



702624

Department of Energy
San Francisco Operations Office
1333 Broadway
Oakland, California 94612

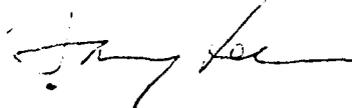
23 FEB 1987

Mr. Arthur J. Toy, Jr.
Hazards Control Department Head, L-382
Lawrence Livermore National Laboratory
University of California
P. O. Box 808
Livermore, CA 94550

SUBJECT: Adhesion and Resuspension of Particles from Surfaces - L656A

Dear Mr. Toy:

I wish to inform you that the HQ Office of Health and Environmental Research has concurred in our assessment that DOE should approve proposal L-656A involving human hand experiments. SAN has therefore approved the subject proposal. Your cooperation is very much appreciated.


for Rudolf T. A. Bredderman
Director
Defense Programs Division

cc: A. Biermann, LLNL, L-386
J. Johnson, LLNL, L-386
F. Hatch, LLNL, L-452

~~_____ Foster, L-50A~~

REPOSITORY DOE-OAK
COLLECTION Environment & Safety Support Div.
BOX No. Central File
FOLDER 1300.3.B. Human Subject Testing
1986-1987

00211661



Lawrence Livermore National Laboratory

Health, Safety, and Environment Department

November 4, 1986

Mr. Harvey Lee
U.S. Department of Energy
San Francisco Operations Office
1330 Broadway
Oakland, CA 94612

RE: Adhesion and Resuspension Studies of Particles from Surfaces - Expanded Scope for AWP No. L-656.

Dear Mr. Lee:

We would like to continue our reimbursable work for the Army under AWP No. L-656 with the inclusion of experimental studies. Original funding for these studies was via MIPR-6-87061 in FY86 and involved a literature search of the mechanism contributing to the adhesion, transfer, and resuspension processes of particulates on surfaces. It has recently been extended into FY87. As you know, near the end of FY86 we received additional funds to conduct experimental studies to determine the quantities of particulate transfer from surfaces to hands by simple contact. These studies would involve the use of human subjects. And from our phone conversations I know that you require further information for DOE about the project because of the human subject factor.

I have been waiting for an initial screening of some of the chemicals which we propose to use for their toxicology and allergic consequences. Dr. J. Schneider, a consultant dermatologist at our Medical Department, has looked into this matter. The candidate chemicals are starch, myosin, sugar, carmine sulfate, glass spheres, and zinc sulfide. The first five of these chemicals pose no threat to human subjects, especially in the quantities and exposure route we will be using. We are still investigating the use of zinc sulfide as a candidate, however. If this compound is found unacceptable for use due to allergic or toxicologic consequences, another compound may be chosen as a replacement. As I previously indicated, experiments requiring the use of human subjects at LLNL undergo an internal review process by our Human Subjects Committee. This committee follows all DOE procedures when reviewing experiments and should provide all the technical review necessary for the approval of this project. The Human Subjects committee will consider the exact experimental protocol, the chemical compounds to be used and the safety of human involvement. I have attached a copy of a letter being sent to them for your information. The letter discusses the chemicals which are proposed to be used for the particles as well as details of the experiment. Few people will be involved in the experiments; they will be full-time LLNL employees. All participants will also be required to read and sign a "Consent to Act as a Human Subject" form, which is a standard LLNL procedure for experiments involving human subjects.

00211681

Harvey Lee

page 2 of 2

As I send this information to you, the Human Subjects Committee will also be taking the matter up for consideration. If you foresee any problems from DOE, please let me know so that we may include them in our considerations.

I will notify you of the outcome of the Human Subjects Committee review. Please call me at 422-8017 if you have questions, comments, or suggestions on the matter.

Sincerely,



Arthur H. Biermann
Special Projects Division
Hazards Control Department

AHB

Encls:

cc: J. S. Johnson

0021169

Interdepartmental letterhead

Mail Station L: 386

Ext: 2-8017

November 4, 1986

TO: The LLNL Human Subjects Committee
Attn: Vivian Shepherd

FROM: A. H. Biermann

SUBJECT: Request for Permission to Investigate the Transfer of
Particulates to Hands Using Human Subjects

The Safety Science Group in Hazards Control has been investigating the adhesion of particles to surfaces and their subsequent removal. We have reached a point in our studies where we would like to obtain actual experimental data on the numbers of particles transferred from surfaces to hands. We want to be able to predict the amount of particles that a hand might pick up from a surface coated with small particles. Because of the initial low funding level at this time, only one participant will be included in our experiments. However, we may want to expand this number to 8 or 10 participants in the event of increased or renewed funding. All participants would be current full-time employees at the Laboratory.

We are interested in the removal of particles from unpainted and painted metallic surfaces. Several types of particles are of interest in the size ranges from 1 to 200 microns in diameter. These include small solid glass spheres, starch, myosin, carmine sulfate; sodium fluorescein, zinc sulfide, and sugar. These specific materials are not mandated; other materials could be used as possible substitutes if these are found to be toxic or irritable to the skin.

To determine the amount of particle transfer from a surface to a hand, we envision the following experimental protocol. Prior to the actual experiment, the surface will be dusted with particles of a certain type and size range in a closed chamber. The desired surface concentrations will be far less than a complete monolayer coverage. The participant's hand will be washed in a prescribed manner, probably with either water, isopropanol, or both. At least 2, and perhaps 3, washings will be done so that complete removal of the particles can be verified. The contact force may vary up to 90 gm/cm² and will be monitored with a scale. Actual contact of the hand on the surface will be short, only 10 to 30 seconds. After contact, the hand will again be washed to quantitatively recover the particles that were transferred from the surface to the hand. Environmental conditions will be regulated at a temperature of approximately 20°C and a relative humidity of 30%. As you can see, the procedure itself is fairly simple.

University of California

 Lawrence Livermore
National Laboratory

0021170

Hazard Analysis:

1. Dr. J. Schneider has been good enough to have a colleague check some of these chemicals as to their toxicological and allergic response consequences in relation to skin contact. He found no data to preclude the use of glass spheres, starch, myosin, carmine sulfate, and sodium fluorescein as test particles in these experiments. However, no data was found for zinc sulfide. We have attached material safety data sheets on the following chemicals: starch, carmine sulfate, sodium fluorescein, and sucrose. No detrimental effects should be expected from skin contact with these substances in the quantities and exposure route used in the proposed experiments. The human subjects will wear a laboratory coat and eye protection. An eye wash station is available. No inhalation or eye contact will be possible in these experiments due to the use of a ventilated enclosure.
2. The use of zinc sulfide required further investigation. The check by Dr. Schneider did not locate information on this substance. Therefore, further searches for data were warranted. A safety data sheet from the chemical company has been received and is attached. Three pertinent statements from the data sheet are; (1) "ZnS is believed to be of low toxicity," (2) it is relatively insoluble in water (<0.00069 g/100ml), and, (3) acute exposure of the skin "may cause irritation, redness, and pain." We have also searched the following databases: HAZARDLINE, TOXLINE, OHMTABS, and RTECS. The latter two contained no ZnS entries. But attached you will find the information contained in the HAZARDLINE and TOXLINE databases. TOXLINE lists the compound as having a toxic level of 4; this corresponds to an expected lethal dose of 50-500 mg/kg for ingestion. In the HAZARDLINE database, under the clothing category, repeated or prolonged skin exposure is not recommended, although no data is available. Similarly, although there are no standard requirements for eye protection, skin washing, or clothing, minimal precautions are advised. In our laboratory we will use these minimal requirements: laboratory coat, eye protection, and availability of water flushing including an eye-wash station. Immediate washings of the hand will always be done as prescribed in the experimental protocol. To date, we have not yet found specific exposure levels to ZnS for skin. The primary danger seems to be via ingestion or possibly inhalation exposure routes.
3. Prior to participation in a set of experiments, a small quantity of particles will be placed on the subject's hand to see if there might be any allergic response to the chemical.
4. Prior to a particular experiment, the subject's hand will be examined under a magnifying glass to check that there are no visible breaks in the skin. Such breaks would preclude the subject's participation in that experiment until their skin has healed. Also, the subject can check his/her hands after exposure under magnification to check for any actual physical damage as a result of the experiment.

5. Total contact time of the subject's hand with the particles will be short, less than 90 seconds.
6. The quantity expected to be transferred to a hand will be minimal. Assuming a 100% transfer of particles to the hand over the total hand area (including areas which will not actually touch the surface), we estimate no more than 100 mg would be transferred to a hand. In many experiments involving a sensitive detection method such as the case of fluorescein, lesser amounts could be used.

If we receive more information on the toxicology consequences of these compounds, we will pass this along to you. Meanwhile, we would appreciate a committee review as soon as possible so that we can begin our experiments. A separate operation safety procedure (OSP) is not planned for this experiment because the hazards are covered under the Building 253 OSP. If you have questions or require additional information, please let me know.



Arthur H. Biermann
Special Projects Division
Hazards Control Department

AHB:beb

Encls:

cc: J. S. Johnson, LLNL
Harvey Lee, SAN
Fred Hatch, LLNL

MATERIAL SAFETY DATA SHEET

For Assistance, Contact:
Regulatory Affairs Dept.
PO Box 907 Ares, IA

HACH COMPANY
PO Box 907
MES, IA 50010

Emergency Telephone #
(515) 222-2333

I. PRODUCT IDENTIFICATION

CATALOG NUMBER: 720
EAS. NO: 1390-65-4
FORMULA: C22H19O13-AIKO852
CHEMICAL FAMILY: Indicators
PRODUCT NAME: Caraine
CHEMICAL NAME: Caraine Acid Alce Lake

II. INGREDIENTS

INGREDIENTS	%	TWA	CAS NUMBER	NATURE of HAZARD	RCRA
Caraine	100	None listed	1390-65-4	Toxicity unknown; may cause irritation	None

III. PHYSICAL DATA

STATE: solid
APPEARANCE: Bright red
ODOR: Not determined
SOLUBILITY IN WATER: Sl. sol. hot water
ACID: Insol. dil. acids
OTHER: Alkali hydroxide or carbonate
BOILING PT.: NA
MELTING PT.: Not distinct
SPECIFIC GRAVITY: ND
pH: Not applicable
VAPOR PRESSURE: Not applicable
VAPOR DENSITY (air=1): NA
EVAPORATION RATE: NA
METAL CORROSIVITY - ALUMINUM: NA
STEEL: NA
SHELF LIFE: Not determined
STORAGE PRECAUTIONS: Store tightly closed.

IV. FIRE, EXPLOSION HAZARD AND REACTIVITY DATA

FLASH PT.: Not applicable
METHOD: NA
FLAMMABILITY LIMITS - LOWER: NA
UPPER: NA
SUSCEPTIBILITY TO SPONTANEOUS HEATING: None
SHOCK SENSITIVITY: None
AUTOIGNITION PT.: ND
EXTINGUISHING MEDIA: water, carbon dioxide, or dry chemical
UNUSUAL FIRE AND EXPLOSION HAZARD: Not determined
HAZARDOUS DECOMPOSITION PRODUCTS: Not determined
OXIDIZER: No
NFPA Codes Health: 1
Flammability: -
Reactivity: -
CONDITIONS TO AVOID: Heat, flames, oxidizers

V. HEALTH HAZARD DATA

THIS PRODUCT IS irritating to eyes, skin and respiratory tract.
ACUTE TOXICITY: Not determined
ROUTE OF MOST DETRIMENTAL EXPOSURE: Not determined
TARGET ORGANS: Not determined
CHRONIC TOXICITY: Not determined
ROUTE OF MOST DETRIMENTAL EXPOSURE: Not determined
TARGET ORGANS: Not determined
LONG-TERM EFFECTS: Not applicable
ROUTE OF EXPOSURE: Not applicable
TARGET ORGANS: Not applicable
OVEREXPOSURE: Not determined

Hach Company
WORLD HEADQUARTERS
PO Box 389 Loveland, CO 80539

Hach Europe
BP 51
B5000 Wavur 1
Belgium

VI. PRECAUTIONARY MEASURES

Wash thoroughly after handling.
Avoid contact with eyes, skin and clothing.
Do not breathe chemicals.

PROTECTIVE EQUIPMENT: adequate ventilation, safety glasses, disposable gloves

VII. FIRST AID

EYE AND SKIN CONTACT: Immediately flush eyes with water for 15 minutes. Call physician. Wash skin with soap and plenty of water.

INGESTION: Give large quantities of water or milk. Call physician immediately.

INHALATION: Remove to fresh air.

VIII. SPILL AND DISPOSAL PROCEDURES

IN CASE OF SPILL OR RELEASE: Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

DISPOSE OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS.

IX. TRANSPORTATION DATA

PROPER SHIPPING NAME: NCR

HAZARD CLASS: Not applicable ; ID: NA

DATE: 11/22/85; CHANGE NO.: 4382

X. REFERENCES

- 1) The Merck Index, 10th Ed. Rahway, New Jersey: Merck and Co., Inc., 1983
- 2) Judgement of technical person compiling data.
- 3) TLV's Threshold Limit Values for Chemical Substances in the Work Environment Adopted by ACGIH for 1983-1984. Second Printing, Cincinnati.
- 4)
- 5)
- 6)
- 7)

##ZINC SULFIDE##

PAGE 01 OF 04

##ZINC SULFIDE##
##ZINC SULFIDE##
##ZINC SULFIDE##

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 10/11/86
PO NBR: N/A
ACCT: 474907-01
INDEX: N/A
CAT NO: 272

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SUBSTANCE IDENTIFICATION

CAS-NUMBER 1314-98-3

SUBSTANCE: ##ZINC SULFIDE##

TRADE NAMES/SYNONYMS: ALPHA-ZINC SULFIDE; WURTZITE; Z-72

CHEMICAL FAMILY:
INORGANIC SALT

MOLECULAR FORMULA: ZN-S MOL WT: 97.43

CERCLA RATINGS (SCALE 0-3): HEALTH=0 FIRE=0 REACTIVITY=0 PERSISTENCE=3

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: ZINC CHLORIDE

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NONE ESTABLISHED

PHYSICAL DATA

DESCRIPTION: COLORLESS CRYSTALS BOILING POINT: SUBL 2165 F (1185 C)

MELTING POINT: 3092 F (1700 C) SPECIFIC GRAVITY: 4.0

SOLUBILITY IN WATER: 0.00069% SOLVENT SOLUBILITY: ACIDS

FIRE AND EXPLOSION DATA

0021175

****ZINC SULFIDE****

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FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE AND NEGLIGIBLE EXPLOSION HAZARD IN DUST FORM WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: NONCOMBUSTIBLE

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL FOAM
(1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING VAPORS OR DUSTS; KEEP UPWIND.

TOXICITY

CARCINOGEN STATUS: NONE.
ZINC SULFIDE IS BELIEVED TO BE OF LOW TOXICITY.

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT.

ACUTE EXPOSURE- HIGH CONCENTRATIONS OF ZINC DUST MAY PRODUCE IRRITATION, DYSPNEA, AND COUGHING.

CHRONIC EXPOSURE- HAS NOT BEEN REPORTED IN HUMANS.

FIRST AID- REMOVE FROM EXPOSURE. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. GET MEDICAL ATTENTION.

SKIN CONTACT:
IRRITANT.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE IRRITATION, REDNESS, AND PAIN.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO ZINC SALTS MAY CAUSE DERMATITIS WITH ERYTHEMATOUS, PAPULAR, AND GRANULOMATOUS REACTIONS IN REACTIONS IN SUSCEPTIBLE INDIVIDUALS.

FIRST AID- WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL MEDICAL ATTENTION.

EYE CONTACT:
IRRITANT.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE REDNESS, PAIN, BLURRED VISION, AND CONJUNCTIVITIS.

00211761

ZINC SULFIDE PAGE 03 OF 04
CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES).

INGESTION:

ACUTE EXPOSURE- INGESTION MAY CAUSE NAUSEA, VOMITING, AND DIARRHEA.

FIRST AID- IF VICTIM IS CONSCIOUS, IMMEDIATELY GIVE 2 TO 4 GLASSES OF WATER, AND INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT. GET MEDICAL ATTENTION IMMEDIATELY.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:
VIGOROUS REACTION WITH IODINE MONOCHLORIDE.

DECOMPOSITION:
THERMAL DECOMPOSITION MAY RELEASE TOXIC FUMES OF ZINC OXIDE OR TOXIC OXIDES OF SULFUR.

POLYMERIZATION:
NOT KNOWN TO OCCUR.

CONDITIONS TO AVOID

CONTACT WITH OR STORAGE WITH IODINE MONOCHLORIDE.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
SWEEP UP AND PLACE IN SUITABLE (FIBERBOARD), CONTAINERS FOR LATER DISPOSAL.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE GENERAL DILUTION VENTILATION SYSTEM.

RESPIRATOR:
50 MG/M3- HIGH-EFFICIENCY PARTICULATE RESPIRATOR.
SUPPLIED-AIR RESPIRATOR.
SELF-CONTAINED BREATHING APPARATUS.

250 MG/M3- HIGH-EFFICIENCY PARTICULATE RESPIRATOR WITH A FULL FACE-PIECE.

ZINC SULFIDE PAGE 04 OF 04
SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE, HELMET, OR
HOOD.
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

2500 MG/M3- TYPE C SUPPLIED-AIR RESPIRATOR OPERATED IN PRESSURE-
DEMAND OR OTHER POSITIVE PRESSURE OR CONTINUOUS-FLOW
MODE.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE
OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE CLOTHING AND EQUIPMENT TO PREVENT
REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
PROTECTIVE GLOVES ARE NOT REQUIRED BUT RECOMMENDED.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A
FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO
THIS SUBSTANCE, THE EMPLOYER SHALL PROVIDE AN EYE-WASH FOUNTAIN WITHIN THE
IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 02/27/85 REVISION DATE: 04/26/85

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0021178

END OF DOCUMENTS IN LIST_1PP aallll//ddooccc=11

AN ACCESSION NUMBER: 97. 8609.
CN CHEMICAL NAME: ALPHA-ZINC *SULFIDE.*
SY SYNONYMS: WURTZITE. *ZINC* *SULFIDE.* *ZINC* *SULFIDE* (ZNS). ALBALITH.
C.I. PIGMENT WHITE 7. IRTRAN 2. SACTOLITH. SACTOLITH HD-S. *ZINC*
MONDSULFIDE.

RN CAS NUMBER: 1314-98-3.

REG. TOXIC NUMBER: NONE.

CHEMICAL FORMULA: SZN.

PD

PHYSICAL DESCRIPTION:
COLORLESS CRYSTALS.

MOL WT:	97.43
BOILING PT:	2165 F SUBLIMES
SOLUBILITY:	0.00069 G
FLASH PT:	N/A
VAPOR PRES:	N/A
MELT PT:	3092 F
UEL IN AIR:	
LEL IN AIR:	
MEC IN AIR:	
SPEC GRAVITY:	3.98
VAPOR DENSITY:	
ODOR THRESHOLD:	
OCTANOL/WATER CO-EFFICIENT:	

EL

PERMISSABLE EXPOSURE:
NONE ESTABLISHED
CERCLA HAZARD RATINGS - TOXICITY 1 - IGNITABILITY 0 - REACTIVITY 0 -
PERSISTENCE 3

OSHA STANDARD 29CFR1910.1200 HAZARD COMMUNICATION REQUIRES CHEMICAL
MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZARDS OF CHEMICALS WHICH
THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS HAVING WORKPLACES IN THE
MANUFACTURING DIVISION, STANDARD INDUSTRIAL CLASSIFICATION CODES 20
THROUGH 39, TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING
HAZARDOUS CHEMICALS BY MEANS OF HAZARD COMMUNICATION PROGRAM
INCLUDING LABELS, MATERIAL SAFETY DATA SHEETS, TRAINING, AND ACCESS
TO WRITTEN RECORDS 48FR53280 11/25/83 FOLLOWING OSHA STANDARDS
APPLICABLE TO SUBSTANCES LISTED 29CFR1910, OTHERWISE ADVISE.

DANGEROUS EXPOSURE:
NONE SPECIFIED
COLORLESS CRYSTALS

IC

INCOMPATIBILITIES:
THERMAL DECOMPOSITION PRODUCTS ARE HAZARDOUS AND/OR TOXIC.

CL

CLOTHING:
NO NIOSH/OSHA DATA; RECOMMEND
PREVENT REPEATED OR PROLONGED SKIN CONTACT
WEAR IMPERVIOUS CLOTHING
WEAR GLOVES
WEAR FACESHIELD (8 INCH MINIMUM)
PLACE CONTAMINATED CLOTHING IN CLOSED CONTAINERS FOR STORAGE UNTIL
LAUNDERED OR DISCARDED
IF CLOTHING IS TO BE LAUNDERED, INFORM PERSON PERFORMING OPERATION
OF CONTAMINANT'S HAZARDOUS PROPERTIES.

0021179

Zinc Sulfide - HAZARDLINE

**WEAR EYE PROTECTION TO PREVENT:
NO STANDARD REQUIREMENT, BUT ADVISE EYE PROTECTION TO
PREVENT REASONABLE PROBABILITY OF EYE CONTACT.**

**EMPLOYEE SHOULD WASH:
NO STANDARD REQUIREMENT, BUT ADVISE WASHING
PROMPTLY WHEN SKIN BECOMES CONTAMINATED.**

**WORK CLOTHING SHOULD BE CHANGED DAILY:
NO STANDARD REQUIREMENT, BUT ADVISE CHANGING
IF IT IS REASONABLY PROBABLE THAT CLOTHING IS CONTAMINATED.**

**REMOVE CLOTHING:
NO STANDARD REQUIREMENT, BUT ADVISE REMOVING
IMMEDIATELY IF IT IS NON-IMPERVIOUS AND BECOMES CONTAMINATED.**

**THE FOLLOWING EQUIPMENT SHOULD BE AVAILABLE:
NO NIOSH/OSHA DATA, ADVISE:
EYE-WASH FOUNTAIN WITHIN IMMEDIATE WORK AREA WHERE EMPLOYEES' EYES
MAY BE EXPOSED TO SUBSTANCE QUICK DRENCHING FACILITIES WITHIN
IMMEDIATE WORK AREA WHERE EMPLOYEES MAY BE EXPOSED TO SUBSTANCE.**

**RP
RESPIRATOR SELECTION (UPPER LIMIT DEVICES PERMITTED):
NO SPEC ADVISE
- DUST MASK
WITH A FULL FACE-PIECE**

**HIGH LEVELS
- SELF-CONTAINED BREATHING APPARATUS
WITH A FULL FACE-PIECE**

**FIREFIGHTING
- SELF-CONTAINED BREATHING APPARATUS
WITH A FULL FACE-PIECE
OPERATED IN PRESSURE-DEMAND OR POSITIVE-PRESSURE MODE**

**MS
MEDICAL SURVEILLANCE:
NO NIOSH/OSHA DATA; ADVISE: EKG RECOMMENDED IF EMPLOYEE TO WEAR
FULL-FACE RESPIRATOR.
GENERAL MEDICAL HISTORY.
40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES
CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT
TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES
MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND
MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO
EMPLOYEE HEALTH FOR 30 YEARS 48FR38187 08/22/83 48FR39225 08/30/83
(EFFECTIVE DATE CORRECTION).
PHYSICIAN EXAMINATION INDUSTRIAL EXPOSURE HISTORY.
PRE-PLACEMENT AND ANNUAL EXAMS.
MEDICAL WARNING FOR REFUSAL OF MEDICAL EXAMINATION.
CENTRAL NERVOUS SYSTEM TESTS, PERIPHERAL NEUROPATHY.
PULMONARY FUNCTIONS.
RESPIRATORY HISTORY.
KIDNEY FUNCTION.
CENTRAL NERVOUS SYSTEM EXAMINATION.**

**RE
ROUTE OF ENTRY:
INHALATION.**

**TO
TARGET ORGANS:
CENTRAL NERVOUS SYSTEM. KIDNEYS. LUNGS. RESPIRATORY SYSTEM.**

0021180

Zinc Sulfide - HAZARDLINE

SYMPTOMS:

MUSCULAR, ORGAN RESPONSIBLE FOR MOTION (SC0110); PAIN, SUFFERING, EITHER PHYSICAL OR MENTAL (SC0182). NERVOUSNESS, STATE OF UNREST, UNEASINESS (SC0118). NAUSEA, SICKNESS AT THE STOMACH (SC0115). VOMITING, PERTAINING TO NAUSEA (SC0166). DIARRHEA, UNCONTROLLED LOOSE BOWELS (SC0046). ANOREXIA, DIMINISHED APPETITE (SC0006). CENTRAL NERVOUS SYSTEM, PERTAINING TO NEURAL BODY SYSTEM (SC0028); DEPRESSION, DECREASE IN ACTIVITY/FUNCTION (SC0043). VERTIGO, FEELING OF WHIRLING MOTION (SC0163). LARYNGEAL, OF THE UPPER THROAT (SC0097); SPASM, CONVULSIVE MUSCULAR CONTRACTION (SC0153). RESPIRATORY, PERTAINING TO THE LUNGS (SC0142); EDEMA, FLUID RETENTION WITH SWELLING (SC0181). BRONCHITIS, INFLAMED BRONCHIAL MUCOUS MEMBRANES (SC0017). FEVER, BODY TEMPERATURE ABOVE NORMAL (SC0067). PNEUMONIA, ACUTE INFECTIOUS DISEASE OF LUNGS (SC0136). RESPIRATORY, PERTAINING TO THE LUNGS (SC0142); DISEASE, PATHOLOGICAL CONDITION (SC0314). KIDNEY DAMAGE, INJURY TO THE KIDNEY (SC0220). HYPOTHERMIA, LOWERED BODY TEMPERATURE (SC0211). WEAKNESS, LACK OF STRENGTH (SC0167). CYANOSIS, DARK BLUE/PURPLE SKIN COLOR (SC0038). DYSPNEA, DIFFICULTY IN BREATHING (SC0052).

FA

FIRST AID.

(1 OF 8)

IF THIS CHEMICAL GETS INTO THE EYES, IMMEDIATELY WASH THE EYES WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING THE LOWER AND UPPER LIDS. GET MEDICAL ATTENTION IMMEDIATELY. CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH THIS CHEMICAL.

(2 OF 8)

IF THIS CHEMICAL GETS ON THE SKIN, IMMEDIATELY WASH CONTAMINATED SKIN WITH SOAP OR MILD DETERGENT & WATER. IF THIS CHEMICAL SOAKS CLOTHING, IMMEDIATELY REMOVE CLOTHING & WASH SKIN WITH SOAP OR MILD DETERGENT & WATER. GET MEDICAL ATTENTION PROMPTLY.

(3 OF 8)

IF A PERSON BREATHE IN LARGE AMOUNTS OF THIS CHEMICAL, MOVE THE EXPOSED PERSON TO FRESH AIR AT ONCE. IF BREATHING HAS STOPPED PERFORM ARTIFICIAL RESPIRATION. KEEP THE AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

(4 OF 8)

WHEN THIS LIQUID CHEMICAL HAS BEEN SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE THE PERSON LARGE QUANTITIES OF WATER TO DILUTE THE CHEMICAL. DO NOT ATTEMPT TO MAKE THE PERSON VOMIT. GET MEDICAL ATTENTION IMMEDIATELY. (IF MILK IS IMMEDIATELY AVAILABLE, GIVE THE PERSON MILK INSTEAD OF WATER.)

(5 OF 8)

INGESTED SALTS OF ALUMINUM, COPPER, NICKEL, ZIN, AND *ZINC:* EMERGENCY TREATMENT - DILUTE WITH WATER OR MILK. REMOVE BY GASTRIC LAVAGE UNLESS PATIENT IS VOMITING. ANTIDOTE - FOR COPPER AND *ZINC* SALTS, GIVE CALCIUM DISODIUM EDETATE ORALLY AND INTRAVENOUSLY. PENICILLAMINE IS EFFECTIVE FOR COPPER POISONING. FURTHER TREATMENT - TREAT HYPOTENSION. RELIEVE IRRITATION BY GIVING MILK OR CORNSTARCH BY DISSOLVING 10 GRAMS CORNSTARCH OR FLOUR IN 1 LITER OF WATER. REPLACE FLUIDS WITH 5% DEXTROSE IN SALINE. KEEP PATIENT WARM AND QUIET. RELIEVE PAIN WITH MEPERIDINE OR MORPHINE. (MEDICATION MUST BE GIVEN BY QUALIFIED MEDICAL PERSONNEL) SPECIAL TREATMENT - TREAT ANURIA AND LIVER DAMAGE. (DREISBACH, HANDBOOK OF POISONING, 11TH ED.).

0021181

Zinc Sulfide - HAZARDOUS

GASTRIC LAVAGE - GIVE PATIENT GLASS OF WATER PRIOR TO PASSING OF STOMACH TUBE. LAY PATIENT ON ONE SIDE, WITH HEAD LOWER THAN WAIST. IMMOBILIZE A STRUGGLING PATIENT WITH A SHEET OR BLANKET. MEASURE DISTANCE ON TUBE FROM MOUTH TO EPIGASTRIUM, MARK TUBE WITH INDELIBLE MARKING OR TAPE. REMOVE DENTURES AND OTHER FOREIGN OBJECTS FROM MOUTH. OPEN MOUTH, USE GAG IF NECESSARY. EXTEND HEAD BY LIFTING THE CHIN. PASS TUBE OVER TONGUE AND TOWARD BACK OF THROAT WITHOUT EXTENDING HEAD OR NECK. IF OBSTRUCTION IS MET BEFORE THE MARK ON TUBE REACHES LEVELS OF TEETH, DO NOT FORCE, BUT REMOVE TUBE AND REPEAT PROCEDURE UNTIL TUBE PASSES TO MARK. PLACE END OF TUBE IN GLASS OF WATER. IF TUBE IS OBSTRUCTED WHEN INTRODUCED ABOUT HALFWAY TO THE MARK, IT MAY HAVE ENTERED TRACHEA. AFTER TUBE IS PLACED IN STOMACH, ASPIRATE FIRST TO REMOVE STOMACH CONTENTS BY IRRIGATION SYRINGE. SAVE STOMACH CONTENTS FOR EXAMINATION, AND REPEAT INTRODUCTION AND WITHDRAWAL OF 100-300 ML WARM WATER UNTIL AT LEAST 3 LITERS OF CLEAR RETURN ARE OBTAINED. USE ACTIVATED CHARCOAL AT BEGINNING OF LAVAGE TO AID IN POISON INACTIVATION. LEAVE 50 GRAMS OF CHARCOAL SUSPENDED IN WATER IN THE STOMACH. IF INTRODUCTION AND REMOVAL OF LAVAGE FLUID BY GRAVITY REQUIRES MORE THAN FIVE MINUTES, ASSIST WITH ASEPTO SYRINGE. PREVENT ASPIRATION WITH CUFFED ENDOTRACHEAL TUBE. AVOID GIVING LARGE QUANTITIES OF WATER. MASSAGE OF EPIGASTRIUM WHILE STOMACH TUBE IS BEING ASPIRATED MAY AID IN POISON REMOVAL. IF PATIENT COMATOSE, INTUBATE TRACHEA WITH CUFFED ENDOTRACHEAL TUBE. SUCCINYLCHLORINE MAY BE ADMINISTERED BY QUALIFIED MEDICAL PERSONNEL TO EASE INSERTION OF TRACHEAL CATHETER PRIOR TO PASSAGE OF STOMACH TUBE. (DREISBACH, HANDBOOK OF POISONING, 11TH ED.).

(7 OF 8)

ACUTE RENAL FAILURE - TREAT SHOCK. FOR HEMOLYTIC REACTIONS, GIVE SODIUM BICARBONATE, 5 G EVERY 1-2 HOURS AS NECESSARY TO MAINTAIN AN ALKALINE URINE. (MEDICATION MUST BE GIVEN BY QUALIFIED MEDICAL PERSONNEL) (DREISBACH, HANDBOOK OF POISONING, 11TH ED.).

(8 OF 8)

LIVER DAMAGE - REMOVE FROM EXPOSURE TO ALL CHEMICALS AND DRUGS. MAINTAIN COMPLETE BED REST. AVOID ANESTHESIA OR SURGICAL PROCEDURES. AVOID DEHYDRATION OR OVERHYDRATION. IF VOMITING SEVERE AND ORAL FLUIDS NOT RETAINED, REPLACE VOMITUS WITH AN EQUAL QUANTITY OF 10% DEXTROSE IN NORMAL SALINE. IN RENAL FUNCTION ADEQUATE, GIVE 1 LITER OF 5% DEXTROSE OR INVERT SUGAR IN NORMAL SALINE PLUS 1-3 LITERS OF 10% DEXTROSE OR INVERT SUGAR IN DISTILLED WATER INTRAVENOUSLY EVERY TWENTY-FOUR HOURS. (DREISBACH, HANDBOOK OF POISONING, 11TH ED.).

DT

SPECIAL DIAGNOSTIC TESTS AND INDEXES OF EXPOSURE:
IF SYMPTOMS OF CENTRAL NERVOUS SYSTEM OCCUR, OBTAIN BLOOD GLUCOSE AND RECTAL TEMPERATURE. PERFORM COMPLETE NEUROLOGIC EXAMINATION AND ANY OTHER SPECIFIC NEUROLOGIC TESTS AS APPLICABLE.
PULMONARY FUNCTION.
SERUM THIOCYANATE.

R6

REGULATORY STATUS.

(1 OF 10)

OSHA STANDARD 29CFR1910.1200 HAZARD COMMUNICATION REQUIRES CHEMICAL MANUFACTURERS AND IMPORTERS TO ASSESS THE HAZARDS OF CHEMICALS WHICH THEY PRODUCE OR IMPORT, AND ALL EMPLOYERS HAVING WORKPLACES IN THE MANUFACTURING DIVISION, STANDARD INDUSTRIAL CLASSIFICATION CODES 20 THROUGH 39, TO PROVIDE INFORMATION TO THEIR EMPLOYEES CONCERNING HAZARDOUS CHEMICALS BY MEANS OF HAZARD COMMUNICATION PROGRAM INCLUDING LABELS, MATERIAL SAFETY DATA SHEETS, TRAINING, AND ACCESS TO WRITTEN RECORDS 48FR53280 11/25/83 FOLLOWING OSHA STANDARDS APPLICABLE TO SUBSTANCES LISTED 29CFR1910, OTHERWISE ADVISE.

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(2 OF 10)

OSHA STANDARD 29CFR1910.94 VENTILATION OSHA STANDARD 29CFR1910.134 RESPIRATORY PROTECTION.

(3 OF 10)

OSHA STANDARD 29CFR1910.20 ACCESS TO EMPLOYEE EXPOSURE AND MEDICAL RECORDS.

(4 OF 10)

OSHA STANDARD 29CFR1910.132 PERSONAL PROTECTIVE EQUIPMENT.

(5 OF 10)

OSHA STANDARD 29CFR1910.141 SANITATION.

(6 OF 10)

OSHA STANDARD 29CFR1910.151 MEDICAL SERVICES AND FIRST AID.

(7 OF 10)

OSHA STANDARD 29CFR1910.133 EYE AND FACE PROTECTION.

(8 OF 10)

40CFR717 RECORDS AND REPORTS OF ALLEGATIONS THAT CHEMICAL SUBSTANCES CAUSE SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO HEALTH OR THE ENVIRONMENT ALLEGED TO HAVE BEEN CAUSED BY A SUBSTANCE OR MIXTURE. EPA MAY INSPECT AND REQUIRE REPORTING OF SUCH RECORDS. 48FR38178 08/22/83.

(9 OF 10)

SUBSTANCE SUBJECT TO REQUIREMENTS OF GENERAL INDUSTRY SAFETY ORDER (GISO) 5194 OR TITLE 8 OF CALIFORNIA ADMINISTRATIVE CODE AND DIVISION 5, CHAPTER 2.5 OF CALIFORNIA LABOR CODE.

(10 OF 10)

SUBSTANCE LISTED HAZARDOUS STATE OF CALIFORNIA ADMINISTRATIVE CODE TITLE 22. SOCIAL SECURITY DIVISION 4. ENVIRONMENTAL HEALTH CHAPTER 30. MINIMUM STANDARDS FOR MANAGEMENT OF HAZARDOUS AND EXTREMELY HAZARDOUS WASTES.

CT

DOCUMENTS SAVED FOR EMPLOYEE RECORDS:

NO FEDERAL AGENCY REQUIREMENT, BUT DUE TO HAZARDOUS NATURE OF SUBSTANCE, ADVISE FOLLOWING:

HEALTH STATUS CLASSIFICATION.

OSHA RESPIRATOR CERTIFICATION 29CFR1910.134.

DEPARTMENT OF TRANSPORTATION IF OPERATES HEAVY EQUIPMENT.

EMPLOYEE HAZARDOUS MATERIALS EDUCATION RECEIPT.

EMPLOYEE MEDICAL RECORDS RECEIPT TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION 8(C) RULE REQUIRES MANUFACTURERS AND CERTAIN PROCESSORS OF CHEMICAL SUBSTANCES AND MIXTURES TO KEEP RECORDS OF SIGNIFICANT ADVERSE REACTIONS TO EMPLOYEE HEALTH FOR 30 YEARS. CONTACT: JACK P. MCCARTHY, OFFICE OF TOXIC SUBSTANCES, EPA (800)424-1404. 48FR38178 8/22/83.

MEDICAL WARNING REQUIRED FOR MEDICAL EXAM REFUSAL SIGNED BY EMPLOYEE.

LS

LEAKS, SPILLS, FIRE AND EVACUATION PROCEDURES.

0021183

Zinc Sulfide - HAZARDOUS

DEPARTMENT OF TRANSPORTATION HAZARD CLASS
49CFR172.101 HAZARDOUS MATERIALS TABLE

NOT LISTED

INTERGOVERNMENTAL MARITIME ORGANIZATION HAZARD CLASS
49CFR172.102 OPTIONAL HAZARDOUS MATERIALS TABLE

NOT LISTED

WD

WASTE DISPOSAL.

(1 OF 1)

THIS MATERIAL NOT LISTED AS HAZARDOUS SUBSTANCE, AS DEFINED IN
SECT1101(14) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE,
COMPENSATION, LIABILITY ACT (CERCLA) OF 1980, PURSUANT TO ONE OR
MORE OF THE FOLLOWING:

- * FEDERAL WATER POLLUTION CONTROL ACT (FWPCA)
- SECTION 311(B)(2)(A) * SOLID WASTE DISPOSAL ACT SECTION 3001
- * CLEAN WATER ACT (CWA) SECTION 307(A)
- * CLEAN AIR ACT (CAA) SECTION 112
- * TOXIC SUBSTANCES CONTROL ACT (TSCA) SECTION
- * COMPREHENSIVE ENVIRONMENTAL RESPONSE,
7 COMPENSATION, AND LIABILITY ACT (CERCLA) SECTION 102

DC	PARAGRAPH	SENTENCE	NS-WORD
	CN (1)	2	4
	SY (1)	3	3
	SY (1)	4	3

END OF REQUEST

END OF DOCUMENTS IN LIST:

Zinc Sulfide - HAZARDLINE

Tox Net

HSN - 5802
 DATE - 850522
 RLEN - 8343
 NAME - ZINC SULFIDE
 RN - 1314-98-3
 SY - ZINC SULFIDE [ZNS]
 SY - ALBALITH
 SY - IRTRAN 2
 SY - ZINC MONOSULFIDE
 MF - S-ZN
 MMFG - PPTD ZINC SULFIDE OF COMMERCE USUALLY CONTAINS 15-20% WATER OF HYDRATION. THE DRIED PPT MAY HAVE BEEN HEATED TO 725 DEG C IN ABSENCE OF AIR TO OBTAIN SUBSTANTIAL CONVERSION TO WURTZITE, THE FORM PREFERRED BY PIGMENT INDUSTRY. [MERCK INDEX 9TH ED 1976 , p. 1310]
 MMFG - BY PASSING HYDROGEN SULFIDE GAS INTO SOLUTION OF ZINC SALT. [HAWLEY. CONDENSED CHEM DICTNRY 9TH ED 1977 , p. 942]
 MMFG - REACTION OF ZINC SULFATE WITH SODIUM SULFIDE FOLLOWED BY CALCINATION; PASSAGE OF HYDROGEN SULFIDE INTO AN AQUEOUS SOLUTION OF A ZINC SALT [SRI]
 FORM - GRADES: TECHNICAL; CP, FLUORESCENT OR LUMINOUS; SINGLE CRYSTALS. [HAWLEY. CONDENSED CHEM DICTNRY 9TH ED 1977 , p. 942]
 MFS - EAGLE-PICHER INDUST, INC, SPECIALTY MATERIALS DIV, MIAMI, OK 74354 [SRI]
 MFS - GEN TELEPHONE & ELECTRONICS CORP, GTE PRODUCTS CORP, DIV, CHEM & METALLURGICAL PA 18848 [SRI]

CONTINUE PRINTING? (YES/NO)

USER:

Y
 USE - PIGMENT FOR PAINTS, OILCLOTHS, LINOLEUM, LEATHER, DENTAL RUBBER (ESP IN FORM OF LITHOPONE); MIXED WITH ZINC OXIDE AS "MINERAL WHITE"; ANHYDROUS FORM IS USED IN X-RAY SCREENS & WITH A TRACE OF A RADIUM OR MESOTHORIUM SALT IN LUMINOUS DIALS OF WATCHES; ALSO TELEVISION SCREENS [MERCK INDEX 9TH ED 1976 , p. 1310]
 USE - WHITE & OPAQUE GLASS; BASE FOR COLOR LAKES; PLASTICS; DYEING (HYDROSULFITE PROCESS); FUNGICIDE [HAWLEY. CONDENSED CHEM DICTNRY 9TH ED 1977 , p. 942]
 USE - GREATEST USE OF ZINC SULFIDE IS IN MAKING LITHOPONE PIGMENT (28% ZNS & 72% BASO4) WHICH IS USED IN PAINT, LINOLEUM & ARTIFICIAL LEATHER...PHOSPHOR IN X-RAY & TELEVISION SCREENS, & IN LUMINOUS WATCH FACES. [PATTY. INDUS HYG & TOX 3RD ED VOL2A,2B,2C 1981-82 , p. 2038]
 USE - PIGMENT, EG, FOR PAINTS, INKS, LACQUERS, & COSMETICS [SRI]
 USE - COMPONENT OF LITHOPONE PIGMENT (WITH BARIUM SULFATE) [SRI]
 USE - PIGMENT FILLER-EG, FOR PAPER, DENTAL IMPRESSION MATERIALS [SRI]
 USE - SEMICONDUCTOR [SRI]
 USE - PHOTOCONDUCTOR, EG, FOR SOLAR CELLS [SRI]
 USE - MICRONUTRIENT IN FERTILIZERS [SRI]
 CPAT - ND [SRI]
 PROD - (1978) 1.82X10+9 GRAMS (LITHOPONE) [SRI]
 PROD - (1981) ND [SRI]
 IMPT - (1979) 7.42X10+8 GRAMS [SRI]
 IMPT - (1981) 6.61X10+8 GRAMS [SRI]
 EXPT - (1979) ND [SRI]
 CONTINUE PRINTING? (YES/NO)

Zinc Sulfide - TOXNET

NECESSARY. CHECK ADEQUACY OF TIDAL VOL (NORMAL= 10-15 CC/KG).
/SULFUR COMPD/ [RUMACK. POISINDEX 1975-PRESENT MGMNT 1]

CONTINUE PRINTING? (YES/NO)

USER:

Y

- ANTR - PREVENTION OF ABSORPTION: A) EMESIS...UNLESS PT...COMATOSE, CONVULSING, OR...LOST GAG REFLEX. IF ANY OF THESE...PRESENT, ENDOTRACHEAL INTUBATION SHOULD PRECEDE GASTRIC LAVAGE WITH LARGE-BORE TUBE. B) ADMIN ACTIVATED CHARCOAL (ADULT: 60-100 G; CHILDREN: 30-60 G). C) ADMIN CATHARTIC. /SULFUR COMPD/ [RUMACK. POISINDEX 1975-PRESENT MGMNT 1]
- ANTR - ORAL EXPOSURE: A) PT...MONITORED & TREATED SYMPTOMATICALLY. B) PULMONARY EDEMA...WILL REQUIRE POS END EXPIRATORY PRESSURE. STEROIDS MAY BE USEFUL. DEXAMETHASONE...SHOULD BE ADMIN EARLY IN COURSE OF THERAPY. /SULFUR COMPD/ [RUMACK. POISINDEX 1975-PRESENT
- ANTR - INHALATION: A) REMOVE TO FRESH AIR. B) MONITOR PT FOR RESP DISTRESS. IF COUGH OR DIFFICULTY IN BREATHING DEVELOPS, EVALUATE FOR RESP TRACT IRRITATION, BRONCHITIS & PNEUMONIA. C) TREATMENT SHOULD INCL RECOMMENDATIONS LISTED IN ORAL EXPOSURE SECTION WHEN APPROPRIATE. /SULFUR COMPD/ [RUMACK. POISINDEX 1975-PRESENT
- ANTR - EYE EXPOSURE: A) .../IRRIGATE/ COPIOUSLY WITH WATER FOR @ LEAST 15 MIN. B) OPHTHALMIC EXAM...PERFORMED IF IRRITATION OR PAIN PERSIST AFTER 15 MIN OF IRRIGATION WITH WATER. C) TREATMENT SHOULD INCL RECOMMENDATIONS LISTED IN ORAL EXPOSURE SECTION WHEN APPROPRIATE. /SULFUR COMPD/ [RUMACK. POISINDEX 1975-PRESENT
- ANTR - DERMAL EXPOSURE: A) ...WASH EXPOSED AREA TWICE WITH SOAP & WATER. B) PHYSICIAN SHOULD EXAM EXPOSED AREA IF IRRITATION OR PAIN PERSISTS AFTER AREA IS WASHED. C) TREATMENT SHOULD INCL RECOMMENDATIONS LISTED IN ORAL EXPOSURE SECTION WHEN APPROPRIATE. /SULFUR COMPD/ [RUMACK. POISINDEX 1975-PRESENT MGMNT 1]

CONTINUE PRINTING? (YES/NO)

USER:

Y

- HTOX - ZINC SULFIDE, AS WELL AS BARIUM SULFATE WHICH WAS SIMILARLY ENCOUNTERED /FROM LIQ CENTER OF GOLF BALL ACCIDENTLY SQUIRTED INTO EYE OF 2 CHILDREN/, PRODUCED ONLY SLIGHT MACROPHAGE REACTION & NEGLIBLE TISSUE DAMAGE. [GRANT. TOX OF THE EYE 1974 , p. 1099]
- HTOX - ORAL EXPOSURE MAY RESULT IN HYDROGEN SULFIDE ODOR ON BREATH (ROTTEN EGGS), DIFFICULTY IN SWALLOWING & REDNESS OF TONGUE & PHARYNX. HEADACHE, VERTIGO, EXCITEMENT OR DEPRESSION, LOSS OF MEMORY, & PROSTRATION MAY BE NOTED. TREMORS, CONVULSIONS & DEATH MAY RESULT. PNEUMONIA & PERIPHERAL NEURITIS MAY FOLLOW AFTER RECOVERY. /SULFUR COMPD/ [RUMACK. POISINDEX 1975-PRESENT
- HTOX - VOMITING, ABDOMINAL PAIN, DIARRHEA & URINARY DISTURBANCES MAY OCCUR /AFTER INGESTION/. ... INHALATION MAY RESULT IN SHORTNESS OF BREATH, COUGH, TIGHTNESS & BURNING IN CHEST, PULMONARY EDEMA, RESP DISTRESS & FAILURE. PNEUMONIA MAY FOLLOW AFTER RECOVERY. /SULFUR COMPD/ [RUMACK. POISINDEX 1975-PRESENT MGMNT 2]
- HTOX - SEE SULFIDE SALTS. IF FREE GASTRIC ACIDITY IS HIGH, THE INGESTION OF THESE SALTS MAY RESULT IN THEIR DECOMP TO HYDROGEN SULFIDE IN STOMACH, WITH SUBSEQUENT SYSTEMIC POISONING. /SULFIDE SALTS/ [GOSSELIN. CTCP 4TH ED 1976 II-55]
- HTOX - HEMOLYTIC REACTIONS, ADSORPTION TESTS, & MICROSCOPIC EVIDENCE PROVIDED INFORMATION ABOUT THE INTERACTIONS BETWEEN EITHER ZINC, ZINC OXIDE, OR ZINC SULFIDE DUST PARTICLES & HUMAN RED BLOOD CELLS. IN VITRO, ZINC DUST EXTENSIVELY HEMOLYZED RED BLOOD CELLS

Zinc Sulfide - TOXNET

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& ABSORBED THE LIBERATED HEMOGLOBIN. METALLIC ZINC HAD THE GREATEST HEMOLYTIC EFFECT & THE LARGEST HEMOGLOBIN BINDING CAPACITY; IT WAS FOLLOWED BY ZINC OXIDE & ZINC SULFIDE. [DELBECK G, DELBECK M; HEMOLYSIS AND HEMOGLOBIN ADSORPTION BY ZINC COMPOUNDS; RES EXP MED 160(4) 255 (1973)]

CONTINUE PRINTING? (YES/NO)

USER:

Y

- ADE - ...IDENTIFIED IN TISSUES OF CONJUNCTIVAE & LIDS OF TWO CHILDREN WHO WERE ACCIDENTLY SQUIRTED IN EYE WITH MATERIAL FROM THE LIQUID CENTER OF GOLF BALLS. [GRANT. TOX OF THE EYE 1974 , p. 1099]
- NATS - OCCURS IN NATURE AS THE MINERALS WURTZITE & SPHALERITE. [MERCK INDEX 9TH ED 1976 , p. 1310]
- NATS - ...ABOVE A RATIO OF FE:ZN OF 1:5 THE MINERAL IS CALLED MARMATITE; ABOVE 5:6 SPHALERITE STRUCTURE CEASES TO EXIST. NEXT TO FE, CD IS MOST COMMON IMPURITY IN SPHALERITE... GALLIUM & GE ALSO OCCUR IN SPHALERITE (LOW TEMP FORMATION); SN & INDIUM OCCUR IN TRACES FROM HIGH TEMP DEPOSITS. [PATTY. INDUS HYG & TOX 3RD ED VOL2A,2B,2C 1981-82 , p. 2033]

Zinc Sulfide - TOXNET

0021187



MATERIAL SAFETY DATA SHEET

J. T. Baker Chemical Co., 222 Red School Lane, Phillipsburg, N.J. 08865

SECTION I. IDENTIFICATION OF PRODUCT

CHEMICAL NAME Fluorescein, Sodium Derivative, Sodium Salt	FORMULA 2-NaOCOC ₆ H ₄ C:C ₆ H ₃ -3(:)OC ₆ H ₃ -6-ONa
SYNONYM OR CROSS REFERENCE	CAS NO: 518-47-8

SECTION II. HAZARDOUS INGREDIENTS

MATERIAL	NATURE OF HAZARD

SECTION III. PHYSICAL DATA

BOILING POINT	MELTING POINT
VAPOR PRESSURE	SPECIFIC GRAVITY
VAPOR DENSITY (AIR=1)	PERCENT VOLATILE BY VOLUME (%)
WATER SOLUBILITY Soluble	EVAPORATION RATE (_____ ° 1)
APPEARANCE Orange-red powder	

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used)	FLAMMABLE LIMITS	Lower	Upper
FIRE EXTINGUISHING MEDIA CO ₂ , dry chemical			
SPECIAL FIRE-FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARD			

SECTION V. HEALTH HAZARD

THRESHOLD LIMIT VALUE
HEALTH HAZARDS Of low hazard to health
FIRST AID PROCEDURES

MATERIAL SAFETY DATA SHEET



DIVISION ADDRESS

MOBAY CHEMICAL CORPORATION
Inorganic Chemicals Division
Penn Lincoln Parkway West
Pittsburgh, PA 15205

ISSUE DATE 11-8-84
SUPERSEDES 11-2-83

TRANSPORTATION EMERGENCY: CALL CHEMTREC
TELEPHONE NO: 800-424-8300; DISTRICT OF COLUMBIA: 202-483-7618

MOBAY NON-TRANSPORTATION EMERGENCY NO
(412-923-1800)

I. PRODUCT IDENTIFICATION

PRODUCT NAME.....: Octapix PS13
PRODUCT CODE NUMBER.....: 0204
CHEMICAL FAMILY.....: Polysaccharide
CHEMICAL NAME.....: Starch
T.S.C.A. STATUS.....: Yes

II. HAZARDOUS INGREDIENTS

COMPONENTS:

Starch

CURRENT TLV:

10mg/m³ total dust
5mg/m³ respirable dust

III. PHYSICAL DATA

APPEARANCE.....: Solid
COLOR.....: White
ODOR.....: Odorless
VAPOR PRESSURE.....: ~0mmHg
BULK DENSITY.....: 400g/l
SOLUBILITY IN WATER.....: completely

IV. FIRE & EXPLOSION DATA

FLASH POINT °F(°C).....: None
EXTINGUISHING MEDIA.....: Water spray, CO₂, dry chemicals
SPECIAL FIRE FIGHTING PROCEDURES/UNUSUAL FIRE OR EXPLOSION HAZARDS:

Organic dusts can form explosive mixtures in air. Precautions should be taken to prevent the build up of electrostatic charges and to remove all ignition sources where dust clouds or dust accumulations are present.

HUMAN EFFECTS

OF OVEREXPOSURE.....: This material is practically non-toxic.
It does not irritate the skin. Eye contact causes only a slight transient irritation. Inhalation of the airborne dust will cause effects similar to any nuisance type dust.

THRESHOLD LIMIT VALUE.....: For nuisance dusts: 10mg/m³ total dust.
5mg/m³ respirable dust.

Product Code: 0204

Page 1 of 2

VI. EMERGENCY & FIRST AID PROCEDURES

EYE CONTACT.....: Flush eyes with water. If irritation persists consult a physician.
 SKIN CONTACT.....: Wash with soap and water.
 INHALATION.....: Remove from the dusty area.

VII. EMPLOYEE PROTECTION RECOMMENDATIONS

EYE PROTECTION.....: Safety glasses.
 SKIN PROTECTION.....: None normally required.
 RESPIRATORY PROTECTION....: NIOSH approved for dusts and mists. Do not exceed the use limits of the respirator.
 VENTILATION.....: Use local exhaust or other means to control dust exposures.

VIII. REACTIVITY DATA

STABILITY.....: Stable
 POLYMERIZATION.....: Will not occur
 INCOMPATIBILITY.....: None known
 (MATERIALS TO AVOID)....: None known
 HAZARDOUS DECOMPOSITION.....: None known
 PRODUCTS.....: None known

IX. SPILL OR LEAK PROCEDURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:**

Sweep up and place in appropriately marked containers. Avoid generating dust.

WASTE DISPOSAL METHOD:

Landfill or incinerate in accordance with federal, state and local requirement.

X. SPECIAL PRECAUTIONS & STORAGE DATA**STORAGE TEMPERATURE**

(MIN./MAX.).....: Ambient/Ambient

AVERAGE SHELF LIFE.....: Unlimited

SPECIAL SENSITIVITY

(HEAT, LIGHT, MOISTURE): None

PRECAUTIONS TO BE TAKEN

IN HANDLING AND STORING: Dust is combustible. Use good house keeping practices to minimize dust accumulation on electrical or other potential ignition sources.

XI. SHIPPING DATA

TECHNICAL SHIPPING NAME...: Starch

D.O.T. HAZARD

CLASSIFICATION.....: Non-Regulated

FRT. CLASS PKG.....: Starch, NOI

REASON FOR ISSUE.....: New Product Code

APPROVED BY.....: Robert C. Campbell

TITLE.....: Regulatory Affairs Specialist

DATE APPROVED.....: November 1, 1984

PRODUCT CODE 0264

Page 2 of 2

HACH COMPANY
International Safety
Regulatory Department
P.O. Box 907
Ames, Iowa 50010 U.S.A.
TWX: 910-620-1158

MATERIAL SAFETY DATA SHEET

HACH EUROPE
BP 51
85000 NAMUR 1
BELGIUM

WORLD HEADQUARTERS



HACH COMPANY
P.O. BOX 389 LOVELAND, COLORADO 80537 U.S.A.

I. PRODUCT IDENTIFICATION			
CAT. NO.	20584	TRADE NAME	SUGAR 30 - 50 mesh
CAS NO.	57-50-1	CHEMICAL NAME	Sucrose
FORMULA	C ₁₂ H ₂₂ O ₁₁	CHEMICAL FAMILY	carbohydrate
			EMERGENCY TELEPHONE NO AMES, IOWA 515-232-2533

II. HAZARDOUS INGREDIENTS						
INGREDIENT	%	TLV	CAS NUMBER	NATURE of HAZARD	RCRA NO.	Ref.
Sucrose	100	10mg/M ³	57-50-1	A dust nuisance: non-toxic		3

III. PHYSICAL DATA			
Solid	XX	Appearance and Odor	monoclinic, sphenoidal crystals.
Liquid		Solubility in Water	very soluble
Boiling Pt.	NA	Melting Pt	Dec. @ 160-180°C
Specific Gravity	1.587 @ 25°C	Vapor Pressure (mmHg)	Not applicable
Evaporation Rate	Not applicable	Vapor Density (Air=1)	Not applicable
		Metal Corrosivity	None

IV. FIRE and EXPLOSION HAZARD DATA			
Flash Point (Method Used)	Not applicable	Flammability Limits	NA
Susceptibility to Spontaneous Heating	None	Shock Sensitivity	None
Fire Point	ND°C	Auto Ignition Point	None °C
Extinguishing Media:	Water XX	CO ₂	Foam
Unusual Fire and Explosion Hazards	Not applicable		

V. HEALTH HAZARD DATA											
Acute Toxicity		Ref. 2 and 3			Rate of Degradation			Ref.			
orl rat LD ₅₀ =29.7g/ug=non-toxic					Route of Most Detrimental Exposure			Not applicable			
NFPA 	Eyes		Skin			Respiratory Tract			Target Organs for Acute Toxicities		
	Yes	No	Ref.	Yes	No	Ref.	Yes	No			Ref.
		X	3		X	3		X			3
		X	3		X	3	X				3
Chronic Toxicity		Not applicable			Route of Most Detrimental Exposure						
Target Organs											
Effects of Over Exposure											
Long Term Effects*					Ref.			Route of Exposure			
Target Organs											

* The following definitions apply:
 Carcinogen: A substance which has the potential to promote malignant growth.
 Mutagen: A substance which has the potential to induce genetic changes.
 Teratogen: A substance which has the potential to cause defects to progeny.
 Tumorigen: A substance which has the potential to induce benign tumors.
 The above terms, when used without a modifier mean that there is epidemiological evidence that a substance affects man. The following modifiers are used to indicate the type of studies currently reported in literature.
 Potential: Some animal studies are positive, some negative or a structural analog of the substance gives positive results in animals.
 Suspected: All animal studies are positive.
 Experimental: Only one set of data exists and it is positive.

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VI. PRECAUTIONARY MEASURES			
For Customer Use	Not sold	Respiratory Protection	Protective Gloves
		Eye Protection	Other
For International Use EEC Cautionary Codes R- 36/37 S- 22 - 25			
Storage Precautions Keep dry			
Production Hazards None		Eye/Face Protection Not applicable	
		Protective Gloves Not applicable	
		Respiratory Protection adequate ventilation	
		Protective Clothing Not applicable	

VII. FIRST AID	
Call your local Poison Center or Physician first. Have them call: Hach Company 515 232-2533 or TWX:910-520-1158. (24 Hour Safety Service)	
EYE CONTACT:	Wash with plenty of lukewarm water.
SKIN CONTACT:	
INGESTION:	
INHALATION:	Remove to fresh air.
EEC CODE: S:	22 - 25

VIII. REACTIVITY DATA			
Shelf Life	Strong Oxidizer: Yes No XXX	Hazardous Polymerization Possible: Yes No XXX	
Hazardous Decomposition Products Not applicable			
Conditions to Avoid Not applicable			

IX. SPILL AND DISPOSAL PROCEDURES	
In Case of Spill or Release	Scoop in a beaker of water and flush down the drain.
Dispose of in accordance with Federal, State and Local regulations.R:	

X. TRANSPORTATION REQUIREMENTS	
DOT Classification	NCR PSN:
IMCO Classification	NCR PSN:
IATA Classification	NCR PSN:

PREPARED BY: Giovanna F. Olson	DATE ISSUED: June 28, 1982	APPROVED: <i>[Signature]</i>
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