**Shipping Name:** Corrosive liquid, n.o.s. (Ammonium Hydroxide)  
**UN/NA #:** UN1760 **Hazard Class:** 8 **Packing Group:** III  
**Required Label(s):** CORROSIVE  
**EMS:** F-A, S-B



## \*\*\* Section 15 - REGULATORY INFORMATION\*\*\*

### U.S. Federal Regulations

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  
SARA 313: 1.0 % de minimis concentration (related to Water Dissociable aqueous ammonium salt solutions)

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

CERCLA: 5000 lb final RQ; 2270 kg final RQ  
SARA 313: 1.0 % de minimis concentration (related to Water Dissociable aqueous ammonium salt solutions)

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

### Federal Insecticide, Fungicide, and Rodenticide Act

This material contains the following chemicals present on either the Listing of Pesticide Chemicals (40 CFR 180) or Pesticides Classified for Restricted Use as listed by FIFRA :

Component	CAS
Ammonium hydroxide	1336-21-6
Ammonium carbonate	506-87-6
Zinc oxide	1314-13-2

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## Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS
Ammonium hydroxide	1336-21-6
Ammonium carbonate	506-87-6
Zinc oxide	1314-13-2

## U.S. State Regulations

### State Regulations

Other state regulations may apply. Check individual state requirements.

### Component Analysis - State

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

No components are listed on the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

## Canadian WHMIS Ingredient Disclosure List (IDL)

Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which fall under WHMIS criteria specified in the Controlled Products Regulations and present above the threshold limits listed on the IDL. The following components are listed on the IDL:

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

## WHMIS Classification

E

## Component Analysis - Inventory

Component	CAS #	TSCA	DSL	NDSL	EINECS	AU	MITI	PH	KR	ELINCS	CN
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

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## \*\*\* Section 16 - OTHER INFORMATION\*\*\*

### Summary of Changes

New SDS: 12/05/2014 v1.0; Revised 05/04/2015 v1.5

### Key / Legend

**ACGIH** = American Conference of Governmental Industrial Hygienists; **AU** = Australia; **BOD** - Biochemical Oxygen Demand; **C** - Celsius; **CA** - Canada; **CAS** = Chemical Abstracts Service; **CERCLA** = Comprehensive Environmental Response, Compensation, and Liability Act; **CFR** = Code of Federal Regulations; **CN** = China; **CPR** = Controlled Products Regulations; **DOT** = Department of Transportation; **DSL** = Domestic Substances List; **EINECS** = European Inventory of Existing Commercial Chemical Substances; **ELINCS** = European List of Notified Chemical Substances; **EPA** = Environmental Protection Agency; **ERG** = Emergency Response Guide; **EU** = European Union; **F** - Fahrenheit; **HEPA** = High Efficiency Particulate Air; **HMIS** = Hazardous Material Information System; **HPV** – High Production Volume Chemical (EU); **IARC** = International Agency for Research on Cancer; **IATA** = International Air Transport Association; **ICL** – In Commerce List (Canada); **IDL** - Ingredient Disclosure List; **IDLH** - Immediately Dangerous to Life and Health; **IMDG** = International Maritime Dangerous Goods; **JP** = Japan; **KR** = Korea; **LEL** - Lower Explosive Limit; **MITI** = Japan Ministry of International Trade and Industry; **mg/Kg** = milligrams per Kilogram; **mg/L** = milligrams per Liter; **mg/m<sup>3</sup>** = milligrams per Cubic Meter; **mppcf** = million particles per cubic foot; **MSHA** = Mine Safety and Health Administration; **MX** = Mexico; **NA** = Not Applicable or Not Available; **NFPA** = National Fire Protection Association; **NIOSH** = National Institute for Occupational Safety and Health; **NJTSR** = New Jersey Trade Secret Registry; **NTP** = National Toxicology Program; **NZ** = New Zealand; **OSHA** = Occupational Safety and Health Administration; **PH** = Philippines; **RCRA** = Resource Conservation & Recovery Act; **SARA** = Superfund Amendments and Reauthorization Act; **STEL** = Short Term Exposure Limit; **STELEV** = Short Term Exposure Limit Exposure Values; **TDG** = Transport Dangerous Goods; **TSCA** = Toxic Substances Control Act; **TWA** - Time Weighted Average; **TWAEV** = Time Weighted Average Exposure Values; **UEL** - Upper Explosive Limit; **US** - United States; **WHMIS** = Workplace Hazardous Materials Information System.

### 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.

End of Sheet MRD 224