



January 24, 2011

Marilyn Koletzke, P.E., Air Permitting Manager  
New Source Review Section  
Florida Department of Environmental Protection  
Bob Martinez Center  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

103-87737  
**RECEIVED**  
JAN 25 2011  
BUREAU OF  
AIR REGULATION

**RE: MOSAIC FERTILIZER, LLC – BARTOW FACILITY  
DEP FILE NO. 1050046-029-AC (PSD-FL-255A)  
ADD A NEW PARTICULATE MATTER EMISSION LIMIT  
RESPONSE TO RAI DATED DECEMBER 9, 2010**

Dear Ms. Koletzke:

Mosaic Fertilizer, LLC (Mosaic) received Florida Department of Environmental Protection's (FDEP's) request for additional information (RAI) dated December 9, 2010, regarding Mosaic's request to replace the particulate matter (PM) emission limit at its No. 3 Fertilizer Plant (EU 001). The request is to replace the current limit of 0.18 pound per ton of phosphorus pentoxide (lb/ton  $P_2O_5$ ) with an equivalent emission limit of 0.088 lb/ton of product. The responses to FDEP's requests are addressed below, in the same order in which they were received.

**Comment 1. An alternate emissions limit of 0.088 pounds per ton (PPT) of product is proposed for when the plant is processing micronutrients additives. The current emission rate is based pounds per ton of phosphorus pentoxide ( $P_2O_5$ ) feed into the process plant.**

**The rationale for this request is that when micronutrients are being processed during a compliance test, there is less phosphoric acid input to the plant. As such, Mosaic is unable to produce sufficient product to achieve the permitted minimum of 90% feed rate of  $P_2O_5$ . (Rule 62-297.32 limiting emissions units operation to 110 percent of the test rate until a new test is conducted) Please advise that the current maximum allowable particulate matter emissions rate of 11.0 pounds per hour (PPH) and 0.18 PPT  $P_2O_5$  of feed will remain unchanged.**

**Response:** The current maximum allowable PM emission rate of 11.0 pounds per hour (lb/hr) will remain unchanged. However, Mosaic requests that the 0.18 lb/ton  $P_2O_5$  input PM emission limit be replaced with an equivalent 0.088 lb/ton product PM emission limit. Therefore, the 0.18 lb/ton  $P_2O_5$  limit would no longer apply. The lb/ton product emission limit is equivalent to the lb/ton  $P_2O_5$  input emission limit, as shown below (both result in maximum hourly emissions of 11.0 lb/hr):

$P_2O_5$  Input Basis:  $0.18 \text{ lb/ton } P_2O_5 \times 61.25 \text{ TPH } P_2O_5 = 11.0 \text{ lb/hr PM}$   
Product Basis:  $0.088 \text{ lb/ton product} \times 3,000 \text{ TPD product} \times 1 \text{ day/24 hours} = 11.0 \text{ lb/hr PM}$

As explained in the application, the lb/ton  $P_2O_5$  limit becomes increasingly stringent for PM when micronutrient enhanced monoammonium phosphate (MAP) products are produced, since the total mass of solids remains the same, but the  $P_2O_5$  feed is reduced.

**Comment 2. Because this modification will influence regulated emissions from the facility for total hazardous air pollutants (HAPs) and radionuclide, the following information regarding the micronutrient additives is being requested:**

**a. Please indicate when Mosaic Fertilizer, LLC begin introducing micronutrient additives into the product of the No. 3 Phosphate Fertilizer Plant.**

Y:\Projects\2010\103-87737 Mosaic RAI\Final\012411\_737 Bartow No. 3 Fertilizer.docx

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**Response:** The addition of commercially available micronutrients (zinc, copper, boron, manganese, and/or sulfur) was authorized under Permit No. 1050046-012-AC issued November 29, 1999. Mosaic did not begin producing micronutrient enhanced MAP product until October 15, 2001.

**Comment 2. b. Please provide the source or origin of the micronutrient additives.**

**Response:** The micronutrient additives are all commercially available additives purchased from producers and suppliers. The material safety data sheets (MSDS) for each of the micronutrients currently being used at the Mosaic Bartow facility (sulfur, boron, and zinc) are attached. The MSDS of the micronutrient (copper) is also attached. Copper enhanced MAP has been produced at the Mosaic Bartow facility in the past, but is not currently being produced, and there are no copper MAP additives currently onsite.

**Comment 2. c. Please specify the constituents on a mass by mass basis for metals and radionuclide that are present in detectable and non-detectable quantities for species or compounds as listed below:**

- Antimony
- Arsenic (inorganic including arsine)
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Cyanide
- Lead
- Manganese
- Mercury
- Nickel
- Radionuclides (including radon)
- Selenium

(Section 112(b) of the Clean Air Act)

**Response:** The only hazardous air pollutant (HAP) that is currently authorized to be added to the MAP product produced by the No. 3 Fertilizer Plant is manganese. As of the date of this response, Mosaic has not added manganese as a micronutrient to its MAP product line. However the micronutrients that are added to the MAP product are dictated by market conditions and demand. Mosaic may produce manganese enhanced MAP product in the future if the demand exists for this product. None of the constituents shown above are listed in the MSDS for the micronutrient additives.

**Comment 2. d. Please identify what the maximum mass feed rate of the micronutrient additives are in tons per hour or percentage of product into the No. 3 Phosphate Fertilizer Plant.**

**Response:** As stated above, the exact formulation of micronutrients in the final MAP product is determined by market demand. There are many different micronutrient enhanced MAP formulations that Mosaic currently produces, all of which contain different percentages, as well as varying combinations of the micronutrients. The highest percentages of micronutrients in the final MAP products that have been produced are given in the table below, along with the corresponding maximum mass feed rate, based on the maximum permitted MAP production rate of 3,000 tons per day (125 TPH).

| Micronutrient   | Highest percentage in MAP product | Micronutrient Mass Feed Rate (TPH) |
|---|-----------------------------------|------------------------------------|
| Sulfur (as S)   | 7.8%                              | 9.75                               |
| Cupric (as CuO)   | 1%                                | 1.25                               |
| Zinc (as ZnO)   | 1.42%                             | 1.78                               |
| Boron (as Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> ) | 2.03%                             | 2.54                               |

Additionally, Mosaic is requesting that the averaging times associated with various parameters for the No. 3 Fertilizer Plant be made consistent with the averaging times for the same parameters as the No. 4 Fertilizer Plant (EU 021). Mosaic Bartow's current Title V Air Operation Permit (Permit No. 1050046-018-AV) does not specify an averaging time for the capacity (specific condition A.1) of the No. 3 Fertilizer Plant, as shown below:

A.1. Capacity

- a. The maximum permitted production rate for the ammonium/diammonium phosphate plant shall not exceed 3000 tons per day of DAP or MAP product
- b. The maximum production rate shall not exceed 61.25 TPH of 100 percent phosphoric acid ( $P_2O_5$ ) input
- c. The maximum heat input rate to the dryer is limited to 40 MMBtu per hour

However, the averaging time for the capacity of the No. 4 Fertilizer Plant is very clearly defined (specific condition F.1), as shown below:

F.1. Capacity

- a. The maximum production rate for the diammonium phosphate fertilizer plant shall not exceed 261 tons of DAP per hour (daily average basis; 120 TPH @ 100 percent  $P_2O_5$ ) and 2,170,212 tons of DAP per year
- b. The maximum heat input rate to the dryer shall not exceed 40 MMBtu per hour (daily average basis)

Mosaic proposes that the wording for specific condition A.1. be changed to the following:

A.1. Capacity

- a. The maximum permitted production rate for the ammonium/diammonium phosphate plant shall not exceed 3000 TPD of DAP or MAP product
- b. The maximum production rate shall not exceed 61.25 TPH of 100 percent phosphoric acid ( $P_2O_5$ ) input (daily average basis)
- c. The maximum heat input rate to the dryer is limited to 40 MMBtu per hour (daily average basis)

In 2010, the No. 3 Fertilizer Plant experienced several exceedances of the hourly production rate limit of 61.25 TPH  $P_2O_5$ . Therefore, this change is being requested to reduce the potential for exceedances of the hourly production rate limit due to small process fluctuations, or due to limitations in the  $P_2O_5$  input rate measurement method. Also, there is no regulatory reason to have such a short-term limit on the plant, as evidenced by the daily limit on the No. 4 Fertilizer Plant. Mosaic does not have any intent of increasing annual production of the No. 3 Fertilizer Plant as a result of this request. There will be no increase in emissions from the No. 3 Fertilizer Plant as a result of this change.

Thank you for your consideration of this information. If you have any questions, please do not hesitate to call me at (352) 336-5600.

Sincerely,

**GOLDER ASSOCIATES INC.**

*David A. Buff*

David A. Buff, P.E., Q.E.P.  
Principal Engineer

cc: Rob Larson, Mosaic  
Rama Iyer, Mosaic

Enclosures

PC/edk

## APPLICATION INFORMATION

### Professional Engineer Certification

1. Professional Engineer Name: **David A. Buff**

Registration Number: **19011**

2. Professional Engineer Mailing Address...

Organization/Firm: **Golder Associates Inc.\*\***

Street Address: **6026 NW 1st Place**

City: **Gainesville**

State: **FL**

Zip Code: **32607**

3. Professional Engineer Telephone Numbers...

Telephone: **(352) 336-5600**

ext. **21145** Fax: **(352) 336-6603**

4. Professional Engineer E-mail Address: **DBuff@golder.com**

5. Professional Engineer Statement:

*I, the undersigned, hereby certify, except as particularly noted herein\*, that:*

*(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and*

*(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.*

*(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐ , if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.*

*(4) If the purpose of this application is to obtain an air construction permit (check here ☒ , if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐ , if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.*

*(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐ , if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.*

Signature

(seal)

Date

\* Attach any exception to certification statement.

\*\* Board of Professional Engineers Certificate of Authorization #00001670.

**MSDS: SULFUR**



IHS Dolphin Comply Plus



Comply Plus® Web v2.9.5

Global View Station

BARTOW

**CONOCOPHILLIPS  
SULFUR**

File Name: 036574

Revision Date: 10/9/2008

Internal ID: 09837

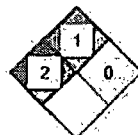
Internal ID:

Format: No Format Specified

This sheet superseded another on 12/4/2008

**Additional Details****MSDS Contents**

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**NFPA****HMIS**

Health  
Flammability  
Reactivity  
PPE

**HMIS III**

Health  
Flammability  
Physical Hazard  
PPE

More...

- ☒ Primary Information
- ☒ Ingredients (2)
- ☒ Locations
- ☒ Attachments
- ☒ Synonyms
- ☒ Requests And Approvals

- ☒ Hazards
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- ☒ Exposure Limits
- ☒ Sites (4)
- ☒ Parts



Print MSDS



Add to Collection



E-mail



Service History

CONOCOPHILLIPS

SULFUR

MATERIAL SAFETY DATA SHEET

**1. PRODUCT AND COMPANY IDENTIFICATION**

PRODUCT NAME: SULFUR

MSDS NUMBER: 002074

**SYNONYMS:**

SULPHUR  
ELEMENTAL SULFUR  
FORMED SULPHUR  
PRILLED SULFUR  
SOIL SULFUR (SCREENED)  
SOIL SULFUR (ROP)  
SOIL SULFUR (DISTRESSED)  
CAKE SULFUR

INTENDED USE: FEEDSTOCK

MANUFACTURER/SUPPLIER:  
CONOCOPHILLIPS  
600 N. DAIRY ASHFORD  
HOUSTON, TEXAS 77079-1175

EMERGENCY HEALTH AND SAFETY NUMBER:  
CHEMTREC: 800-424-9300 (24 HOURS)

MSDS INFORMATION:  
PHONE: 800-762-0942

EMAIL: MSDS@CONOCOPHILLIPS.COM

INTERNET: HTTP://W3.CONOCOPHILLIPS.COM/NETMSDS/

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## 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

CAUTION!

SKIN IRRITANT

MAY CONTAIN OR RELEASE POISONOUS HYDROGEN SULFIDE GAS

NFPA:  
2  
1  
0

APPEARANCE: BRIGHT YELLOW

PHYSICAL FORM: SOLID

ODOR: ROTTEN EGG / SULFUROUS

POTENTIAL HEALTH EFFECTS:

EYE:  
CONTACT MAY CAUSE MILD EYE IRRITATION INCLUDING STINGING, WATERING, AND REDNESS.

SKIN:  
SKIN IRRITANT, CONTACT MAY CAUSE REDNESS, ITCHING, A BURNING SENSATION, AND SKIN DAMAGE. NO HARMFUL EFFECTS FROM SKIN ABSORPTION HAVE BEEN REPORTED.

INHALATION (BREATHING):  
MAY CONTAIN OR RELEASE POISONOUS HYDROGEN SULFIDE GAS - SEE OTHER COMMENTS.

INGESTION (SWALLOWING): NO HARMFUL EFFECTS REPORTED FROM INGESTION.

SIGNS AND SYMPTOMS:  
EFFECTS OF OVEREXPOSURE MAY INCLUDE IRRITATION OF THE DIGESTIVE TRACT, IRRITATION OF THE RESPIRATORY TRACT, HEADACHES, COUGHING, RUNNY NOSE, VOMITING, DIARRHEA, SHORTNESS OF BREATH, ABDOMINAL PAIN AND CHEST PAIN.

OTHER COMMENTS:  
THIS MATERIAL MAY CONTAIN OR LIBERATE HYDROGEN SULFIDE, A POISONOUS GAS WITH THE SMELL OF ROTTEN EGGS. THE SMELL DISAPPEARS RAPIDLY BECAUSE OF OLFACTORY FATIGUE SO ODOR MAY NOT BE A RELIABLE INDICATOR OF EXPOSURE. EFFECTS OF



OVEREXPOSURE INCLUDE IRRITATION OF THE EYES, NOSE, THROAT AND RESPIRATORY TRACT, BLURRED VISION, PHOTOPHOBIA (SENSITIVITY TO LIGHT), AND PULMONARY EDEMA (FLUID ACCUMULATION IN THE LUNGS). SEVERE EXPOSURES CAN RESULT IN NAUSEA, VOMITING, MUSCLE WEAKNESS OR CRAMPS, HEADACHE, DISORIENTATION AND OTHER SIGNS OF NERVOUS SYSTEM DEPRESSION, IRREGULAR HEARTBEATS, CONVULSIONS, RESPIRATORY FAILURE, AND DEATH.

ALLERGIC SKIN RESPONSES AFTER REPEATED CONTACT WITH SULFUR HAVE BEEN REPORTED BUT ARE NOT COMMON.

PRE-EXISTING MEDICAL CONDITIONS:  
CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE INCLUDE SKIN DISORDERS.

SEE SECTION 11 FOR ADDITIONAL TOXICITY INFORMATION.

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### 3. COMPOSITION / INFORMATION ON INGREDIENTS

| COMPONENT        | CASRN     | CONCENTRATION* |
|------------------|-----------|----------------|
| SULFUR           | 7704-34-9 | >99            |
| HYDROGEN SULFIDE | 7783-06-4 | TRACE          |

\* ALL CONCENTRATIONS ARE PERCENT BY WEIGHT UNLESS INGREDIENT IS A GAS.  
GAS CONCENTRATIONS ARE IN PERCENT BY VOLUME.

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### 4. FIRST AID MEASURES

#### EYE CONTACT:

IF IRRITATION OR REDNESS DEVELOPS FROM EXPOSURE, FLUSH EYES WITH CLEAN WATER. IF SYMPTOMS PERSIST, SEEK MEDICAL ATTENTION.

#### SKIN CONTACT:

REMOVE CONTAMINATED SHOES AND CLOTHING, AND FLUSH AFFECTED AREA(S) WITH LARGE AMOUNTS OF WATER. IF SKIN SURFACE IS DAMAGED, APPLY A CLEAN DRESSING AND SEEK MEDICAL ATTENTION. IF SKIN SURFACE IS NOT DAMAGED, CLEANSE AFFECTED AREA(S) THOROUGHLY BY WASHING WITH MILD SOAP AND WATER OR A WATERLESS HAND CLEANER. IF IRRITATION OR REDNESS DEVELOPS, SEEK MEDICAL ATTENTION. WASH CONTAMINATED CLOTHING BEFORE REUSE.

#### INHALATION (BREATHING):

IF RESPIRATORY SYMPTOMS OR OTHER SYMPTOMS OF EXPOSURE DEVELOP, MOVE VICTIM AWAY FROM SOURCE OF EXPOSURE AND INTO FRESH AIR IN A POSITION COMFORTABLE FOR BREATHING. IF SYMPTOMS PERSIST, SEEK IMMEDIATE MEDICAL ATTENTION. IF VICTIM IS NOT BREATHING, CLEAR AIRWAY AND IMMEDIATELY BEGIN ARTIFICIAL RESPIRATION, IF BREATHING DIFFICULTIES DEVELOP, OXYGEN SHOULD BE ADMINISTERED BY QUALIFIED PERSONNEL. SEEK IMMEDIATE MEDICAL ATTENTION.

#### INGESTION (SWALLOWING):

FIRST AID IS NOT NORMALLY REQUIRED; HOWEVER, IF SWALLOWED AND SYMPTOMS DEVELOP, SEEK MEDICAL ATTENTION.

#### NOTES TO PHYSICIAN:

AT HIGH CONCENTRATIONS HYDROGEN SULFIDE MAY PRODUCE PULMONARY EDEMA, RESPIRATORY DEPRESSION, AND/OR RESPIRATORY PARALYSIS. THE FIRST PRIORITY IN TREATMENT SHOULD BE THE ESTABLISHMENT OF ADEQUATE VENTILATION AND THE ADMINISTRATION OF 100% OXYGEN. ANIMAL STUDIES SUGGEST THAT NITRITES ARE A USEFUL ANTIDOTE, HOWEVER, DOCUMENTATION OF THE EFFICACY OF NITRITES IN HUMANS IS LACKING. IF THE DIAGNOSIS OF HYDROGEN SULFIDE POISONING IS

CONFIRMED AND IF THE PATIENT DOES NOT RESPOND RAPIDLY TO SUPPORTIVE CARE, THE USE OF NITRITES MAY BE AN EFFECTIVE ANTIDOTE IF DELIVERED WITHIN THE FIRST FEW MINUTES OF EXPOSURE. FOR ADULTS THE DOSE IS 10 ML OF A 3% NaNO<sub>2</sub> SOLUTION (0.5 GM NaNO<sub>2</sub> IN 15 ML WATER) I.V. OVER 2-4 MINUTES. THE DOSAGE SHOULD BE ADJUSTED IN CHILDREN OR IN THE PRESENCE OF ANEMIA, AND METHEMOGLOBIN LEVELS, ARTERIAL BLOOD GASES, AND ELECTROLYTES SHOULD BE MONITORED CLOSELY.

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## 5. FIREFIGHTING MEASURES

### NFPA 704 HAZARD CLASS:

HEALTH 2  
FLAMMABILITY 1  
INSTABILITY 0

0-MINIMAL  
1-SLIGHT  
2-MODERATE  
3-SERIOUS  
4-SEVERE

OSHA FLAMMABILITY CATEGORY: NONE

### UNUSUAL FIRE & EXPLOSION HAZARDS:

THIS MATERIAL MAY BURN, BUT WILL NOT IGNITE READILY. FLASH POINT VARIES DEPENDING ON THE IMPURITIES PRESENT IN THE PRODUCT. SULFUR BURNS EASILY IN AIR WHEN IGNITED BY FLAME OR EXCESS HEAT. SOLID MATERIAL MAY BURN, BUT WILL NOT IGNITE READILY.

DUST MAY FORM AN EXPLOSIVE MIXTURE WITH AIR. SULFUR CAN FORM EXPLOSIVE MIXTURES WITH OXIDIZERS (SEE SECTION 10). HAZARDOUS COMBUSTION/DECOMPOSITION PRODUCTS, INCLUDING HYDROGEN SULFIDE, MAY BE RELEASED BY THIS MATERIAL WHEN EXPOSED TO HEAT OR FIRE. USE CAUTION AND WEAR PROTECTIVE CLOTHING, INCLUDING RESPIRATORY PROTECTION.

### EXTINGUISHING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, FOAM, WATER SPRAY, SAND OR EARTH IS RECOMMENDED. CARBON DIOXIDE CAN DISPLACE OXYGEN. USE CAUTION WHEN APPLYING CARBON DIOXIDE IN CONFINED SPACES.

### FIRE FIGHTING INSTRUCTIONS:

FOR FIRES BEYOND THE INCIPIENT STAGE, EMERGENCY RESPONDERS IN THE IMMEDIATE HAZARD AREA SHOULD WEAR PROTECTIVE CLOTHING. WHEN THE POTENTIAL CHEMICAL HAZARD IS UNKNOWN, IN ENCLOSED OR CONFINED SPACES, A SELF CONTAINED BREATHING APPARATUS SHOULD BE WORN. IN ADDITION, WEAR OTHER APPROPRIATE PROTECTIVE EQUIPMENT AS CONDITIONS WARRANT (SEE SECTION 8).

ISOLATE IMMEDIATE HAZARD AREA AND KEEP UNAUTHORIZED PERSONNEL OUT. CONTAIN SPILL IF IT CAN BE DONE SAFELY. MOVE UNDAMAGED CONTAINERS FROM IMMEDIATE HAZARD AREA IF IT CAN BE DONE SAFELY. COOL EQUIPMENT EXPOSED TO FIRE WITH WATER, IF IT CAN BE DONE SAFELY.

HAZARDOUS COMBUSTION PRODUCTS: COMBUSTION MAY YIELD OXIDES OF SULFUR.

SEE SECTION 9 FOR FLAMMABLE PROPERTIES INCLUDING FLASH POINT AND FLAMMABLE (EXPLOSIVE) LIMITS

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## 6. ACCIDENTAL RELEASE MEASURES

**PERSONAL PRECAUTIONS:**

THIS MATERIAL MAY BURN, BUT WILL NOT IGNITE READILY. KEEP ALL SOURCES OF IGNITION AWAY FROM SPILL/RELEASE. STAY UPWIND AND AWAY FROM SPILL/RELEASE. NOTIFY PERSONS DOWN WIND OF THE SPILL/RELEASE, ISOLATE IMMEDIATE HAZARD AREA AND KEEP UNAUTHORIZED PERSONNEL OUT. WEAR APPROPRIATE PROTECTIVE EQUIPMENT, INCLUDING RESPIRATORY PROTECTION, AS CONDITIONS WARRANT (SEE SECTION 8). MAY CONTAIN OR RELEASE POISONOUS HYDROGEN SULFIDE GAS. SEE SECTIONS 2 AND 7 FOR ADDITIONAL INFORMATION ON HAZARDS AND PRECAUTIONARY MEASURES.

**ENVIRONMENTAL PRECAUTIONS:**

CONTAIN SPILL IF IT CAN BE DONE SAFELY. PREVENT SPILLED MATERIAL FROM ENTERING SEWERS, STORM DRAINS, OTHER UNAUTHORIZED DRAINAGE SYSTEMS, AND NATURAL WATERWAYS. USE WATER SPARINGLY TO MINIMIZE ENVIRONMENTAL CONTAMINATION AND REDUCE DISPOSAL REQUIREMENTS. IF SPILL/RELEASE IN EXCESS OF EPA REPORTABLE QUANTITY (SEE SECTION 15) IS MADE INTO THE ENVIRONMENT, IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (PHONE NUMBER 800-424-8802).

**METHODS FOR CONTAINMENT AND CLEAN-UP:**

NOTIFY RELEVANT AUTHORITIES IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS. CLEANUP UNDER EXPERT SUPERVISION IS ADVISED. CAREFULLY SHOVEL OR SWEEP UP SPILLED MATERIAL AND PLACE IN A SUITABLE CONTAINER. MINIMIZE DUST GENERATION.

**7. HANDLING AND STORAGE****PRECAUTIONS FOR SAFE HANDLING:**

WEAR PROTECTIVE GLOVES. WASH THOROUGHLY AFTER HANDLING. USE GOOD PERSONAL HYGIENE PRACTICES AND WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT.

DO NOT WEAR CONTAMINATED CLOTHING OR SHOES.

**CONDITIONS FOR SAFE STORAGE:**

KEEP CONTAINER(S) TIGHTLY CLOSED. THIS MATERIAL MAY CONTAIN OR RELEASE POISONOUS HYDROGEN SULFIDE GAS. IN A TANK, BARGE, OR OTHER CLOSED CONTAINER, THE VAPOR SPACE ABOVE THIS MATERIAL MAY ACCUMULATE HAZARDOUS CONCENTRATIONS OF HYDROGEN SULFIDE. SOIL SULFUR BULK STORAGE BINS AND HANDLING EQUIPMENT SHOULD HAVE LARGE OPENINGS TO MINIMIZE BRIDGING. BIN WALLS SHOULD BE DESIGNED TO CARRY THE LOADING OF THE MATERIAL. STEEL AND CONCRETE ARE SUITABLE MATERIALS OF CONSTRUCTION IF PROPERLY COATED.

SOIL SULFUR CAN CONTAIN RESIDUAL MOISTURE. STORE AWAY FROM OTHER MATERIALS THAT MAY BE DAMAGED BY MOISTURE. SLABS SHOULD BE DESIGNED TO DRAIN MOISTURE AWAY FROM THE PRODUCT. USE AND STORE THIS MATERIAL IN COOL, DRY, WELL-VENTILATED AREA AWAY FROM HEAT AND ALL SOURCES OF IGNITION. STORE ONLY IN APPROVED CONTAINERS. KEEP AWAY FROM ANY INCOMPATIBLE MATERIAL (SEE SECTION 10). PROTECT CONTAINER(S) AGAINST PHYSICAL DAMAGE.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

| COMPONENT        | US-ACGIH   | OSHA   | OTHER |
|------------------|--|--|-------|
| SULFUR           | TWA:<br>10 MG/M3 TWA-TOTAL<br>3 MG/M3-RESP.<br>AS NUISANCE DUST,<br>IF GENERATED | TWA: 15 MG/M3 -TOTAL<br>TWA: 5 MG/M3 -RESP.<br>AS NUISANCE DUST, IF<br>GENERATED |       |
| HYDROGEN SULFIDE | STEL: 15 PPM<br>TWA: 10 PPM  | CEILING: 20 PPM  |       |

**NOTE:**

STATE, LOCAL OR OTHER AGENCIES OR ADVISORY GROUPS MAY HAVE ESTABLISHED MORE STRINGENT LIMITS. CONSULT AN INDUSTRIAL HYGIENIST OR SIMILAR PROFESSIONAL, OR YOUR LOCAL AGENCIES, FOR FURTHER INFORMATION.

**EYE/FACE PROTECTION:**

THE USE OF EYE PROTECTION THAT MEETS OR EXCEEDS ANSI Z.87.1 IS RECOMMENDED TO PROTECT AGAINST POTENTIAL EYE CONTACT, IRRITATION, OR INJURY. DEPENDING ON CONDITIONS OF USE, A FACE SHIELD MAY BE NECESSARY.

**SKIN/HAND PROTECTION:**

THE USE OF GLOVES IMPERVIOUS TO THE SPECIFIC MATERIAL HANDLED IS ADVISED TO PREVENT SKIN CONTACT. USERS SHOULD CHECK WITH MANUFACTURERS TO CONFIRM THE BREAKTHROUGH PERFORMANCE OF THEIR PRODUCTS.

**SUGGESTED PROTECTIVE MATERIALS:****RESPIRATORY PROTECTION:**

WHERE THERE IS POTENTIAL FOR AIRBORNE EXPOSURE TO HYDROGEN SULFIDE (H<sub>2</sub>S) ABOVE EXPOSURE LIMITS, A NIOSH APPROVED, SELF-CONTAINED BREATHING APPARATUS (SCBA) OR EQUIVALENT OPERATED IN A PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE SHOULD BE USED. UNDER CONDITIONS WHERE HYDROGEN SULFIDE (H<sub>2</sub>S) IS NOT DETECTED, A NIOSH CERTIFIED AIR PURIFYING RESPIRATOR EQUIPPED WITH R OR P95 FILTERS MAY BE USED.

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OR IS EQUIVALENT TO OSHA 29 CFR 1910.134 AND ANSI Z88.2 SHOULD BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE. AIR PURIFYING RESPIRATORS PROVIDE LIMITED PROTECTION AND CANNOT BE USED IN ATMOSPHERES THAT EXCEED THE MAXIMUM USE CONCENTRATION (AS DIRECTED BY REGULATION OR THE MANUFACTURER'S INSTRUCTIONS), IN OXYGEN DEFICIENT (LESS THAN 19.5 PERCENT OXYGEN) SITUATIONS, OR UNDER CONDITIONS THAT ARE IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).

**OTHER PROTECTIVE EQUIPMENT:**

EYE WASH AND QUICK-DRENCH SHOWER FACILITIES SHOULD BE AVAILABLE IN THE WORK AREA, THOROUGHLY CLEAN SHOES AND WASH CONTAMINATED CLOTHING BEFORE REUSE.

SUGGESTIONS PROVIDED IN THIS SECTION FOR EXPOSURE CONTROL AND SPECIFIC TYPES OF PROTECTIVE EQUIPMENT ARE BASED ON READILY AVAILABLE INFORMATION. USERS SHOULD CONSULT WITH THE SPECIFIC MANUFACTURER TO CONFIRM THE PERFORMANCE OF THEIR PROTECTIVE EQUIPMENT. SPECIFIC SITUATIONS MAY REQUIRE CONSULTATION WITH INDUSTRIAL HYGIENE, SAFETY, OR ENGINEERING PROFESSIONALS.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**NOTE:**

UNLESS OTHERWISE STATED, VALUES ARE DETERMINED AT 20 DEG. C (68 DEG. F) AND 760 MM Hg (1 ATM). DATA REPRESENT TYPICAL VALUES AND ARE NOT INTENDED TO BE SPECIFICATIONS.

APPEARANCE: BRIGHT YELLOW

PHYSICAL FORM: SOLID

ODOR: ROTTEN EGG / SULFUROUS

ODOR THRESHOLD: NO DATA

pH: NOT APPLICABLE

VAPOR PRESSURE: 1 MM Hg @ 363 DEG. F / 184 DEG. C

VAPOR DENSITY (AIR=1): >1

BOILING POINT/RANGE: 832 DEG. F / 444 DEG. C

MELTING/FREEZING POINT: 246 DEG. F / 119 DEG. C

SOLUBILITY IN WATER: INSOLUBLE

PARTITION COEFFICIENT (n-OCTANOL/WATER) (KOW): NO DATA

SPECIFIC GRAVITY: 1.80 @ 68 DEG. F (20 DEG. C)

BULK DENSITY: 15 LBS/GAL

EVAPORATION RATE (nBuAc=1): NO DATA

FLASH POINT: 405 DEG. F / 207 DEG. C

TEST METHOD: CLEVELAND OPEN CUP (COC), ASTM D92

LEL (VOL % IN AIR): 35 G/M3

UEL (VOL % IN AIR): 1400 G/M3

AUTOIGNITION TEMPERATURE: 450 DEG. F / 232 DEG. C

BURN RATE: NO DATA

---

## 10. STABILITY AND REACTIVITY

STABILITY: STABLE UNDER NORMAL AMBIENT AND ANTICIPATED CONDITIONS OF USE.

CONDITIONS TO AVOID:

AVOID ALL POSSIBLE SOURCES OF IGNITION. AVOID HIGH LEVELS OF AIRBORNE DUST, AVOID HEATING ABOVE FLASHPOINT.

MATERIALS TO AVOID (INCOMPATIBLE MATERIALS):

ELEMENTAL SULFUR CAN REACT WITH METALS SUCH AS SODIUM, CALCIUM, TIN, NICKEL, OR ZINC UNDER CERTAIN CONDITIONS. AVOID CONTACT WITH STRONG OXIDIZING AGENTS SUCH AS ACIDS, CHLORINE, DICHROMATES, OR PERMANGANATES.

HAZARDOUS DECOMPOSITION PRODUCTS:

NOT ANTICIPATED UNDER NORMAL CONDITIONS OF USE.

HAZARDOUS POLYMERIZATION: NOT KNOWN TO OCCUR.

---

## 11. TOXICOLOGICAL INFORMATION

ACUTE DATA:

| COMPONENT        | ORAL LD50      | DERMAL LD50    | INHALATION LC50                  |
|------------------|----------------|----------------|----------------------------------|
| SULFUR           | >8.4 G/KG      | >2 G/KG        | >9 MG/L                          |
| HYDROGEN SULFIDE | NOT APPLICABLE | NOT APPLICABLE | LC50 (RAT):<br>1500 MG/M3/15 MIN |

## 12. ECOLOGICAL INFORMATION

### ECOLOGICAL INFORMATION:

SULFUR IS NOT CLASSIFIED AS AN ENVIRONMENTAL HAZARD. IN SIX STUDIES ON ECOLOGICAL EFFECTS (INVOLVING BOBWHITE QUAIL, TWO FISH SPECIES, DAPHNIA, MYSID SHRIMP AND HONEY BEES), SULFUR HAS BEEN SHOWN TO BE PRACTICALLY NON-TOXIC TO THE SPECIES TESTED. WHILE THERE IS POTENTIAL FOR NON-TARGET ORGANISMS TO BE EXPOSED TO SULFUR, LITTLE HAZARD TO THESE SPECIES IS EXPECTED TO RESULT.

---

## 13. DISPOSAL CONSIDERATIONS

THE GENERATOR OF A WASTE IS ALWAYS RESPONSIBLE FOR MAKING PROPER HAZARDOUS WASTE DETERMINATIONS AND NEEDS TO CONSIDER STATE AND LOCAL REQUIREMENTS IN ADDITION TO FEDERAL REGULATIONS.

THIS MATERIAL, IF DISCARDED AS PRODUCED, WOULD NOT BE A FEDERALLY REGULATED RCRA "LISTED" HAZARDOUS WASTE AND IS NOT BELIEVED TO EXHIBIT CHARACTERISTICS OF HAZARDOUS WASTE. SEE SECTIONS 7 AND 8 FOR INFORMATION ON HANDLING, STORAGE AND PERSONAL PROTECTION AND SECTION 9 FOR PHYSICAL/CHEMICAL PROPERTIES. IT IS POSSIBLE THAT THE MATERIAL AS PRODUCED CONTAINS CONSTITUENTS WHICH ARE NOT REQUIRED TO BE LISTED IN THE MSDS BUT COULD AFFECT THE HAZARDOUS WASTE DETERMINATION. ADDITIONALLY, USE WHICH RESULTS IN CHEMICAL OR PHYSICAL CHANGE OF THIS MATERIAL COULD SUBJECT IT TO REGULATION AS A HAZARDOUS WASTE.

CONTAINER CONTENTS SHOULD BE COMPLETELY USED AND CONTAINERS SHOULD BE EMPTIED PRIOR TO DISCARD.

---

## 14. TRANSPORTATION INFORMATION

### U.S. DEPARTMENT OF TRANSPORTATION (DOT):

SHIPPING DESCRIPTION: SULFUR, 9, NA1350, III

NON-BULK PACKAGE MARKING: NOT REGULATED

NON-BULK PACKAGE LABELING: NOT REGULATED

BULK PACKAGE/PLACARD MARKING: NONE / 1350 OR CLASS 9 / 1350

### PACKAGING - REFERENCES:

NONE; NONE; 49 CFR 173.240 (EXCEPTIONS; NON-BULK; BULK)

HAZARDOUS SUBSTANCE: SEE SECTION 15 FOR RQ'S

EMERGENCY RESPONSE GUIDE: 133

### NOTE:

SOLID SULFUR IS NOT REGULATED IF TRANSPORTED IN NON-BULK PACKAGING OR IF FORMED TO A SPECIFIC SHAPE, SUCH AS PRILLS, GRANULES, PELLETS, PASTILLES, OR FLAKES. (49 CFR 172.102, SPECIAL PROVISION 30)

SHIPPING DESCRIPTION MAY BE MODIFIED BY PLACING THE UN OR NA NUMBER AS THE FIRST ELEMENT. THIS ORDER BECOMES MANDATORY ON JANUARY 1, 2013.

ALTERNATIVE SHIPPING DESCRIPTION MAY BE: SULFUR, 4.1, UN1350, III

### INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG):

SHIPPING DESCRIPTION: UN1350, SULPHUR, 4.1, III

NON-BULK PACKAGE MARKING: SULPHUR, UN1350

LABELS: FLAMMABLE SOLID

PLACARDS/MARKING (BULK): FLAMMABLE SOLID / 1350

PACKAGING - NON-BULK: P002, LP02  
EMS: F-A, S-G

NOTE:

SOLID SULPHUR IS NOT SUBJECT TO THE IMDG CODE WHEN FORMED TO A SPECIFIC SHAPE SUCH AS PRILLS, GRANULES, PELLETS, PASTILLES OR FLAKES.  
(IMDG 3.3.1 242)

INTERNATIONAL CIVIL AVIATION ORG. / INTERNATIONAL AIR TRANSPORT ASSOC.  
(ICAO/IATA):

UN/ID #: UN1350  
PROPER SHIPPING NAME: SULPHUR  
HAZARD CLASS/DIVISION: 4.1  
SUBSIDIARY RISK: NONE  
PACKING GROUP: III  
NON-BULK PACKAGE MARKING: SULPHUR, UN1350  
LABELS: FLAMMABLE SOLID  
ERG CODE: 3L

NOTE:

SOLID SULPHUR IS NOT REGULATED WHEN IT HAS BEEN FORMED TO A SPECIFIC SHAPE, E.G. PRILLS, GRANULES, PELLETS, PASTILLES OR FLAKES. (IATA DGR 4.4 A105)

|                           | LTD. QTY | PASSENGER AIRCRAFT | CARGO AIRCRAFT ONLY |
|---------------------------|----------|--------------------|---------------------|
| PACKAGING INSTRUCTION #   | Y419     | 419                | 420                 |
| MAX. NET QTY. PER PACKAGE | 10 KG    | 20 KG              | 100 KG              |

## 15. REGULATORY INFORMATION

CERCLA/SARA - SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES AND TPQS  
(IN POUNDS):

THIS MATERIAL CONTAINS THE FOLLOWING CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA 302 AND 40 CFR 372:

| COMPONENT        | TPQ    | EPCRA RQ |
|------------------|--------|----------|
| HYDROGEN SULFIDE | 500 LB | 100 LB   |

CERCLA/SARA - SECTION 311/312 (TITLE III HAZARD CATEGORIES):

ACUTE HEALTH: YES  
CHRONIC HEALTH: NO  
FIRE HAZARD: NO  
PRESSURE HAZARD: NO  
REACTIVE HAZARD: NO

CERCLA/SARA - SECTION 313 AND 40 CFR 372:

THIS MATERIAL DOES NOT CONTAIN ANY CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA 313 AND 40 CFR 372.

EPA (CERCLA) REPORTABLE QUANTITY (IN POUNDS):

THIS MATERIAL CONTAINS THE FOLLOWING CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF 40 CFR 302, 4:

| COMPONENT        | RQ     |
|------------------|--------|
| HYDROGEN SULFIDE | 100 LB |

CALIFORNIA PROPOSITION 65:

THIS MATERIAL DOES NOT CONTAIN ANY CHEMICALS WHICH ARE KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM AT CONCENTRATIONS THAT TRIGGER THE WARNING REQUIREMENTS OF CALIFORNIA PROPOSITION 65.

CANADIAN REGULATIONS:

THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CONTROLLED PRODUCTS REGULATIONS (CPR) AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE REGULATIONS.

WHMIS HAZARD CLASS: B4 - FLAMMABLE SOLIDS

NATIONAL CHEMICAL INVENTORIES:

ALL COMPONENTS ARE EITHER LISTED ON THE US TSCA INVENTORY, OR ARE NOT REGULATED UNDER TSCA.

ALL COMPONENTS ARE EITHER ON THE DSL, OR ARE EXEMPT FROM DSL LISTING REQUIREMENTS.

U.S. EXPORT CONTROL CLASSIFICATION NUMBER: EAR99

---

## 16. OTHER INFORMATION

DATE OF ISSUE: 09-OCT-2008

STATUS: FINAL

PREVIOUS ISSUE DATE: 02-NOV-2005

REVISED SECTIONS OR BASIS FOR REVISION:

FORMAT CHANGE

PERIODIC REVIEW AND UPDATE

MSDS NUMBER: 002074

GUIDE TO ABBREVIATIONS:

ACGIH = AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

CASRN = CHEMICAL ABSTRACTS SERVICE REGISTRY NUMBER

CEILING = CEILING LIMIT (15 MINUTES)

CERCLA = THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT

EPA = ENVIRONMENTAL PROTECTION AGENCY

IARC = INTERNATIONAL AGENCY FOR RESEARCH ON CANCER

LEL = LOWER EXPLOSIVE LIMIT

NE = NOT ESTABLISHED

NFPA = NATIONAL FIRE PROTECTION ASSOCIATION

NTP = NATIONAL TOXICOLOGY PROGRAM

OSHA = OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

PEL = PERMISSIBLE EXPOSURE LIMIT (OSHA)

SARA = SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT



STEL = SHORT TERM EXPOSURE LIMIT (15 MINUTES)

TLV = THRESHOLD LIMIT VALUE (ACGIH)

TWA = TIME WEIGHTED AVERAGE (8 HOURS)

OEL = UPPER EXPLOSIVE LIMIT

WHMIS = WORKER HAZARDOUS MATERIALS INFORMATION SYSTEM (CANADA)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

THE INFORMATION PRESENTED IN THIS MATERIAL SAFETY DATA SHEET IS BASED ON DATA BELIEVED TO BE ACCURATE AS OF THE DATE THIS MATERIAL SAFETY DATA SHEET WAS PREPARED. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. NO RESPONSIBILITY IS ASSUMED FOR ANY DAMAGE OR INJURY RESULTING FROM ABNORMAL USE OR FROM ANY FAILURE TO ADHERE TO RECOMMENDED PRACTICES. THE INFORMATION PROVIDED ABOVE, AND THE PRODUCT, ARE FURNISHED ON THE CONDITION THAT THE PERSON RECEIVING THEM SHALL MAKE THEIR OWN DETERMINATION AS TO THE SUITABILITY OF THE PRODUCT FOR THEIR PARTICULAR PURPOSE AND ON THE CONDITION THAT THEY ASSUME THE RISK OF THEIR USE. IN ADDITION, NO AUTHORIZATION IS GIVEN NOR IMPLIED TO PRACTICE ANY PATENTED INVENTION WITHOUT A LICENSE.

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**MSDS: ZINC OXIDE**



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Global View Station

BARTOW

**MALLINCKRODT BAKER  
ZINC OXIDE**

File Name: 038033

Revision Date: 8/20/2008

Internal ID: 11135

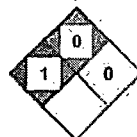
Internal ID:

Format: No Format Specified

This sheet superseded another on 1/16/2009

**Additional Details****MSDS Contents**

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2. COMPOSITION/INFORMATION ON INGREDIENTS
3. HAZARDS IDENTIFICATION
4. FIRST AID MEASURES
5. FIRE FIGHTING MEASURES
6. ACCIDENTAL RELEASE MEASURES
7. HANDLING AND STORAGE
8. EXPOSURE CONTROLS/PERSONAL PROTECTION
9. PHYSICAL AND CHEMICAL PROPERTIES
10. STABILITY AND REACTIVITY
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16. OTHER INFORMATION

**NFPA****HMIS**

Health  
Flammability  
Reactivity  
PPE

**HMIS III**

Health  
Flammability  
Physical Hazard  
PPE

More...

- ☒ Primary Information
- ☒ Ingredients (1)
- ☒ Locations (1)
- ☒ Attachments
- ☒ Synonyms
- ☒ Requests And Approvals

- ☒ Hazards
- ☒ User-Defined
- ☒ Exposure Limits
- ☒ Sites (1)
- ☒ Parts



Print MSDS



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Service History

MSDS NUMBER: Z3705

EFFECTIVE DATE: 08/20/08

SUPERCEDES: 12/05/05

MSDS

MATERIAL SAFETY DATA SHEET

MALLINCKRODT CHEMICALS

J.T. BAKER(R\*)

FROM:

MALLINCKRODT BAKER, INC.  
222 RED SCHOOL LANE  
PHILLIPSBURG, NJ 08865

24 HOUR EMERGENCY TELEPHONE: 908-859-2151  
CHEMTREC: 1-800-424-9300

NATIONAL RESPONSE IN CANADA:  
CANUTEC: 613-996-6666

OUTSIDE U.S. AND CANADA:

CHEMTREC: 703-527-3887

NOTE:

CHEMTREC, CANUTEC AND NATIONAL RESPONSE CENTER EMERGENCY NUMBERS 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 (1-800-582-2537) FOR ASSISTANCE.

ZINC OXIDE

---

## 1. PRODUCT IDENTIFICATION

SYNONYMS: CHINESE WHITE; ZINC WHITE; FLOWERS OF ZINC; CALAMINE

CAS NO.: 1314-13-2

MOLECULAR WEIGHT: 81.38

CHEMICAL FORMULA: ZnO

PRODUCT CODES:

J.T. BAKER: 4358, 4360, 5070

MALLINCKRODT: 3419, 7030, 8824, 8825, 8832, 8843

---

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

| INGREDIENT | CAS NO    | PERCENT   | HAZARDOUS |
|------------|-----------|-----------|-----------|
| ZINC OXIDE | 1314-13-2 | 99 - 100% | YES       |

---

## 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

CAUTION!

MAY IRRITATE RESPIRATORY TRACT.

SAF-T-DATA(TM) RATINGS (PROVIDED HERE FOR YOUR CONVENIENCE):

HEALTH RATING 2 - MODERATE

FLAMMABILITY RATING 1 - SLIGHT

REACTIVITY RATING 0 - NONE

CONTACT RATING 1 - SLIGHT

LAB PROTECTIVE EQUIP: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

STORAGE COLOR CODE: GREEN (GENERAL STORAGE)

POTENTIAL HEALTH EFFECTS:

INHALATION:

MAY CAUSE IRRITATION TO THE RESPIRATORY TRACT. SYMPTOMS MAY INCLUDE COUGHING

AND SHORTNESS OF BREATH. INHALATION CAN CAUSE A FLU-LIKE ILLNESS (METAL FUME FEVER). THIS 24 - TO 48-HOUR ILLNESS IS CHARACTERIZED BY CHILLS, FEVER, ACHING MUSCLES, DRYNESS IN THE MOUTH AND THROAT AND HEADACHE.

INGESTION:

LARGE ORAL DOSES MAY CAUSE IRRITATION TO THE GASTROINTESTINAL TRACT.

SKIN CONTACT: NOT EXPECTED TO BE A HEALTH HAZARD FROM SKIN EXPOSURE.

EYE CONTACT: NOT EXPECTED TO BE A HEALTH HAZARD.

CHRONIC EXPOSURE: NO INFORMATION FOUND.

AGGRAVATION OF PRE-EXISTING CONDITIONS:

PERSONS WITH A PRE-EXISTING HEART CONDITION OR IMPAIRED RESPIRATORY FUNCTION MAY BE MORE SUSCEPTIBLE TO THE EFFECTS OF THIS SUBSTANCE.

---

#### 4. FIRST AID MEASURES

INHALATION:

REMOVE TO FRESH AIR. GET MEDICAL ATTENTION FOR ANY BREATHING DIFFICULTY.

INGESTION:

NOT EXPECTED TO REQUIRE FIRST AID MEASURES. IF LARGE AMOUNTS WERE SWALLOWED, GIVE WATER TO DRINK AND GET MEDICAL ADVICE.

SKIN CONTACT:

NOT EXPECTED TO REQUIRE FIRST AID MEASURES. WASH EXPOSED AREA WITH SOAP AND WATER. GET MEDICAL ADVICE IF IRRITATION DEVELOPS.

EYE CONTACT:

NOT EXPECTED TO REQUIRE FIRST AID MEASURES. WASH THOROUGHLY WITH RUNNING WATER. GET MEDICAL ADVICE IF IRRITATION DEVELOPS.

---

#### 5. FIRE FIGHTING MEASURES

FIRE: NOT CONSIDERED TO BE A FIRE HAZARD.

EXPLOSION: FINELY DIVIDED POWDER PRESENTS AN EXPLOSION HAZARD.

FIRE EXTINGUISHING MEDIA:

USE ANY MEANS SUITABLE FOR EXTINGUISHING SURROUNDING FIRE.

SPECIAL INFORMATION:

IN THE EVENT OF A FIRE, WEAR FULL PROTECTIVE CLOTHING AND NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN THE PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE. ZINC OXIDE FUME MAY BE RELEASED WHEN HEATED.

---

#### 6. ACCIDENTAL RELEASE MEASURES

CLEAN-UP PERSONNEL REQUIRE PROTECTIVE CLOTHING AND RESPIRATORY PROTECTION FROM DUST. VENTILATE AREA OF LEAK OR SPILL. WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AS SPECIFIED IN SECTION 8.

**SPILLS:**

SWEEP UP AND CONTAINERIZE FOR RECLAMATION OR DISPOSAL. VACUUMING OR WET SWEEPING MAY BE USED TO AVOID DUST DISPERSAL.

---

**7. HANDLING AND STORAGE**

KEEP IN A TIGHTLY CLOSED CONTAINER, STORED IN A COOL, DRY, VENTILATED AREA. PROTECT AGAINST PHYSICAL DAMAGE. ISOLATE FROM INCOMPATIBLE SUBSTANCES. CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTY SINCE THEY RETAIN PRODUCT RESIDUES (DUST, SOLIDS); OBSERVE ALL WARNINGS AND PRECAUTIONS LISTED FOR THE PRODUCT.

---

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****AIRBORNE EXPOSURE LIMITS:****ZINC OXIDE:**

OSHA PERMISSIBLE EXPOSURE LIMIT (PEL):  
FUME: 5 MG/M3 (TWA)

RESPIRABLE FRACTION: 5 MG/M3 (TWA)

TOTAL DUSTS: 15 MG/M3 (TWA)

ACGIH THRESHOLD LIMIT VALUE (TLV):  
2 MG/M3 (TWA)  
10 MG/M3 (STEL).  
RESPIRABLE FRACTION

**VENTILATION SYSTEM:**

A SYSTEM OF LOCAL AND/OR GENERAL EXHAUST IS RECOMMENDED TO KEEP EMPLOYEE EXPOSURES BELOW THE AIRBORNE EXPOSURE LIMITS. LOCAL EXHAUST VENTILATION IS GENERALLY PREFERRED BECAUSE IT CAN CONTROL THE EMISSIONS OF THE CONTAMINANT AT ITS SOURCE, PREVENTING DISPERSION OF IT INTO THE GENERAL WORK AREA. PLEASE REFER TO THE ACGIH DOCUMENT, INDUSTRIAL VENTILATION. A MANUAL OF RECOMMENDED PRACTICES, MOST RECENT EDITION, FOR DETAILS.

**PERSONAL RESPIRATORS (NIOSH APPROVED):**

IF THE EXPOSURE LIMIT IS EXCEEDED, A HALF-FACE DUST/MIST RESPIRATOR MAY BE WORN FOR UP TO TEN TIMES THE EXPOSURE LIMIT OR THE MAXIMUM USE CONCENTRATION SPECIFIED BY THE APPROPRIATE REGULATORY AGENCY OR RESPIRATOR SUPPLIER, WHICHEVER IS LOWEST. A FULL-FACE PIECE DUST/MIST RESPIRATOR MAY BE WORN UP TO 50 TIMES THE EXPOSURE LIMIT, OR THE MAXIMUM USE CONCENTRATION SPECIFIED BY THE APPROPRIATE REGULATORY AGENCY, OR RESPIRATOR SUPPLIER, WHICHEVER IS LOWEST. FOR EMERGENCIES OR INSTANCES WHERE THE EXPOSURE LEVELS ARE NOT KNOWN, USE A FULL-FACEPIECE POSITIVE-PRESSURE, AIR-SUPPLIED RESPIRATOR.

**WARNING:**

AIR-PURIFYING RESPIRATORS DO NOT PROTECT WORKERS IN OXYGEN-DEFICIENT ATMOSPHERES.

SKIN PROTECTION: WEAR PROTECTIVE GLOVES AND CLEAN BODY-COVERING CLOTHING.

**EYE PROTECTION:**

USE CHEMICAL SAFETY GOGGLES. MAINTAIN EYE WASH FOUNTAIN AND QUICK-DRENCH FACILITIES IN WORK AREA.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: WHITE TO YELLOWISH-WHITE AMORPHOUS POWDER.

ODOR: ODORLESS.

SOLUBILITY: INSOLUBLE IN WATER, ALCOHOL; SOLUBLE IN DILUTE ACIDS.

SPECIFIC GRAVITY: 5.67

pH: NO INFORMATION FOUND.

% VOLATILES BY VOLUME @ 21C (70F): 0

BOILING POINT: SUBLIMES.

MELTING POINT: 1975C (3587F)

VAPOR DENSITY (AIR=1): NO INFORMATION FOUND.

VAPOR PRESSURE (MMHg): NO INFORMATION FOUND.

EVAPORATION RATE (BuAc=1): NO INFORMATION FOUND.

---

## 10. STABILITY AND REACTIVITY

### STABILITY:

STABLE UNDER ORDINARY CONDITIONS OF USE AND STORAGE. ABSORBS CARBON DIOXIDE FROM AIR.

### HAZARDOUS DECOMPOSITION PRODUCTS:

WHEN HEATED TO VERY HIGH TEMPERATURES, ZINC OXIDE SUBLIMES TO PRODUCE TOXIC FUMES.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

### INCOMPATIBILITIES:

HAS EXPLODED WHEN MIXED WITH CHLORINATED RUBBER. REACTS VIOLENTLY WITH MAGNESIUM, LINSEED OIL. ZINC OXIDE AND MAGNESIUM CAN REACT EXPLOSIVELY WHEN HEATED.

CONDITIONS TO AVOID: HEAT, INCOMPATIBLES.

---

## 11. TOXICOLOGICAL INFORMATION

INVESTIGATED AS A MUTAGEN, REPRODUCTIVE EFFECTOR.

### CANCER LISTS:

| INGREDIENT             | NTP CARCINOGEN |             | IARC CATEGORY |
|------------------------|----------------|-------------|---------------|
|                        | KNOWN          | ANTICIPATED |               |
| ZINC OXIDE (1314-13-2) | NO             | NO          | NONE          |

**12. ECOLOGICAL INFORMATION**

ENVIRONMENTAL FATE: NO INFORMATION FOUND.

ENVIRONMENTAL TOXICITY: NO INFORMATION FOUND.

**13. DISPOSAL CONSIDERATIONS**

WHATEVER CANNOT BE SAVED FOR RECOVERY OR RECYCLING SHOULD BE MANAGED IN AN APPROPRIATE AND APPROVED WASTE DISPOSAL FACILITY. PROCESSING, USE OR CONTAMINATION OF THIS PRODUCT MAY CHANGE THE WASTE MANAGEMENT OPTIONS. STATE AND LOCAL DISPOSAL REGULATIONS MAY DIFFER FROM FEDERAL DISPOSAL REGULATIONS. DISPOSE OF CONTAINER AND UNUSED CONTENTS IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REQUIREMENTS.

**14. TRANSPORT INFORMATION**

NOT REGULATED.

**15. REGULATORY INFORMATION**

## CHEMICAL INVENTORY STATUS - PART 1:

| INGREDIENT             | TSCA | EC  | JAPAN | AUSTRALIA |
|------------------------|------|-----|-------|-----------|
| ZINC OXIDE (1314-13-2) | YES  | YES | YES   | YES       |

## CHEMICAL INVENTORY STATUS - PART 2:

| INGREDIENT             | KOREA | CANADA<br>DSL | NDSL | PHIL. |
|------------------------|-------|---------------|------|-------|
| ZINC OXIDE (1314-13-2) | YES   | YES           | NO   | YES   |

## FEDERAL, STATE &amp; INTERNATIONAL REGULATIONS - PART 1:

| INGREDIENT             | SARA 302<br>RQ | TPQ | LIST | SARA 313<br>CHEMICAL CATG. |
|------------------------|----------------|-----|------|----------------------------|
| ZINC OXIDE (1314-13-2) | NO             | NO  | NO   | ZINC COMPOUND              |

## FEDERAL, STATE &amp; INTERNATIONAL REGULATIONS - PART 2:

| INGREDIENT             | CERCLA | RCRA<br>261.33 | TSCA<br>8(D) |
|------------------------|--------|----------------|--------------|
| ZINC OXIDE (1314-13-2) | NO     | NO             | NO           |

CHEMICAL WEAPONS CONVENTION: NO

TSCA 12(B): NO

CDTA: NO

SARA 311/312:



ACUTE: YES  
CHRONIC: NO  
FIRE: NO  
PRESSURE: NO  
REACTIVITY: NO (PURE / SOLID)

AUSTRALIAN HAZCHEM CODE: NONE ALLOCATED.

POISON SCHEDULE: NONE ALLOCATED.

WHMIS:

THIS MSDS HAS BEEN PREPARED ACCORDING TO THE HAZARD CRITERIA OF THE CONTROLLED PRODUCTS REGULATIONS (CPR) AND THE MSDS CONTAINS ALL OF THE INFORMATION REQUIRED BY THE CPR.

---

## 16. OTHER INFORMATION

NFPA RATINGS:

HEALTH 1  
FLAMMABILITY 0  
REACTIVITY 0

LABEL HAZARD WARNING:

CAUTION!

MAY IRRITATE RESPIRATORY TRACT.

LABEL PRECAUTIONS:

AVOID BREATHING DUST.  
KEEP CONTAINER CLOSED.  
USE WITH ADEQUATE VENTILATION.

LABEL FIRST AID:

IF INHALED, REMOVE TO FRESH AIR. GET MEDICAL ATTENTION FOR ANY BREATHING DIFFICULTY.

PRODUCT USE: LABORATORY REAGENT.

REVISION INFORMATION: NO CHANGES.

DISCLAIMER:

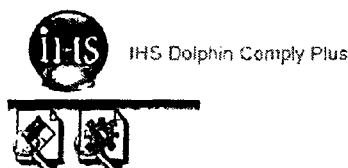
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PREPARED BY: ENVIRONMENTAL HEALTH & SAFETY

PHONE NUMBER: (314) 654-1600 (U.S.A.)

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**MSDS: CUPRIC OXIDE**



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Global View Station  
RIVERVIEW



ADCHEM AUSTRALIA  
CUPRIC OXIDE

File Name: 036573

Revision Date: 9/1/2006

Internal ID: 03153

Internal ID:

Format: No Format Specified

This sheet superseded another on 1/23/2009

#### Additional Details

#### MSDS Contents

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2. HAZARDS IDENTIFICATION
3. COMPOSITION/INFORMATION ON INGREDIENTS
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#### NFPA



#### HMIS

Health  
Flammability  
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Health  
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Service History

MATERIAL SAFETY DATA SHEET

INFOSAFE NO.: LPVSL

ISSUE DATE: SEPTEMBER 2006

ISSUED BY: ADCHEM

PRODUCT NAME: CUPRIC OXIDE

## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

PRODUCT NAME: CUPRIC OXIDE

COMPANY NAME: ADCHEM (AUSTRALIA) PTY LTD

ADDRESS:  
PO BOX 103  
LINKSON STREET  
BURRA S.A 5417

## AUSTRALIA

## TELEPHONE/FAX NUMBER:

TEL: 61 8 8892 2200

FAX: 61 8 8892 2008

## RECOMMENDED USE:

PIGMENT OR CERAMIC COLORANT, FORMULATION OF TIMBER PRESERVATIVES, CATALYST OR CATALYST MANUFACTURE, TRACE MINERAL SOURCE IN ANIMAL FEED AND FERTILIZER, MANUFACTURE OF FRICTION MATERIALS, FOR FERRITES IN ELECTRONICS, COATING OF STEEL CORD AND MANUFACTURE OF OTHER COPPER COMPOUNDS.

## OTHER NAMES:

## NAME:

BLACK COPPER OXIDE

COPPER (II) OXIDE

## PRODUCT CODE:

---

## 2. HAZARDS IDENTIFICATION

## HAZARD CLASSIFICATION:

HAZARDOUS SUBSTANCE.

NON-DANGEROUS GOODS.

HAZARD CLASSIFICATION ACCORDING TO THE CRITERIA OF NOHSC.

DANGEROUS GOODS CLASSIFICATION ACCORDING TO THE AUSTRALIA DANGEROUS GOODS CODE.

## RISK PHRASE(S):

R22: HARMFUL IF SWALLOWED.

---

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

## INGREDIENTS:

| NAME                   | CAS       | PROPORTION |
|------------------------|-----------|------------|
| COPPER OXIDE           | 1317-38-0 | >97 %      |
| INGREDIENTS DETERMINED |           | BALANCE    |
| NOT TO BE HAZARDOUS    |           |            |

---

## 4. FIRST AID MEASURES

## INHALATION:

IF INHALED, REMOVE FROM CONTAMINATED AREA. APPLY ARTIFICIAL RESPIRATION IF NOT BREATHING. IF SYMPTOMS DEVELOP SEEK MEDICAL ATTENTION.

## INGESTION:

DO NOT INDUCE VOMITING. IMMEDIATELY WASH OUT MOUTH WITH WATER. SEEK MEDICAL

ATTENTION.

SKIN:

WASH AFFECTED AREA THOROUGHLY WITH SOAP AND WATER. IF SYMPTOMS DEVELOP SEEK MEDICAL ATTENTION.

EYE:

IF CONTACT WITH THE EYE(S) OCCUR, WASH WITH COPIOUS AMOUNTS OF WATER, HOLDING EYELID(S) OPEN. TAKE CARE NOT TO RINSE CONTAMINATED WATER INTO THE NON-AFFECTED EYE. IF IRRITATION DEVELOPS AND PERSISTS, SEEK MEDICAL ATTENTION.

FIRST AID FACILITIES: NORMAL WASHROOM FACILITIES.

ADVICE TO DOCTOR: TREAT SYMPTOMATICALLY.

OTHER INFORMATION:

FOR ADVICE, CONTACT A POISONS INFORMATION CENTRE (PHONE EG AUSTRALIA 131 126).

---

## 5. FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA:

USE EXTINGUISHING MEDIA SUITABLE FOR SURROUNDING ENVIRONMENT

HAZARDS FROM COMBUSTION PRODUCTS: NON COMBUSTIBLE.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS:

FULL PROTECTIVE CLOTHING AND SELF-CONTAINED BREATHING APPARATUS.

HAZCHEM CODE: NONE ALLOCATED

---

## 6. ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES:

REMOVE ALL SOURCES OF HEAT. INCREASE VENTILATION. WEAR SUFFICIENT RESPIRATORY PROTECTION AND FULL PROTECTIVE CLOTHING TO MINIMIZE SKIN AND EYE EXPOSURE.

AVOID INHALATION. SWEEP/VACUUM UP MATERIAL AVOIDING DUST GENERATION OR DAMPEN SPILLED MATERIAL WITH WATER TO AVOID AIRBORNE DUST. SEAL ALL WASTES IN VAPOR TIGHT LABELED PLASTIC CONTAINERS FOR EVENTUAL DISPOSAL. DO NOT ALLOW PRODUCT TO ENTER DRAINS, WATERWAYS OR SEWERS. IF THIS MATERIAL ENTERS THE WATERWAYS CONTACT THE ENVIRONMENTAL PROTECTION AUTHORITY, OR YOUR LOCAL WASTE MANAGEMENT AUTHORITY.

---

## 7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING:

AVOID GENERATING DUST. USE SMALLEST POSSIBLE AMOUNTS IN DESIGNATED AREAS WITH ADEQUATE VENTILATION. HAVE EMERGENCY EQUIPMENT (FOR FIRES, SPILLS, LEAKS, ETC.) READILY AVAILABLE. LABEL CONTAINERS. KEEP CONTAINERS CLOSED WHEN NOT IN USE. WEAR APPROPRIATE PROTECTIVE EQUIPMENT TO PREVENT INHALATION, SKIN AND EYE CONTACT. ENSURE A HIGH LEVEL OF PERSONAL HYGIENE IS

MAINTAINED WHEN USING THIS PRODUCT. THAT IS; ALWAYS WASH HANDS BEFORE EATING, DRINKING, SMOKING OR USING THE TOILET.

**CONDITIONS FOR SAFE STORAGE:**

STORE IN A COOL, DRY, WELL-VENTILATED AREA, OUT OF DIRECT SUNLIGHT AND MOISTURE. STORE IN LABELED, CORROSION-RESISTANT CONTAINERS. KEEP CONTAINERS TIGHTLY CLOSED. STORE AWAY FROM BASES, WATER AND OTHER INCOMPATIBLE MATERIALS. HAVE APPROPRIATE FIRE EXTINGUISHERS AVAILABLE IN AND NEAR THE STORAGE AREA.

---

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**NATIONAL EXPOSURE STANDARDS:**

| NAME         | STEL  |     | TWA   |     | FOOTNOTE                           |
|--------------|-------|-----|-------|-----|------------------------------------|
|              | MG/M3 | PPM | MG/M3 | PPM |                                    |
| COPPER OXIDE |       |     | 1     |     | (COPPER, DUSTS<br>& MISTS (AS Cu)) |

BIOLOGICAL LIMIT VALUES: NO BIOLOGICAL LIMIT ALLOCATED.

**OTHER EXPOSURE INFORMATION:**

AS PUBLISHED BY THE NATIONAL OCCUPATIONAL HEALTH AND SAFETY COMMISSION (NOHSC):

TWA - THE TIME-WEIGHTED AVERAGE AIRBORNE CONCENTRATION OVER AN EIGHT-HOUR WORKING DAY, FOR A FIVE-DAY WORKING WEEK OVER AN ENTIRE WORKING LIFE. ACCORDING TO CURRENT KNOWLEDGE THESE CONCENTRATIONS SHOULD NEITHER IMPAIR THE HEALTH OF, NOR CAUSE UNDUE DISCOMFORT TO, NEARLY ALL WORKERS

**ENGINEERING CONTROLS:**

USE WITH GOOD GENERAL VENTILATION. IF DUSTS ARE PRODUCED LOCAL EXHAUST VENTILATION SHOULD BE USED.

**RESPIRATORY PROTECTION:**

WHERE SUFFICIENT VENTILATION IS NOT AVAILABLE, AVOID BREATHING DUST BY WEARING AN AS 1716 APPROVED P1 OR P2 PARTICULATE FILTER RESPIRATOR, FINAL CHOICE OF APPROPRIATE BREATHING PROTECTION IS DEPENDANT UPON ACTUAL AIRBORNE CONCENTRATIONS AND THE TYPE OF BREATHING PROTECTION REQUIRED WILL VARY ACCORDING TO INDIVIDUAL CIRCUMSTANCES. EXPERT ADVICE MAY BE REQUIRED TO MAKE THIS DECISION. REFERENCE SHOULD BE MADE TO AUSTRALIAN STANDARDS AS/NZS 1715, SELECTION, USE AND MAINTENANCE OF RESPIRATORY PROTECTIVE DEVICES; AND AS/NZS 1716, RESPIRATORY PROTECTIVE DEVICES.

**EYE PROTECTION:**

SAFETY GLASSES WITH SIDE SHIELDS, GOGGLES OR FULL-FACE SHIELD AS APPROPRIATE RECOMMENDED. FINAL CHOICE OF APPROPRIATE EYE/FACE PROTECTION WILL VARY ACCORDING TO INDIVIDUAL CIRCUMSTANCES I.E. METHODS OF HANDLING OR ENGINEERING CONTROLS AND ACCORDING TO RISK ASSESSMENTS UNDERTAKEN. EYE PROTECTION SHOULD CONFORM WITH AUSTRALIAN/NEW ZEALAND STANDARD AS/NZS 1337 - EYE PROTECTORS FOR INDUSTRIAL APPLICATIONS.

**HAND PROTECTION:**

WEAR GLOVES OF IMPERVIOUS MATERIAL SUCH AS PVC. FINAL CHOICE OF APPROPRIATE GLOVES WILL VARY ACCORDING TO INDIVIDUAL CIRCUMSTANCES I.E. METHODS OF HANDLING OR ACCORDING TO RISK ASSESSMENTS UNDERTAKEN.

REFERENCE SHOULD BE MADE TO AS/NZS 2161.1:

OCCUPATIONAL PROTECTIVE GLOVES - SELECTION, USE AND MAINTENANCE.

**BODY PROTECTION:**

WEAR APPROPRIATE CLOTHING INCLUDING CHEMICAL RESISTANT APRON WHERE CLOTHING IS LIKELY TO BE CONTAMINATED.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### APPEARANCE:

FINE BLACK TO BROWNISH AMORPHOUS POWDER OR BLACK CRYSTALLINE POWDER OR GRANULES.

ODOR: ODORLESS.

MELTING POINT: 1326 DEG. C

BOILING POINT: NOT AVAILABLE.

SOLUBILITY IN WATER: IMMISCIBLE.

SPECIFIC GRAVITY: 6.3 - 6.5 (WATER = 1)

pH VALUE: NOT APPLICABLE.

VAPOR PRESSURE: NEGLIGIBLE @ 25 DEG. C

VAPOR DENSITY (AIR=1): NOT APPLICABLE

FLASH POINT: NOT APPLICABLE.

FLAMMABILITY: NON FLAMMABLE.

FLAMMABLE LIMITS LOWER - NOT APPLICABLE.

FLAMMABLE LIMITS UPPER - NOT APPLICABLE.

---

## 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: STABLE UNDER NORMAL CONDITIONS.

CONDITIONS TO AVOID: AVOID EXTREMES OF TEMPERATURE AND DUSTY CONDITIONS.

INCOMPATIBLE MATERIALS: NOT AVAILABLE.

HAZARDOUS DECOMPOSITION PRODUCTS: NONE KNOWN.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

---

## 11. TOXICOLOGICAL INFORMATION

TOXICOLOGY INFORMATION: NO TOXICITY DATA AVAILABLE FOR THIS PRODUCT.

### INHALATION:

INHALATION OF PRODUCT DUSTS MAY CAUSE IRRITATION OF THE NOSE, THROAT AND RESPIRATORY SYSTEM.

### INGESTION:

HARMFUL IF SWALLOWED. INGESTION OF THIS PRODUCT WILL IRRITATE THE GASTRIC TRACT CAUSING NAUSEA AND VOMITING.

SKIN:



SKIN CONTACT MAY CAUSE MECHANICAL IRRITATION RESULTING IN REDNESS AND ITCHING

EYE: EYE CONTACT MAY CAUSE MECHANICAL IRRITATION.

CHRONIC EFFECTS: NOT AVAILABLE.

---

## 12. ECOLOGICAL INFORMATION

ECOTOXICITY: NO ECOLOGICAL DATA AVAILABLE FOR THIS PRODUCT.

PERSISTENCE/DEGRADABILITY: NOT AVAILABLE.

MOBILITY: NOT AVAILABLE.

ENVIRON, PROTECTION: AVOID CONTAMINATING WATERWAYS.

---

## 13. DISPOSAL CONSIDERATIONS

DISPOSAL CONSIDERATIONS:

DISPOSE OF WASTE ACCORDING TO FEDERAL, EPA AND STATE REGULATIONS.

---

## 14. TRANSPORT INFORMATION

TRANSPORT INFORMATION:

NOT CLASSIFIED AS DANGEROUS GOODS, ACCORDING TO THE AUSTRALIAN CODE FOR THE TRANSPORT OF DANGEROUS GOODS BY ROAD AND RAIL.

U.N. NUMBER: NONE ALLOCATED

PROPER SHIPPING NAME: NONE ALLOCATED

DG CLASS: NONE ALLOCATED

HAZCHEM CODE: NONE ALLOCATED

PACKING GROUP: NONE ALLOCATED

---

## 15. REGULATORY INFORMATION

POISONS SCHEDULE: S6

HAZARD CATEGORY: HARMFUL

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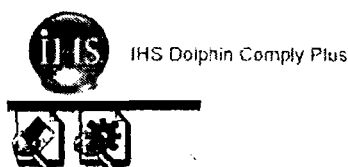
## 16. OTHER INFORMATION

DATE OF PREPARATION OR LAST REVISION OF MSDS:

MSDS CREATED: SEPTEMBER 2006

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**MSDS: BORAX**



**U.S. BORAX  
DEHYBOR**



**Comply Plus® Webv2.9.5**  
Global View Station  
**BARTOW**



File Name: **038686**

Revision Date: **12/1/2006**

Internal ID: **11424**

Internal ID:

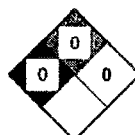
Format: **No Format Specified**

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#### NFPA



#### HMIS

Health  
Flammability  
Reactivity  
PPE

#### HMIS III

1\* Health  
0 Flammability  
0 Physical Hazard  
PPE

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#### Additional MSDS Files

038686.pdf - Adobe Acrobat™ Document



Print MSDS



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Service History

20 MULE TEAM (R\*)

DEHYBOR (R\*)  
ANHYDROUS BORAX

MATERIAL SAFETY DATA SHEET

DATE OF ISSUE: DECEMBER 2006

SUPERSEDES: MAY 2000

VERSION:

## 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: DEHYBOR

GRADE: TECHNICAL

PRODUCT USE: INDUSTRIAL MANUFACTURING

CHEMICAL FORMULA: Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>

CHEMICAL NAME/SYNONYMS:

SODIUM TETRABORATE, DISODIUM TETRABORATE, ANHYDROUS BORAX

CHEMICAL FAMILY: INORGANIC BORATES

CAS REGISTRY NUMBER: 1330-43-4

(REFER TO SECTION 15 FOR TSCA/DSL CHEMICAL INVENTORY LISTING)

MANUFACTURER:

U.S. BORAX INC.

26877 TOURNEY ROAD

VALENCIA, CA 91355-1847

EMERGENCY PHONE NUMBERS:

24 HR. MEDICAL INFO. SERVICE: (661) 284-5200

CHEMTREC (SPILLS): (800) 424-9300

---

## 2 COMPOSITION/INFORMATION ON INGREDIENTS

THIS PRODUCT CONTAINS GREATER THAN 99 PERCENT (%) SODIUM TETRABORATE, Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>, WHICH IS HAZARDOUS UNDER THE OSHA HAZARD COMMUNICATION STANDARD AND UNDER THE CANADIAN CONTROLLED PRODUCTS REGULATIONS OF THE HAZARDOUS PRODUCTS ACT (WHMIS), BASED ON ANIMAL CHRONIC TOXICITY STUDIES. REFER TO SECTIONS 3 AND 11 FOR DETAILS ON HAZARDS.

---

## 3 HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:

DEHYBOR IS A WHITE, ODORLESS, POWDER SUBSTANCE THAT IS NOT FLAMMABLE COMBUSTIBLE, OR EXPLOSIVE AND HAS LOW ACUTE ORAL AND DERMAL TOXICITY.

POTENTIAL ECOLOGICAL EFFECTS:

LARGE AMOUNTS OF DEHYBOR CAN BE HARMFUL TO PLANTS AND OTHER SPECIES. THEREFORE, RELEASES TO THE ENVIRONMENT SHOULD BE MINIMIZED.

POTENTIAL HEALTH EFFECTS:

ROUTES OF EXPOSURE:

INHALATION IS THE MOST SIGNIFICANT ROUTE OF EXPOSURE IN OCCUPATIONAL AND OTHER SETTINGS. DERMAL EXPOSURE IS NOT USUALLY A CONCERN BECAUSE DEHYBOR IS POORLY ABSORBED THROUGH INTACT SKIN.

INHALATION:

OCCASIONAL MILD IRRITATION EFFECTS TO THE NOSE AND THROAT MAY OCCUR FROM INHALATION OF DEHYBOR DUST AT LEVELS GREATER THAN 10 MG/M<sup>3</sup>.

EYE CONTACT:

DEHYBOR IS NON-IRRITATING TO THE EYES IN NORMAL INDUSTRIAL USE.

SKIN CONTACT: DEHYBOR DOES NOT CAUSE IRRITATION TO INTACT SKIN.

INGESTION:

PRODUCTS CONTAINING DEHYBOR ARE NOT INTENDED FOR INGESTION. DEHYBOR HAS A LOW ACUTE TOXICITY. SMALL AMOUNTS (E.G., A TEASPOON) SWALLOWED ACCIDENTALLY ARE NOT LIKELY TO CAUSE EFFECTS; SWALLOWING AMOUNTS LARGER THAN THAT MAY CAUSE GASTROINTESTINAL SYMPTOMS.

CANCER: DEHYBOR IS NOT A KNOWN CARCINOGEN.

REPRODUCTIVE/DEVELOPMENTAL:

ANIMAL INGESTION STUDIES IN SEVERAL SPECIES, AT HIGH DOSES, INDICATE THAT BORATES CAUSE REPRODUCTIVE AND DEVELOPMENTAL EFFECTS. A HUMAN STUDY OF OCCUPATIONAL EXPOSURE TO BORATE DUST SHOWED NO ADVERSE EFFECT ON REPRODUCTION.

TARGET ORGANS:

NO TARGET ORGAN HAS BEEN IDENTIFIED IN HUMANS. HIGH DOSE ANIMAL INGESTION STUDIES INDICATE THE TESTES ARE THE TARGET ORGANS IN MALE ANIMALS.

SIGNS AND SYMPTOMS OF EXPOSURE:

SYMPTOMS OF ACCIDENTAL OVER-EXPOSURE TO DEHYBOR MIGHT INCLUDE NAUSEA, VOMITING AND DIARRHEA, WITH DELAYED EFFECTS OF SKIN REDNESS AND PEELING. THESE SYMPTOMS HAVE BEEN ASSOCIATED WITH THE ACCIDENTAL OVER-EXPOSURE TO THE CHEMICALLY RELATED SUBSTANCE BORIC ACID. REFER TO SECTION 11 FOR DETAILS ON TOXICOLOGICAL DATA.

---

## 4 FIRST AID MEASURES

INHALATION:

IF SYMPTOMS SUCH AS NOSE OR THROAT IRRITATION ARE OBSERVED, REMOVE PERSON TO FRESH AIR.

EYE CONTACT:

USE EYE WASH FOUNTAIN OR FRESH WATER TO CLEANSE THE EYE. IF IRRITATION PERSISTS FOR MORE THAN 30 MINUTES, SEEK MEDICAL ATTENTION.

SKIN CONTACT: NO TREATMENT NECESSARY BECAUSE NON-IRRITATING.

INGESTION:

SWALLOWING SMALL QUANTITIES (ONE TEASPOON) WILL CAUSE NO HARM TO HEALTHY ADULTS. IF LARGER AMOUNTS ARE SWALLOWED, GIVE TWO GLASSES OF WATER TO DRINK AND SEEK MEDICAL ATTENTION.

NOTE TO PHYSICIANS:

OBSERVATION ONLY IS REQUIRED FOR ADULT INGESTION IN THE RANGE OF 4-8 GRAMS OF DEHYBOR. FOR INGESTION OF LARGER AMOUNTS, MAINTAIN ADEQUATE KIDNEY FUNCTION AND FORCE FLUIDS. GASTRIC LAVAGE IS RECOMMENDED FOR SYMPTOMATIC PATIENTS ONLY. HEMODIALYSIS SHOULD BE RESERVED FOR MASSIVE ACUTE INGESTION OR PATIENTS WITH RENAL FAILURE. BORON ANALYSES OF URINE OR BLOOD ARE ONLY USEFUL FOR DOCUMENTING EXPOSURE AND SHOULD NOT BE USED TO EVALUATE SEVERITY OF POISONING OR TO GUIDE TREATMENT(1). REFER TO SECTION 11 FOR DETAILS.

---

## 5 FIREFIGHTING MEASURES

GENERAL HAZARD:

NONE, BECAUSE DEHYBOR IS NOT FLAMMABLE, COMBUSTIBLE OR EXPLOSIVE. THE PRODUCT IS ITSELF A FLAME RETARDANT.

EXTINGUISHING MEDIA:

ANY FIRE EXTINGUISHING MEDIA MAY BE USED ON NEARBY FIRES.

FLAMMABILITY CLASSIFICATION (29 CFR 1910.1200): NON-FLAMMABLE SOLID.

---

## 6 ACCIDENTAL RELEASE MEASURES

### GENERAL:

DEHYBOR IS A WATER-SOLUBLE WHITE POWDER THAT MAY, AT HIGH CONCENTRATIONS, CAUSE DAMAGE TO TREES OR VEGETATION BY ROOT ABSORPTION. (REFER TO ECOLOGICAL INFORMATION, SECTION 12, FOR SPECIFIC INFORMATION.)

### LAND SPILL:

VACUUM, SHOVEL OR SWEEP UP DEHYBOR AND PLACE IN CONTAINERS FOR DISPOSAL IN ACCORDANCE WITH APPLICABLE LOCAL REGULATIONS. AVOID CONTAMINATION OF WATER BODIES DURING CLEANUP AND DISPOSAL. PERSONAL PROTECTIVE EQUIPMENT IS NOT NEEDED TO CLEANUP LAND SPILLS.

### SPILLAGE INTO WATER:

WHERE POSSIBLE, REMOVE ANY INTACT CONTAINERS FROM THE WATER. ADVISE LOCAL WATER AUTHORITY THAT NONE OF THE AFFECTED WATER SHOULD BE USED FOR IRRIGATION OR FOR THE ABSTRACTION OF POTABLE WATER UNTIL NATURAL DILUTION RETURNS THE BORON VALUE TO ITS NORMAL ENVIRONMENTAL BACKGROUND LEVEL. (REFER TO SECTIONS 12, 13 AND 15 FOR ADDITIONAL INFORMATION.) DEHYBOR IS A NON-HAZARDOUS WASTE WHEN SPILLED OR DISPOSED OF, AS DEFINED IN THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REGULATIONS (40 CFR 261). (REFER TO REGULATORY INFORMATION, SECTION 15, FOR ADDITIONAL REFERENCES.)

---

## 7 HANDLING AND STORAGE

### GENERAL:

NO SPECIAL HANDLING PRECAUTIONS ARE REQUIRED, BUT DRY, INDOOR STORAGE IS RECOMMENDED. TO MAINTAIN PACKAGE INTEGRITY AND TO MINIMIZE CAKING OF THE PRODUCT, BAGS SHOULD BE HANDLED ON A FIRST-IN, FIRST-OUT BASIS. GOOD HOUSEKEEPING PROCEDURES SHOULD BE FOLLOWED TO MINIMIZE DUST GENERATION AND ACCUMULATION.

STORAGE TEMPERATURE: AMBIENT

STORAGE PRESSURE: ATMOSPHERIC

SPECIAL SENSITIVITY: MOISTURE (CAKING)

---

## 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

### ENGINEERING CONTROLS:

USE LOCAL EXHAUST VENTILATION TO KEEP AIRBORNE CONCENTRATIONS OF DEHYBOR DUST BELOW PERMISSIBLE EXPOSURE LEVELS.

### PERSONAL PROTECTION:

WHERE AIRBORNE CONCENTRATIONS ARE EXPECTED TO EXCEED EXPOSURE LIMITS, NIOSH/MSHA CERTIFIED RESPIRATORS SHOULD BE USED. EYE GOGGLES AND GLOVES ARE NOT REQUIRED FOR NORMAL INDUSTRIAL EXPOSURES, BUT MAY BE WARRANTED IF ENVIRONMENT IS EXCESSIVELY DUSTY.

### OCCUPATIONAL EXPOSURE LIMITS:

SODIUM TETRABORATE (DEHYBOR) IS REGULATED BY OSHA, CAL OSHA AND ACGIH.

ACGIH/TLV: 1 MG/M3

CAL OSHA/PEL: 5 MG/M3

OSHA/PEL (TOTAL DUST): 10 MG/M3

---

## 9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: WHITE, ODORLESS, CRYSTALLINE SOLID

HEAT OF SOLUTION: 2.13 X 10(5) J/KG (92 BTU/LB) (ABSORBED)

SPECIFIC GRAVITY: 2.37

MELTING POINT: 742 DEG. C (1367 DEG. F) (CRYSTALLINE PHASE)

VAPOR PRESSURE: NEGLIGIBLE @ 20 DEG. C

pH @ 20 DEG. C: 9.3 (3% SOLUTION)

SOLUBILITY IN WATER:

3.1% @ 25 DEG. C

2.48% @ 20 DEG. C

MOLECULAR WEIGHT: 201.27

---

## 10 STABILITY AND REACTIVITY

GENERAL:

DEHYBOR IS A STABLE PRODUCT. IF WETTED IT REACTS EXOTHERMICALLY, FORMING HYDRATED SODIUM BORATES.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

REACTION WITH STRONG REDUCING AGENTS, SUCH AS METAL HYDRIDES OR ALKALI METALS, WILL GENERATE HYDROGEN GAS, WHICH COULD CREATE AN EXPLOSIVE HAZARD.

HAZARDOUS DECOMPOSITION: NONE.

---

## 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

INGESTION:

LOW ACUTE ORAL TOXICITY; LD50 IN RATS IS 2,400 TO 2,600 MG/KG OF BODY WEIGHT (BASED ON SODIUM TETRABORATE DECAHYDRATE EXPERIMENTAL DATA).

SKIN/DERMAL:

LOW ACUTE DERMAL TOXICITY; LD50 IN RABBITS IS GREATER THAN 2,000 MG/KG OF BODY WEIGHT. DEHYBOR IS POORLY ABSORBED THROUGH INTACT SKIN.

INHALATION: NO EXPERIMENTAL TEST DATA.

SKIN IRRITATION:

NO EXPERIMENTAL TEST DATA. HYDRATED SODIUM TETRABORATES ARE NON-IRRITANTS.



**EYE IRRITATION:**

NO EXPERIMENTAL TEST DATA. EYE IRRITATION SEEN IN RABBITS TREATED WITH HYDRATED SODIUM TETRABORATES. MANY YEARS OF OCCUPATIONAL EXPOSURE TO SODIUM TETRABORATES INDICATE NO ADVERSE EFFECTS ON HUMAN EYE. THEREFORE, DEHYBOR IS NOT CONSIDERED TO BE A HUMAN EYE IRRITANT IN NORMAL INDUSTRIAL USE.

**SENSITIZATION:**

NO EXPERIMENTAL DATA; HOWEVER, OTHER BORATES INCLUDING DISODIUM TETRABORATE PENTAHYDRATE ARE NOT SKIN SENSITISERS.

**OTHER:****REPRODUCTIVE/DEVELOPMENTAL TOXICITY:**

ANIMAL FEEDING STUDIES IN RAT, MOUSE AND DOG, AT HIGH DOSES, HAVE DEMONSTRATED EFFECTS ON FERTILITY AND TESTES(2). STUDIES WITH THE CHEMICALLY RELATED BORIC ACID IN THE RAT, MOUSE AND RABBIT, AT HIGH DOSES, DEMONSTRATE DEVELOPMENTAL EFFECTS ON THE FETUS, INCLUDING FETAL WEIGHT LOSS AND MINOR SKELETAL VARIATIONS(3, 4). THE DOSES ADMINISTERED WERE MANY TIMES IN EXCESS OF THOSE TO WHICH HUMANS WOULD NORMALLY BE POSED(5).

**CARCINOGENICITY/MUTAGENICITY:**

NO EVIDENCE OF CARCINOGENICITY IN MICE(6). NO MUTAGENIC ACTIVITY WAS OBSERVED FOR BORIC ACID IN A BATTERY OF SHORT-TERM MUTAGENICITY ASSAYS.

**HUMAN DATA:**

HUMAN EPIDEMIOLOGICAL STUDIES SHOW NO INCREASE IN PULMONARY DISEASE IN OCCUPATIONAL POPULATIONS WITH CHRONIC EXPOSURES TO BORIC ACID DUST AND SODIUM BORATE DUST. A RECENT EPIDEMIOLOGY STUDY UNDER THE CONDITIONS OF NORMAL OCCUPATIONAL EXPOSURE TO BORATE DUSTS INDICATED NO EFFECT ON FERTILITY(7).

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## 12 ECOLOGICAL INFORMATION

**ECOTOXICITY DATA:****GENERAL:**

BORON (B) IS THE ELEMENT IN SODIUM TETRABORATE (DEHYBOR) WHICH IS USED BY CONVENTION TO REPORT BORATE PRODUCT ECOLOGICAL EFFECTS. IT OCCURS NATURALLY IN SEA-WATER AT AN AVERAGE CONCENTRATION OF 5 MG B/L AND GENERALLY OCCURS IN FRESH WATER AT CONCENTRATIONS UP TO 1 MG B/L. IN DILUTE AQUEOUS SOLUTIONS THE PREDOMINANT BORON SPECIES PRESENT IS UNDISSOCIATED BORIC ACID. TO CONVERT SODIUM TETRABORATE INTO THE EQUIVALENT BORON (B) CONTENT, MULTIPLY BY 0.2149.

**PHYTOTOXICITY:**

BORON IS AN ESSENTIAL MICRONUTRIENT FOR HEALTHY GROWTH OF PLANTS; HOWEVER, IT CAN BE HARMFUL TO BORON SENSITIVE PLANTS IN HIGH QUANTITIES. CARE SHOULD BE TAKEN TO MINIMIZE THE AMOUNT OF DEHYBOR RELEASED TO THE ENVIRONMENT.

**ALGAL TOXICITY:**

GREEN ALGAE, SCENEDESNUS SUBSPICATUS:  
96-HR EC10: 24 MG B/L+

**INVERTEBRATE TOXICITY(8):**

DAPHNIDS, DAPHNIA MAGNA STRAUS:  
24-HR EC50: 242 MG B/L+

TEST SUBSTANCE: + SODIUM TETRABORATE

**FISH TOXICITY:**

## SEA-WATER(9):

DAB, LIMANDA LIMANDA:  
96-HR LC50: 74 MG B/L+

## FRESH WATER(10):

RAINBOW TROUT, S. GAIRDNERI (EMBRYO-LARVAL STAGE):  
24-DAY LC50: 88 MG B/L+  
32-DAY LC50: 54 MG B/L+

GOLDFISH, CARASSIUS AURATUS (EMBRYO-LARVAL STAGE):  
7-DAY LC50: 65 MG B/L+  
3-DAY LC50: 71 MG B/L+

## ENVIRONMENTAL FATE DATA:

## PERSISTENCE/DEGRADATION:

BORON IS NATURALLY OCCURRING AND UBIQUITOUS IN THE ENVIRONMENT. DEHYBOR  
DECOMPOSES IN THE ENVIRONMENT TO NATURAL BORATE.

## OCTANOL/WATER PARTITION COEFFICIENT:

NO VALUE. IN AQUEOUS SOLUTION SODIUM TETRABORATE IS CONVERTED SUBSTANTIALLY  
INTO UNDISSOCIATED BORIC ACID.

## SOIL MOBILITY:

DEHYBOR IS SOLUBLE IN WATER AND IS LEACHABLE THROUGH NORMAL SOIL.

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### 13 DISPOSAL CONSIDERATIONS

## DISPOSAL GUIDANCE:

SMALL QUANTITIES OF DEHYBOR CAN USUALLY BE DISPOSED OF AT LANDFILL SITES. NO  
SPECIAL DISPOSAL TREATMENT IS REQUIRED, BUT LOCAL AUTHORITIES SHOULD BE  
CONSULTED ABOUT ANY SPECIFIC LOCAL REQUIREMENTS. TONNAGE QUANTITIES OF  
PRODUCT SHOULD, IF POSSIBLE, BE USED FOR AN APPROPRIATE APPLICATION.

## RCRA (40 CFR 261):

DEHYBOR IS NOT LISTED UNDER ANY SECTIONS OF THE FEDERAL RESOURCE  
CONSERVATION AND RECOVERY ACT (RCRA).

## NPRI (CANADA):

DEHYBOR IS NOT LISTED ON THE CANADIAN NATIONAL POLLUTANT RELEASE INVENTORY.

REFER TO SECTION 15 FOR ADDITIONAL REGULATORY INFORMATION.

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### 14 TRANSPORT INFORMATION

## DOT HAZARDOUS CLASSIFICATION:

SODIUM TETRABORATE (DEHYBOR) IS NOT REGULATED BY THE U.S. DEPARTMENT OF  
TRANSPORTATION (DOT) AND IS THEREFORE NOT CONSIDERED A HAZARDOUS  
MATERIAL/SUBSTANCE.

## TDG CANADIAN TRANSPORTATION:

SODIUM TETRABORATE (DEHYBOR) IS NOT REGULATED UNDER TRANSPORTATION OF  
DANGEROUS GOODS (TDG).

## INTERNATIONAL TRANSPORTATION:

SODIUM TETRABORATE (DEHYBOR) HAS NO UN NUMBER, AND IS NOT REGULATED UNDER

INTERNATIONAL RAIL, ROAD, WATER OR AIR TRANSPORT REGULATIONS.

## 15 REGULATORY INFORMATION

### OSHA/CAL OSHA:

THIS MSDS DOCUMENT MEETS THE REQUIREMENTS OF BOTH OSHA (29 CFR 1910.1200) AND CAL OSHA (TITLE 8 CCR 5194 (G)) HAZARD COMMUNICATION STANDARDS. REFER TO SECTION 8 FOR REGULATORY EXPOSURE LIMITS.

### WHMIS CLASSIFICATION:

SODIUM TETRABORATE (DEHYBOR) IS CLASSIFIED AS CLASS D - DIVISION 2A UNDER CANADIAN WHMIS GUIDELINES.

### CHEMICAL INVENTORY LISTING:

SODIUM TETRABORATE (DEHYBOR), 1330-43-4, APPEARS ON SEVERAL CHEMICAL INVENTORY LISTS (INCLUDING THE EPA TSCA INVENTORY, CANADIAN DSL, EUROPEAN EINECS, JAPANESE MITI, AUSTRALIAN AND KOREAN LISTS) UNDER THE CAS NO. REPRESENTING THIS INORGANIC SALT.

U.S. EPA TSCA INVENTORY: 1330-43-4

CANADIAN DSL: 1330-43-4

EINECS: 215-540-4

SOUTH KOREA: 1-760

JAPANESE MITI: (1)-69

### RCRA:

SODIUM TETRABORATE IS NOT LISTED AS A HAZARDOUS WASTE UNDER ANY SECTIONS OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) OR REGULATIONS (40 CFR 261 ET SEQ).

### SUPERFUND:

CERCLA/SARA. SODIUM TETRABORATE IS NOT LISTED UNDER CERCLA OR ITS 1986 AMENDMENTS, SARA, INCLUDING SUBSTANCES LISTED UNDER SECTION 313 OF SARA, TOXIC CHEMICALS, 42 USC 11023, 40 CFR 372.65, SECTION 302 OF SARA, EXTREMELY HAZARDOUS SUBSTANCES, 42 USC 11002, 40 CFR 355, OR THE CERCLA HAZARDOUS SUBSTANCES LIST, 42 USC 9604, 40 CFR 302.

### SAFE DRINKING WATER ACT (SDWA):

SODIUM TETRABORATE IS NOT REGULATED UNDER THE SDWA, 42 USC 300G-1, 40 CFR 141 ET SEQ. CONSULT STATE AND LOCAL REGULATIONS FOR POSSIBLE WATER QUALITY ADVISORIES REGARDING BORON COMPOUNDS.

CLEAN WATER ACT (CWA) (FEDERAL WATER POLLUTION CONTROL ACT):  
33 USC 1251 ET SEQ.

A) SODIUM TETRABORATE (DEHYBOR) IS NOT ITSELF A DISCHARGE COVERED BY ANY WATER QUALITY CRITERIA OF SECTION 304 OF THE CWA, 33 USC 1314.

B) IT IS NOT ON THE SECTION 307 LIST OF PRIORITY POLLUTANTS, 33 USC 1317, 40 CFR 129.

C) IT IS NOT ON THE SECTION 311 LIST OF HAZARDOUS SUBSTANCES, 33 USC 1321, 40 CFR 116.

### CANADIAN DRINKING WATER GUIDELINE:

AN "INTERIM MAXIMUM ACCEPTABLE CONCENTRATION" (IMAC) FOR BORON IS CURRENTLY SET AT 5 MG B/L.

### IARC:

THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) (A UNIT OF THE WORLD HEALTH ORGANIZATION) DOES NOT LIST OR CATEGORIZE SODIUM TETRABORATE AS A CARCINOGEN.

NTP BIENNIAL REPORT ON CARCINOGENS: SODIUM TETRABORATE IS NOT LISTED.

OSHA CARCINOGEN: SODIUM TETRABORATE IS NOT LISTED.

CALIFORNIA PROPOSITION 65:

SODIUM TETRABORATE (DEHYBOR) IS NOT LISTED ON THE PROPOSITION 65 LIST OF CARCINOGENS OR REPRODUCTIVE TOXICANTS.

FEDERAL FOOD, DRUG AND COSMETIC ACT:

PURSUANT TO 21 CFR 175.105, 176.180 AND 181.30, DEHYBOR IS APPROVED BY THE FDA FOR USE IN ADHESIVE COMPONENTS OF PACKAGING MATERIALS, AS A COMPONENT OF PAPER COATINGS ON SUCH MATERIALS, OR FOR USE IN THE MANUFACTURE THEREOF, WHICH MATERIALS ARE EXPECTED TO COME IN CONTACT WITH DRY FOOD PRODUCTS.

CLEAN AIR ACT (MONTREAL PROTOCOL):

DEHYBOR WAS NOT MANUFACTURED WITH AND DOES NOT CONTAIN ANY CLASS I OR CLASS II OZONE DEPLETING SUBSTANCES.

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## 16 OTHER INFORMATION

### REFERENCES:

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- (2). WEIR R J, FISHER R S, TOXICOL. APPL. PHARMACOL. 23: 351-364 (1972).
- (3). FAIL ET AL., FUND. APPL. TOXICOL. 17: 225-239 (1991).
- (4). PRICE ET AL., J. AM. COLL. TOXICOL. 14: (2), 173 (ABST. P-17) (1995).
- (5). MURRAY F J, REGUL. TOXICOL. PHARMACOL. (DEC. 1995).
- (6). NATIONAL TOXICOLOGY PROGRAM (NTP):  
TOXICOLOGY AND CARCINOGENESIS STUDIES OF BORIC ACID IN B6C3F1 MICE, TECH. REPORT SER. NO. 324, U.S. DEPT. OF HEALTH AND HUMAN SERVICES. NIH PUBL. NO. 88-2580 (1987).
- (7). WHORTON ET AL., OCCUP. ENVIRON. MED. 51: 761-767 (1994).
- (8). SCHOBEL ET AL., TENSIDE SURFACTANTS DETERGENTS 25: 99-107 (1988).
- (9). HUGMAN S J, MANCE G, WATER RESEARCH CENTRE REPORT 616-M (1983).
- (10). BUTTERWICK L, DE OUDE N, RAYMOND K, ECOTOXICOL, ENVIRON, SAFETY 17: 339-371 (1989).

FOR GENERAL INFORMATION ON THE TOXICOLOGY OF INORGANIC BORATES, SEE PATTY'S INDUSTRIAL HYGIENE AND TOXICOLOGY, 4TH ED. VOL. II, (1994), CHAP. 42, BORON; ECETOC TECH. REPORT NO. 63 (1995).

PRODUCT LABEL TEXT HAZARD INFORMATION\*:

DO NOT INGEST.

INGESTION MAY CAUSE REPRODUCTIVE HARM OR BIRTH DEFECTS BASED ON ANIMAL DATA.

AVOID CONTAMINATION OF FOOD OR FEED.

NOT FOR USE IN FOOD, DRUG, OR PESTICIDES.

REFER TO MSDS.

KEEP OUT OF REACH OF CHILDREN.

\* THE WHMIS PANEL FORMAT IS USED FOR CANADIAN PRODUCT.

NATIONAL FIRE PROTECTION ASSOC. (NFPA) CLASSIFICATION:

HEALTH 0

FLAMMABILITY 0

REACTIVITY 0

HAZARDOUS MATERIALS INFORMATION SYSTEMS (HMIS):

(FLAMMABILITY) RED 0

(REACTIVITY) YELLOW 0

(ACUTE HEALTH) BLUE 1\*

\* CHRONIC EFFECTS

FOR FURTHER INFORMATION CONTACT:

U.S. BORAX INC.

OCCUPATIONAL HEALTH & PRODUCT SAFETY DEPARTMENT: (661) 287-6050

US-US-DE

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