27
9/20/79

ORNL/TM-6981/V1

**Materials Safety Data Sheets
The Basis for Control of Toxic Chemicals
Volume 1**

E. E. Ketchen
W. E. Porter

MASTER

OAK RIDGE NATIONAL LABORATORY
OPERATED BY UNION CARBIDE CORPORATION • FOR THE DEPARTMENT OF ENERGY

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

DISCLAIMER
This book was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

ORNL/TM-6981/V1
(Rev. Dec. 1979)

Contract No. W-7405-eng-26

HEALTH DIVISION

Industrial Hygiene Department

MATERIAL SAFETY DATA SHEETS

THE BASIS FOR CONTROL OF TOXIC CHEMICALS

VOLUME 1

E. E. Ketchen
W. E. Porter

Date Published: September 1979

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830
operated by
UNION CARBIDE CORPORATION
for the
Department of Energy

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Printed in the United States of America. Available from
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road, Springfield, Virginia 22161
Price: Printed Copy \$15.00; Microfiche \$3.00

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, contractors, subcontractors, or their employees, makes any warranty, express or implied, nor assumes any legal liability or responsibility for any third party's use or the results of such use of any information, apparatus, product or process disclosed in this report, nor represents that its use by such third party would not infringe privately owned rights.

FOREWORD

The Material Safety Data Sheets contained in this volume are the basis for the Toxic Chemical Control Program developed by the Industrial Hygiene Department, Health Division, ORNL. The three volumes are the update and expansion of ORNL/TM-5721 and ORNL/TM-5722 "Material Safety Data Sheets The Basis for Control of Toxic Chemicals", Volume I and Volume II. As such, they are a valuable adjunct to the data cards issued with specific chemicals. The chemicals are identified by name, stores catalog number where appropriate, and sequence numbers from the NIOSH Registry of Toxic Effects of Chemical Substances, 1977 Edition, if available.

The data sheets were developed and compiled to aid in apprising the employees of hazards peculiar to the handling and/or use of specific toxic chemicals. Space limitation necessitate the use of descriptive medical terms and toxicological abbreviations. A glossary and an abbreviation list were developed to define some of those sometimes unfamiliar terms and abbreviations. Questions concerning these data sheets should be referred to the Industrial Hygiene Department.

The three volumes are being printed in a looseleaf form to accommodate additional data sheets and updated sheets without the re-issue of new volumes. The page numbers are keyed to the catalog number in the chemical stores at ORNL.

**THIS PAGE
WAS INTENTIONALLY
LEFT BLANK**

(Rev. Dec. 1979)

V

TABLE OF CONTENTS

FOREWORD

1. Control of Toxic Materials

Introduction

Mechanics of System

Conclusion

References

2. Glossary of Terms

3. Abbreviations

4. Material Safety Data Sheets

Page Index

Data Sheets

5. Appendix

Chemical Abstracts Service Registry Number

(To be Continued in ORNL/TM-6981/V2)

CONTROL OF TOXIC MATERIALSIntroduction

The widely divergent activities of Oak Ridge National Laboratory make it virtually impossible for the industrial hygiene group to anticipate the use of all toxic materials and to monitor each operation involving their use. Hence the user must have a knowledge of the toxicity of the material he is using in order to use it in a safe manner.

More than five years ago a program⁽¹⁾ was developed to: 1) inform the material user of the health hazards and 2) inform Industrial Hygiene of the toxic material use. When a chemical is purchased from the chemical store room, the user receives a toxic material control card (TMCC). The front side of the card contains information relative to potential health hazards. The user describes the proposed use of the material, the location, and identifies himself on the back side of the card before returning it to the Industrial Hygiene Department. With this information, appropriate follow-up action can be taken relative to the handling of the material. Attached to the card is a gummed label which gives the health, flammability and reactivity rating, along with other special information in abbreviated form. The user detaches the label from the card and affixes it to the container.

At the time the TMCC is prepared, a more detailed material safety data sheet (MSDS) is also prepared to provide additional information for both the user and the Industrial Hygiene Department. Toxicity may not be a direct measurement of the health hazard. In some cases the

material may be extremely toxic, but the physical properties may be such that it is easy to prevent exposure. Hence, the MSDS can be valuable in several ways to the user. An attempt is made to place the MSDS's in many locations throughout the Laboratory in order to have them available to all who may need them.

Mechanics of System

ORNL stores chemicals are classified as to toxicity, flammability, reactivity, and special properties using a 0 through 4 index.^(1,2) At this point those materials which are extremely toxic or highly toxic (Class 3 and 4) have been classified and put into the system. Materials which are of importance primarily because of flammability and/or reactivity have not yet been included. Through a joint effort with the ORNL Safety Department, materials with limited shelf life, such isopropyl ether, have also been included.

The toxicity rating appears on the tear-off label portion of the card. Descriptive terminology is given in Table I. The materials are placed in a 0 through 4 toxicity class based on the range of threshold limit values (TLV's),^(1,2,3) also shown in this table. No claim is made as to the validity of the TLV ranges shown in Table I. They were selected somewhat arbitrarily by mutual agreement of representatives of the Industrial Hygiene Departments of the Nuclear Division plants. In cases where the TLV of a material is given both in parts per million parts air (ppm) and in milligrams per cubic meter of air (mg/m³), the one which results in the more restrictive (higher toxicity) rating

is preferentially used. This is, almost without exception, the ppm limit. In cases where no TLV's have been set, the oral LD₅₀ for rats, the inhalation LC₅₀ for rats, or the skin LD₅₀ for rabbits is used as shown in Table II.^(1,2) Many of the chemicals stocked at ORNL cannot be classified using Table I or II. These materials are classified on the basis of other toxicity data or by comparison with similar materials. Materials in class 2 are now being evaluated and are being placed in the system.

The TMCC is designed to inform the user of the potential health hazard(s) of stores chemicals (Fig. 1). The current TLV's (if available) and the routes of absorption into the body are listed on the TMCC. The reader is informed of the acute symptoms of exposure and the effects of chronic exposure. Brief emergency procedures, which are to be used in the event of an exposure, and unusual hazards are also given. In the space designated as "carcinogen" on the TMCC, a "yes", "no", or "neoplastic" is entered, followed by "mutagen" and/or "teratogen" if applicable. (See Figs. 1,2). The health, flammability and reactivity hazard ratings are shown on the label as a 0-4 designation, as well as a special hazard notice (if any).

Recently, with the adoption of new rules on the release of toxic materials to the environment,⁽⁴⁾ the word "spills" has been added to the label, and the phrase "report all spills" has been added to the TMCC in the section for unusual hazards, as shown in Fig. 1. This alerts the employee to the fact that there are rules on the discharge of this material and that he must contact the Laboratory Environmental

Coordinator before disposing of the material.

The MSDS's compiled in this volume were designed to provide additional information beyond the scope of TMCC's. The MSDS contains all the information from the TMCC, but in an expanded form, with the exception of the environmental control information. This will be included in a manual being developed by the Laboratory Environmental Coordinator. In addition, physical properties information, toxicity data (such as LD50's and LC50's), and fire and explosion data are given.

The toxicological information is printed on the TMCC (shown in Fig. 1), which is about 7 1/2 X 3 1/2 inches. The shelf life is reported on both the TMCC and adhesive-backed label (shown in Fig. 3). These are found in the stores bin along with the chemical and the stores issue card. When the material is issued, the purchaser receives the TMCC. The employee, who uses the material or who is responsible for its use, is requested to read the information on the front side of the card and sign the card as an indication he understands the information.

The employee who uses the chemical(s) is requested to furnish information concerning its planned use. Space is available for this purpose on the back side of the TMCC (Fig. 4). Since in certain cases it is difficult to correlate the material purchase (by one employee) with the use (by another employee), the charge number and data are requested. The description of use, which should include precautions to avoid exposure, is also an important part. This information helps to determine whether it is necessary for an industrial hygiene representative to contact the user of the material. The other information on the card is

an aid to the location and identification of the worker. The employee then returns the completed card to the Industrial Hygiene Department, Bldg. 3550.

The materials issued are checked monthly against the TMCC's returned (a sample reconciliation report sheet is shown in Fig. 5). To help reconcile the toxic material purchases with the returned TMCC's, employee badge number is also requested. Each Division Safety Officer is given the tabulated results of the reconciliation report and asked to contact the employee(s) in his particular division who did not comply.

CONCLUSION

The toxic material control card was designed to inform the user, in a brief descriptive format, of materials with toxic properties and to have the user inform Industrial Hygiene of plans for use of the material. The MSDS is designed to give the user more comprehensive information on the toxic material.

TABLE I

Relative Toxicity Criteria Based on TLV's			
Rating	Commonly Used Term	TLV	
		ppm	mg/c.m.
4	Extremely Toxic	≤10	≤.25
3	Highly Toxic	11 to 250	.26 to 2.5
2	Moderately Toxic	251 to 500	2.51 to 5.0
1	Slightly Toxic or Practically Non-Toxic	501 to 1000	5.1 to 10
0	Relatively Harmless	>1000	>10

TABLE II

Relative Toxicity Criteria Based on LD50 and LC50 Data

Commonly Used Term	LD50 Single Oral Dose Rats mg/kg	LC50 Inhalation 4-hr. Vapor Exposure Rats PPM	LD50-Skin Rabbits mg/kg
Extremely Toxic	≤ 1	≤ 10	≤ 5
Highly Toxic	1.1 to 50	11 to 100	5.1 to 43
Moderately Toxic	50.1 to 500	101 to 1,000	44 to 340
Slightly Toxic or Practically Non- Toxic	501 to 15,000	1,001 to 100,000	350 to 22,600
Relatively Harmless	>15,000	>100,000	>22,600

CATALOG NO. 03-206-8801 ORNL (3)

MATERIAL

ACRYLONITRILE

CONTROL OF TOXIC MATERIALS

OSHA THRESHOLD LIMIT VALUE

2PPM

CARCINOGENIC

YES

-MUTAGEN-TERATOGEN

PRINCIPLE ROUTES OF ABSORPTION **ABSORPTION THROUGH THE SKIN, INHALATION, INGESTION.**

RELEVANT SYMPTOMS OF EXPOSURE **HEADACHE, NAUSEA, VOMITING, ABDOMINAL CRAMPS, UNCONSCIOUSNESS, CONVULSIONS**

EFFECTS OF CHRONIC EXPOSURE **FLUSHING OF FACE, NAUSEA, JAUNDICE, TUMORS OF C.N.S.**

& EAR CANAL.

EMERGENCY AND FIRST AID PROCEDURES **GET MEDICAL ATTENTION, WASH SKIN WITH SOAP & WATER. INHALATION- INHALE AMYL NITRITE VAPOR; IF SWALLOWED- GIVE EMETIC.**

UNUSUAL HAZARDS

REPORT ALL SPILLS.

TEAR OFF PERFORATED LABEL AND AFFIX
TO CHEMICAL CONTAINER.

SIGNED USER OF MATERIAL

UCN-10736

(1235 10-75)

(PLEASE COMPLETE REVERSE SIDE)

ACRYLONITRILE

FLAMMABILITY

***SPILL/POLYMER.**

0=HARMLESS

1=SLIGHT HAZARD

2=HAZARDOUS

3=HIGH HAZARD

4=EXTREMELY HAZARD

Fig. 1

CATALOG NO. 03-026-2805

DRNL (3)

MATERIAL

CONTROL OF TOXIC MATERIALS

CADMIUM CHLORIDE

OSHA THRESHOLD LIMIT VALUE

0.032 MG/C.M.

PRINCIPLE ROUTES OF ABSORPTION

CARCINOGENIC

NEOPLASTIC

TERATOGEN

INHALATION OR INGESTION OF DUST.

RELEVANT SYMPTOMS OF EXPOSURE NAUSEA, VOMITING, DIARRHEA, HEADACHE, SALIVATION,

LIVER DAMAGE, RENAL FAILURE, AND SHORTNESS OF BREATH.

EFFECTS OF CHRONIC EXPOSURE LOSS OF SENSE OF SMELL, COUGH, DYSPNEA, WEIGHT LOSS,

ANEMIA, AND YELLOW-STAINED TEETH.

EMERGENCY AND FIRST AID PROCEDURES

REMOVE FROM EXPOSURE. OBTAIN MEDICAL AID.

UNUSUAL HAZARDS

REPORT ALL SPILLS.

TEAR OFF PERFORATED LABEL AND AFFIX
TO CHEMICAL CONTAINER.

SIGNED (USER OF MATERIAL)

UCN-10736

1235 10-75)

(PLEASE COMPLETE REVERSE SIDE)

CADMIUM CHLORIDE

FLAMMABILITY

* SPILLS

0=HARMLESS

1=SLIGHT HAZARD

2=HAZARDOUS

3=HIGH HAZARD

4=EXTREM. HAZARD

Fig. 2

CATALOG NO. 03-247-6209

ORWL (3)

MATERIAL

CONTROL OF TOXIC MATERIALS

ISOPROPYL ETHER

OSHA THRESHOLD LIMIT VALUE

250 PPM, 1050 MG/C.M.

PRINCIPLE ROUTES OF ABSORPTION

CARCINOGENIC

NO

INHALATION, INGESTION.

RELEVANT SYMPTOMS OF EXPOSURE

ANESTHETIC ACTION, MUCOUS MEMBRANE IRRITATION.

EFFECTS OF CHRONIC EXPOSURE

DERMATITIS

EMERGENCY AND FIRST AID PROCEDURES IF SWALLOWED - GIVE EMETIC, GET MEDICAL AID; WASH SKIN & EYES; INHALATION - GIVE OXYGEN AS NEEDED.

UNUSUAL HAZARDS REACTS WITH OXYGEN TO PRODUCE EXPLOSIVE PEROXIDES. SHELF LIFE 3 MONTHS

TEAR OFF PERFORATED LABEL AND AFFIX TO CHEMICAL CONTAINER.

SIGNED (USER OF MATERIAL)

UCN-10736
(1235 10-75)

(PLEASE COMPLETE REVERSE SIDE)

ISOPROPYL ETHER

FLAMMABILITY

0=HARMLESS
1=SLIGHT HAZARD
2=HAZARDOUS
3=HIGH HAZARD
4=EXTREM. HAZARD
SHELF LIFE 3MO

Fig. 3

PLEASE
PRINT

**** THIS CARD MUST BE FILLED OUT BY PERSON USING CHEMICAL AND**

RETURNED TO YOUR PLANT INDUSTRIAL HYGIENE DEPARTMENT IMMEDIATELY.

NOTE: BIOLOGY DIVISION STAFF SEND CARDS TO INDUSTRIAL HYGIENE DEPARTMENT AT X-10, BLDG. 3550

* CHARGE OR WORK ORDER NUMBER	DIVISION NAME	DATE OF PURCHASE
BUILDING	ROOM	QUANTITY PURCHASED
DESCRIPTION OF USE, INCLUDING PRECAUTIONS (e.g., OPERATION IN HOOD)		
PHONE	BADGE NUMBER	NAME (PLEASE PRINT)

* Charge or Work Order for Identification only. ** Only one completed card required for each purchase.

Fig. 4

PAGE 17 ORNL TOXIC CHEMICALS USAGE RECONCILIATION REPORT 7010 03/08/79 TIME: 231328														
-----STORES USAGE INFORMATION-----														
ACCOUNT	WORK ORD	DESCRIPTION	UNIT	QTY	DEPT	BADGE	DATE	UNIT	QTY	BLOG	NAME	BADGE	ACCT/NO	DATE
***** * * * RETURNED FORM UCN-14736/12315-*****														
DIVISION 02 TOTAL (03-214-7036) -----			2	NO. ISSUES: 1		0	NO. DOCUMENTS RETURNED: 0							
3420-65-0172		BENZENE BENZOL	BTL	1	3420	046189154	02-07	1	4500N			046189154	3420650172	02-06
3420-65-0235		BENZENE BENZOL	BTL	1	3420	414082610	02-26	1	4500N			414082610	3420650235	02-26
								5	4500N			257190446	3420650235	02-27
DIVISION 04 TOTAL (03-215-7036) -----			2	NO. ISSUES: 2		7	NO. DOCUMENTS RETURNED: 3							
CHEMICAL NO. TOTAL (03-215-7036) -----			4	NO. ISSUES: 3		7	NO. DOCUMENTS RETURNED: 3							
3390-65-0285		BENZENE	BT	1	3390	571082078	01-31	1	4500S			571082078	3390650285	01-31
3390-65-0285		BENZENE	BT	1	3390	571082078	02-06	1	4500S			571082078	3390650285	02-06
3390-65-0275		BENZENE	BT	1	3390	359108591	02-12	1	4500S			359108591	3390650275	02-12
3390-65-0226		BENZENE	BT	1	3390	410441495	02-22	1	4500S			410441495	3390650226	02-22
3390-65-0275		BENZENE	BTL	2	3390	359108591	02-26	2	4500S			359108591	3390650275	02-26
3390-65-0265		BENZENE	BTL	1	3390	571082078	02-26	1	4500S			571082078	3390650265	02-26
DIVISION 01 TOTAL (03-214-7106) -----			7	NO. ISSUES: 6		7	NO. DOCUMENTS RETURNED: 6							
4455-65-0672		BENZENE BENZOL PUR	BTL	2	4455	213487511	02-05	2	9201			213487511	4455650672	02-02
DIVISION 02 TOTAL (03-214-7106) -----			2	NO. ISSUES: 1		2	NO. DOCUMENTS RETURNED: 1							
3420-65-0235		BENZENE	BTL	1	3420	264300251	02-16	1	4000N					
								1	4500N					02-22
														02-23
								1	4500N					02-23
DIVISION 04 TOTAL (03-215-7106) -----			1	NO. ISSUES: 1		3	NO. DOCUMENTS RETURNED: 4							
3203-65-0141		BENZENE	BTL	1	3203	99999	02-09							
3203-65-0141		BENZENE	BTL	1	3203	99999	02-21							
3203-65-0141		BENZENE	BTL	1	3203	99999	02-23							
DIVISION 20 TOTAL (03-215-7106) -----			3	NO. ISSUES: 3		0	NO. DOCUMENTS RETURNED: 0							
CHEMICAL NO. TOTAL (03-215-7106) -----			13	NO. ISSUES: 11		12	NO. DOCUMENTS RETURNED: 11							
3420-65-0240		CARBON DISULFIDE	BTL	1	3420	365403587	02-16	1	4500N			365403587	3420650240	02-16

1-12

Fig. 5

- FIG. 1 CONTROL CARD FOR ACRYLONITRILE
- FIG. 2 CONTROL CARD FOR CADMIUM CHLORIDE
- FIG. 3 CONTROL CARD FOR ISOPROPYL ETHER
- FIG. 4 REVERSE SIDE OF CONTROL CARD
- FIG. 5 PRINTOUT SHEET FROM RECONCILIATION REPORT

REFERENCES

1. Porter, W. E., C. L. Hunt and N. E. Bolton: A System for Labeling and Control of Toxic Materials in a Large Research Facility. Am. Ind. Hyg. Assoc. J. 36: 51-56 (1977).
2. U. S. Department of Health, Education and Welfare: A Recommended Standard An Identification System for Occupationally Hazardous Materials. HEW Publication No. (NIOSH) 75-126:13-23 (1974).
3. Threshold Limit Values for Chemical Substances in Work Room Air Adopted by ACGIH for 1978. Am. Conf. of Gov. Ind. Hyg. Cincinnati (1978).
4. Federal Register 44(34): 10,280 - 10,283, Friday, Feb. 16, 1979.

PAGES 2-1 to 2-2
WERE INTENTIONALLY
LEFT BLANK

Albumin	A water-soluble protein excreted in urine
Anemia	A condition in which the blood is deficient in hemoglobin and/or numbers of red cells compared with normal blood
Anesthesia	Loss of feeling or sensation, especially the loss of tactile sensibility
Anorexia	Lack or loss of the appetite for food
Anosmia	Absence of the sense of smell
Anuria	Total suppression of urinary output by the kidney
Apathy	Lack of feeling or emotion, indifference
Arthralgia	Neuralgia or pain in a joint
Asbestosis	Lung disease caused by prolonged inhaling of asbestos
Asphyxia	Suffocation
Bronchiolitis	Capillary bronchitis
Bronchitis	Inflammation of the bronchial tubes
Bronchopneumonia	Inflammation of the lungs following infection of the upper respiratory tract, infectious fevers, or debilitating diseases
Bronchospasms	Bronchial spasm
Carcinoma	A malignant new growth made up of epithelial cells, which give rise to metastases
Cataract	An opacity of the crystalline eye lens or its capsule
Cirrhosis	A disease of the liver marked by the progressive destruction of liver cells

Conjunctivitis	Inflammation of the conjunctiva, the delicate membrane that lines the eyelids and covers the eyeballs
Convulsion	A violent contraction of the voluntary muscles
Cornea	Transparent structure of the external layer of the eyeball
Cyanosis	Blueness of the skin caused by insufficient oxygenation of the blood
Delirium	A mental disturbance marked by illusion, hallucinations, physical restlessness, and incoherence
Dermatitis	Inflammation of the skin
Dyspnea	Difficult or labored breathing
Emphysema	A swelling or inflation due to presence of air in the interstices of the connective tissues of the lungs
Epigastric	Pertaining to the belly or (epigastrium)
Erosion	An eating or gnawing away
Euphoria	Exaggerated sense of well-being
Gangrene	Anemic necrosis of tissue
Gastroenteritis	Inflammation of the stomach and intestines
Goiters	Enlargement of the thyroid gland
Hallucinations	A sense perception not founded upon objective reality
Hematemesis	Vomiting of blood
Hematuria	Discharge of blood in the urine
Hemoglobinuria	Presence of hemoglobin in the urine
Hemolytic Anemia	Anemia due to active destruction of red cells

Hepatitis	Inflammation of the liver
Hyperactivity	Overactivity
Hyperemia	Excess of blood in any part of the body
Hyperpnea	Abnormal exaggeration of the respiratory movements
Hypotension	Abnormally low blood pressure
Hypothermia	Abnormally low temperature
Inebriation	The condition of being drunk
Ingestion	The act of taking food, medicines, etc. into the body by mouth
Insomnia	Inability to sleep
Intoxication	The condition produced by excessive use of alcohol; also, the state of being poisoned
Lacrimation	The secretion and discharge of tears
Laryngitis	Sore throat, hoarseness, and cough due to inflammation of the larynx
Lassitude	Weakness, exhaustion
Lethargy	A condition of drowsiness of mental origin
Leukopenia	Reduction of white cells in the blood
Malaise	Uneasiness, discomfort, and distress
Malignant tumors	Tumors that tend to become progressively worse and result in death
Mottling	A condition of a tissue spotted with patches of color
Myalgia	Pain in a muscle or muscles
Narcosis	A state of profound unconsciousness produced by a drug

Narcotic	Having the effect of producing sleep or stupor and at the same time relieving pain (adj.)
Nausea	Tending to vomit, feeling of sickness at the stomach
Necrosis	Death of a circumscribed portion of tissue
Nephritis	Inflammation of the kidney (hemorrhagic)
Neuritis	Inflammation of a nerve
Neurotoxic	Poisonous or destructive to nerve tissue
Oliguria	Reduced daily output of urine
Opacity	The condition of being opaque
Opaque	Impervious to light rays
Pallor	Paleness
Palpitation	Unduly rapid beating of the heart
Papilledema	Edema of the optic papilla
Paralysis	Loss or impairment due to lesion of muscular mechanism
Petechia	A small area of discoloration formed by the effusion of blood
Pharyngitis	Inflammation of the pharynx
Pneumonitis	Localized inflammation of the lung
Polyneuritis	Inflammation of many nerves at once
Prostration	Extreme exhaustion or powerlessness
Psychic disturbances	Mental disturbances
Pulmonary edema	Fluid in the lungs
Pulmonary fibrosis	Fibrous tissues in the lungs

Pyorrhea	A discharge of pus, particularly from the gums
Retching	A strong involuntary effort to vomit
Salivation	An excessive discharge of saliva
Somnolence	Sleepiness
Stomatitis	Inflammation of the mouth
Stupor	Partial or nearly complete unconsciousness
Thiocyanate Intoxication	Characterized by central nervous system stimulation and depression, and muscular incoordination
Tinnitus	Ringings in the ears
Ulceration	The formation of an ulcer
Vertigo	A sensation as if the external world were revolving around the patient or if he were revolving in space; the term is sometimes erroneously used as a synonym for dizziness

3. Key to Abbreviations

**THIS PAGE
WAS INTENTIONALLY
LEFT BLANK**

KEY TO ABBREVIATIONS

cc	cubic centimeter
CNS	central nervous system effects
gm	gram
H	hour
IRR	irritant effects
kg	kilogram (one thousand grams)
LC50	lethal concentration 50 percent kill
LCLo	lowest published lethal concentration
LD50	lethal dose 50 percent kill
LDLo	lowest published lethal dose
C.M.	cubic meter
mg	milligram (one thousandth of a gram; 10^{-3} gm)
ml	milliliter
ppm	parts per million (v/v)
TCLo	lowest published toxic concentration
TDLo	lowest published toxic dose
TLV	threshold limit value
TWA	time weighted average
W	week
Y	year

4. Material Safety Data Sheets

**THIS PAGE
WAS INTENTIONALLY
LEFT BLANK**

InorganicPage No.

Chromic Acid	1-0721
Hydriodic Acid	1-0922
Hydrobromic Acid	1-1113
Hydrochloric Acid	1-1324
Hydrofluoric Acid	1-1500
Hydrofluosilicic Acid	1-1716
Hypophosphorous Acid (30%)	1-1917
Iodic Acid	1-2128
Nitric Acid	1-2933
Perchloric Acid	1-3703
Periodic Acid	1-3904
Phosphoric Anhydride	1-4506
Phosphoric Acid	1-4516
Phosphotungstic Acid	1-4807
Sulfuric Acid	1-7212
Sulfurous Acid	1-7262
Aluminum Chloride	6-1310
Ammonium Bichromate	8-1102
Ammonium Bifluoride	8-1503
Ammonium Fluoride	8-4401
Ammonium Hydroxide	8-5123
Ammonium Oxalate	8-6527
Ammonium Sulfide Solution	8-7851
Ammonium Vanadate	8-9336
Antimony	10-0360
Antimony Trichloride	10-0600
Arsenic Metal	13-0401
Barium Acetate	15-0102
Barium Carbonate	15-0903
Barium Chloride	15-1904
Barium Hydroxide	15-3706
Barium Metal	15-4607
Barium Nitrate	15-5538
Beryllium Nitrate	17-6661
Bromine	24-5204
Cadmium Chloride	26-2805
Cadmium (Metal)	26-4805
Calcium Fluoride	28-3516
Calcium Oxide	28-5926
Chromium Metal	40-3400
Chromic Nitrate	40-4550
Chromium Potassium Sulfate	40-5600
Cobalt Metal	42-4001
Cupric Carbonate	46-2903

Cupric Chloride	46-3433
Cupric Nitrate	46-4403
Cupric Oxide	46-4953
Cupric Sulfate	46-6403
Cuprous Chloride	46-8423
Cuprous Cyanide	46-8721
Cuprous Oxide	46-9303
Ferric Chloride	53-2624
Ferric Nitrate	53-3804
Iodine	74-1009
Lead Acetate	82-0102
Lead Chloride	82-1802
Lead Dioxide	82-3002
Lead Metal	82-4802
Lead Nitrate	82-5402
Lead Oxide	82-6002
Lead Sulfate	82-7202
Lithium Aluminum Hydride	84-1003
Lithium Fluoride	84-5003
Lithium Hydroxide	84-6003
Lithium Metal	84-8003
Mercuric Chloride	91-2006
Mercuric Iodide	91-3006
Mercuric Nitrate	91-4006
Mercurous Nitrate	91-8006
Mercury Metal	91-9026
Nickel Carbonyl	97-0001
Nickel Metal	97-2848
Nickelous Ammonium Sulfate	97-3508
Nickelous Chloride	97-4908
Nickelous Nitrate	97-7008
Nickelous Sulfate	97-8508
Phosphorous Pentachloride	106-5001
Potassium Arsenate	110-0452
Potassium Bichromate	110-0802
Potassium Bifluoride	110-1032
Potassium Chromate	110-2902
Potassium Cyanide	110-3502
Potassium Fluoride	110-4522
Potassium Hydroxide	110-5042
Potassium Metal	110-5602
Potassium Oxalate	110-6402
Potassium Periodate	110-6802
Ruthenium Chloride	121-2905
Selenium Metal	125-4006
Sodium Arsenite	131-1068
Sodium Azide	131-1108

Sodium Calcium Hydrate	131-3158
Sodium Chromate	131-3608
Sodium Cyanide	131-4008
Sodium Dichromate	131-4108
Sodium Fluoride	131-4808
Sodium Hydroxide	131-5323
Sodium Hypochlorite	131-5508
Sodium Metal	131-6028
Sodium Oxalate	131-6908
Sodium Peroxide	131-7338
Sodium Silicate	131-8148
Sodium Tellurite	131-8758
Stannic Chloride	133-3008
Stannous Chloride	133-6008
Tellurium Metal	141-5902
Titanium Chloride	150-4003
Vanadium Pentoxide	154-6035
Yttrium Metal	159-5006
Yttrium Oxide	159-8006
Zinc Chloride	161-2007

Gases

Ammonia (anhydrous)	910-4030
Carbon Monoxide	927-5550
Chlorine, liquid, compressed	934-4000
Hydrogen Sulfide	950-9425
Sulfur Dioxide	988-2020

Other

Asbestos Fiber	609-2050
----------------	----------

Precious Metals

Gold Cyanide	5201-1400
Sel-Rex Bright Gold B ₁	5201-4000
Sel-Rex Bright Gold M ²	5201-4050
Gold(ous) Potassium Cyanide	5201-6200
Osmic Acid Anhydride	5401-0401
Chloroplatinic Acid	5601-0801
Platinum Chloride	5601-1120
Diamino Platinum Nitrite	5601-1510
Rhodium Trichloride	5801-1105
Silver Carbonate	5901-1101
Silver Cyanide	5901-1251
Silver Nitrate	5901-5621

Organic Acids

Acetic Anhydride	201-0100
Acetic Acid	201-0200
P-Arsanilic Acid	201-2102
Bromoacetic Acid	201-4004
B-Bromopropionic Acid	201-4454
Chloroacetic Acid	201-5905
Chloromaleic Anhydride	201-6186
Chlorosulfonic Acid	201-6706
Formic Acid	202-1400
8 Hydroxy-5-Quinoline Sulfonic Acid	202-2903
Maleic Acid	202-4405
Maleic Anhydride	202-4505
Malonic Acid	202-4805
Methoxyacetic Acid	202-5206
Nitrophthalic Anhydride	202-9610
Oxalic Acid	203-0302
Phenylarsonic Acid	203-1303
Phthalic Anhydride	203-2024
Picramic Acid	203-2504
Picric Acid	203-2704
Pyrogalllic Acid	203-3455
Tannic Acid	203-7309
Thioglycolic Acid	203-8310
Trichloro Acetic Acid	203-9202

Organic

Acetal	205-1550
Acetaldehyde	205-2000
Acetamide	205-2500
Acetonitrile	205-5000
Acetonylacetone	205-6000
Acetyl Chloride	206-3501
Acetyl Methyl Amine	206-4501
Acetyl Methylurea	206-6001
Acetyl Thiourea	206-6501
Acetyl Urea	206-7501
Acrylonitrile	206-8801

Alcohols

Allyl Alcohol	208-0202
Iso-Amyl Alcohol	208-0332
n-Butyl Alcohol	208-0902
Isobutyl Alcohol	208-0942

Sec Butyl Alcohol	208-0962
Tertiary Butyl Alcohol	208-0982
Diacetone Alcohol	208-1602
2 Di-N-Butylaminoethyl Alcohol	208-2202
B-Di Ethylaminoethyl Alcohol	208-2752
B-Dimethylaminoethyl Alcohol	208-3102
Furfuryl Alcohol	208-5002
n-Heptyl Alcohol	208-5202
Methyl Alcohol	208-6002
N-Propyl Alcohol	208-8702

Organic

Allylamine	211-3103
Allyl Bromide	211-3203
Allyl Chloride	211-3303
P-Aminoazobenzene	211-6503
P-Aminoazobenzene Hydrochloride	211-6703
2-Amino-1, 4-Dimethylbenzene	212-0104
4 amino - 1, 3-Dimethylbenzene	212-0134
5-amino-1, 3-Dimethylbenzene	212-0164
O-aminodiphenyl	212-0204
2-Aminopyridine	212-1704
Iso amyl acetate	212-5004
n-Amyl Acetate	212-5104
Aniline	213-2005
Aniline Hydrochloride	213-2205
Aniline Sulfate	213-2405
O-Anisidine	213-3205
P-Anisidine	213-3255
Anthracene	213-4005
Azobenzene	213-9005
Azoxybenzene	213-9505
Benzalazine	216-3006
1,2-Benzanthracene	216-6006
Benzene (Benzol)	216-7006
Benzidine, Dihydrochloride	216-9146
Benzoyl Bromide	217-6107
Benzoyl Chloride	217-7107
Benzyl Bromide	219-0708
Benzyl Chloride	219-1708
Benzyl-M-Toluidine	219-8208
Benzyl-O-Toluidine	219-8238
Benzyl-P-Toluidine	219-8268
Bromal	220-0809
α -Bromo-acetophenone	220-1803

Bromoacetyl Bromide	220-2309
3-Bromo-4-Aminotoluene	220-2809
5-Bromo-2-Aminotoluene	220-3309
M-Bromoaniline	220-3809
O-Bromoaniline	220-3839
P-Bromoaniline	220-3869
Bromobenzene	220-4859
M-Bromobenzoyl Bromide	220-5809
Bromochloromethane	220-6809
P-BromoDiethylaniline	220-7809
P-Bromodimethylaniline	220-8309
2-Bromo-1, 4-dimethylbenzene	220-8809
O-Bromodiphenyl	220-9309
P-Bromodiphenyl	220 9359

PRODUCT DESIGNATION

03-001-0721
03-001-0741
Chromic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS
Chromium trioxide

FORMULA
 CrO_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See Note #1			
#1 Lowest published toxic concentration in air -						
Inhalation - human 0.110 mg/C.M.						

SECTION III PHYSICAL DATA MW 118.02

BOILING POINT decomposed	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 196°C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.7		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR
Dark, purple-red crystals.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Non-flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Decomposing material will form hot viscous foam - caution against possibility of steam explosion.

PRODUCT DESIGNATION
Chromic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV 0.05 mg/m³ CARCINOGENIC yes

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of dust or mist. SKIN AND EYE
IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Respiratory system irritant, severe skin & eye burns. If
ingested - dizziness, intense thirst, shock, oliguria and anuria.

EFFECTS OF CHRONIC EXPOSURE Dermatitis with edema & ulceration. If inhaled, ulceration,
bleeding and nasal septum perforation. Acute hepatitis & jaundice.

EMERGENCY AND FIRST AID PROCEDURES
Remove from exposure, rest, keep warm and obtain medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)
Alkali metals, organic matter, acetone, pyridine, benzene.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles - face shield
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR w/appropriate filter

OTHER PROTECTIVE EQUIPMENT
Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Separate from combustible, organic or other readily oxidizable materials.

OTHER PRECAUTIONS
Avoid storage on wooden floors.

SIGNATURE DATE

1-0721B

CAS:010034852

MW-37600

PRODUCT DESIGNATION

03-001-0922
Hydriodic AcidMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS
Hydriotic AcidFORMULA
HI

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not	available		

SECTION III PHYSICAL DATA MW - 127.91

BOILING POINT -35.38°C at m	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -50.8°C.	° F.	VAPOR DENSITY (Air = 1) 4.4
SPECIFIC GRAVITY (H ₂ O = 1) 2.85		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

Pale yellow liquid.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Use water, neutralize with chemically basic substances.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Hydriodic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Suggest value 10 PPM

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor

SKIN AND EYE

IRRITATION

Severe

REVELANT SYMPTOMS OF EXPOSURE

Conjunctivitis, pulmonary edema, coughing, choking, headache,
dizziness, cyanosis.

EFFECTS OF CHRONIC EXPOSURE

Possible jaw necrosis, erosion of teeth, bronchial irritation
with chronic cough.

EMERGENCY AND FIRST AID PROCEDURES

Ingestion - give milk of magnesia; get medical aid;
inhalation - respiratory resuscitation as needed, wash skin & eyes - get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Fluorine, Perchloric Acid

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene rubber

SPECIAL

RESPIRATION

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, full face shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Avoid physical damage.

OTHER PRECAUTIONS

SIGNATURE

DATE

1-0922B

CAS:010035106

MW38500

PRODUCT DESIGNATION

03-001-1113
Hydrobromic AcidMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Hydrobromic Acid

FORMULA

HBr

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀ PPM	
			ORAL	PERCUT.	SPECIES	CONC.
			See	Note	Rat	2858/IH
					Mouse	814 /IH
Lowest published toxic concentration in air						
Inhalation - human 3 PPM. - irritation						

SECTION III PHYSICAL DATA MW - 80.92

BOILING POINT -67°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT -88.5°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 2.77		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts./100 pts H ₂ O Very		VOLATILE % Vol.	% Wt.
APPEARANCE AND ODOR Pale yellow liquid.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Add water, then neutralize with chemically basic substances such as sodium bicarbonate, soda ash, or slaked lime.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS In contact with common metals and presence of moisture produces hydrogen which may form explosive mixtures in air.

PRODUCT DESIGNATION

Hydrobromic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 3 PPM, 10 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Conjunctivitis, pulmonary edema, coughing, choking, headache, dizziness, cyanosis.

EFFECTS OF CHRONIC EXPOSURE Possible jaw necrosis, erosion of teeth, bronchial irritation with chronic cough.

EMERGENCY AND FIRST AID PROCEDURES If ingested - give milk of magnesia, get medical aid; Inhalation - resuscitation measures if necessary. Wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Fluorine

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene rubber

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, full face shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, well-ventilated place, separated from all oxidizing material.

OTHER PRECAUTIONS

SIGNATURE

DATE

1-1113B

PRODUCT DESIGNATION

3-001-1324
Hydrochloric Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Hydrochloric Acid	FORMULA HCl

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ PPM	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published lethal concentration in air					Rat	4701/1H
inhalation - human - 1300 ppm (30 min.)					Mouse	2142/30M
			900		Rabbit	

SECTION III PHYSICAL DATA

BOILING POINT -84.9°C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -114.8°C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.187		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Use water, neutralize with chemically basic substances		
SPECIAL FIRE FIGHTING PROCEDURES Wear full protective clothing		
UNUSUAL FIRE AND EXPLOSION HAZARDS On contact with common metals produces hydrogen which may form explosive mixtures in air.		

PRODUCT DESIGNATION

Hydrochloric Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 5 ppm, 7 mg/C.M. ceiling value

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor or mist.

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Conjunctivitis, pulmonary edema, choking, coughing, headache, dizziness, cyanosis, low blood pressure and high pulse pressure. Severe ulceration of skin.

EFFECTS OF CHRONIC EXPOSURE

Possible jaw necrosis, erosion of teeth, bronchial irritation with chronic cough.

EMERGENCY AND FIRST AID PROCEDURES Ingestion: dilute with large quantities of water or milk.

Then use milk of magnesia. Eye or skin contact: flood areas with large amounts of water for 15 min. Inhalation: remove from exposure - use artificial respiration if necessary.

SECTION VI REACTIVITY DATA

Obtain medical help.

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) Calcium Carbide, Cesium Acetylene Carbide, Cesium Carbide, Dural 100, Lithium Silicide, Magnesium Boride, Rubidium Acetylene Carbide.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene Rubber

SPECIAL

RESPIRATOR

w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, full face shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, well-ventilated place, separated from all oxidizing materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

1-1324B

CAS - 007664393

MW 78750

PRODUCT DESIGNATION

Hydrofluoric Acid
03-001-1500MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀ PPM	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published toxic concentration					mouse	456/IH
inhalation - man 110 ppm/1 min.			80		rat	1276/IH
LCLO inhalation - human 50 ppm/30 min.					guinea pig	4327/15M
					monkey	1774/IH

SECTION III PHYSICAL DATA

BOILING POINT 19.4°C.	° F.	VAPOR PRESSURE at 2.5°C.	400	mm Hg.
MELTING POINT -92.3°C.	° F.	VAPOR DENSITY (Air = 1)		
SPECIFIC GRAVITY (H ₂ O = 1) 0.921 g/liter (gas) 0.987 (liquid)		EVAPORATION RATE (_____ = 1)		
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very soluble		VOLATILE	% Vol.	% Wt.
APPEARANCE AND ODOR Irritating odor				

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing

UNUSUAL FIRE AND EXPLOSION HAZARDS

Hydrogen may be formed when in contact with certain metals.

PRODUCT DESIGNATION

Hydrofluoric Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 3 PPM, 2 mg/C.M.

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

Inhalation and skin absorption.

IRRITATION

RELEVANT SYMPTOMS OF EXPOSURE

Coughing, choking, chills, possible cyanosis and pulmonary edema. Skin contact produces severe burns.

EFFECTS OF CHRONIC EXPOSURE

Slight possibility of fluorosis, weight loss, brittleness of bones, anemia, weakness, discoloration of teeth.

EMERGENCY AND FIRST AID PROCEDURES

Skin - wash thoroughly 15-60 min. Eyes - wash 5 min.

in water - Inhalation, give 100% oxygen as needed. Obtain medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Bismuthic Acid, Fluorene, (Nitric and Lactic Acids) Sodium -

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

Full protection

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

Neoprene

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

Rubber apron - full-face shield.

W/appropriate filter

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in well-ventilated area away from other chemicals.

OTHER PRECAUTIONS

SIGNATURE

DATE

1-1500B

CAS: 001309451^e

VV82250

PRODUCT DESIGNATION

03-001-1716
Hydrofluosilicic AcidMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS	FORMULA
Fluorosilicic Acid	H ₂ SiF ₆

SECTION II HAZARDOUS INGREDIENTS 2 6

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published lethal dose - oral - guinea pig 200 mg/kg.						
#2 lowest published lethal dose subcutaneous - guinea pig - 250 mg/kg.						

SECTION III PHYSICAL DATA MW 144.11

BOILING POINT N/A	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT N/A	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) N/A		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O S		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Clear liquid hydrolyzes when exposed to moist air.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		
SPECIAL FIRE FIGHTING PROCEDURES Wear full protective clothing.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Hydrogen may be formed when in contact with certain metals.		

PRODUCT DESIGNATION

Hydrofluosilicic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 3 PPM (for HF), 2 Mg/CM

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, skin absorption

SKIN AND EYE

IRRITATION

Yes

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of respiratory system, severe skin or eye burns.

EFFECTS OF CHRONIC EXPOSURE

Weight loss - brittleness of bones, anemia, weakening, discoloration of teeth.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest - give oxygen if necessary, get medical attention; wash from eyes or skin, get medical attention; if swallowed, wash mouth - drink water, milk of magnesia, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

May react exothermally with As_2O_3 or P_2O_5

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Full face shield

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

1-1716B

PRODUCT DESIGNATION

03-001-1917
Hypophosphorous Acid (30%)

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Hypophosphorous Acid

FORMULA

$H(H_2PO_2)_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA

BOILING POINT d at 140°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 26.5°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.493		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O V.S.		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless oily liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

Emits PH₃ and H₂ vapors on heating above 140°C.
May explode on heating.

PRODUCT DESIGNATION

Hypophosphorous Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Ingestion

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

Slow attack on skin, attack on mucous membranes and digestive tract.

EFFECTS OF CHRONIC EXPOSURE

Erosion of teeth.

EMERGENCY AND FIRST AID PROCEDURES

Wash from skin and eyes; if swallowed - wash mouth, drink water, then milk of magnesia, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts violently with oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Face shield

MECHANICAL (GENERAL)

GLOVES

SPECIAL

Rubber

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

Face shield and rubber apron.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

1-1917B

PRODUCT DESIGNATION

03-001-2128
Iodic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

 HIO_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
-H ₂ O at 170°C.			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
110°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
4.629			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
2.69			
APPEARANCE AND ODOR			
White crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Water		
SPECIAL FIRE FIGHTING PROCEDURES		
UNUSUAL FIRE AND EXPLOSION HAZARDS		
Strong oxidizing agent		

PRODUCT DESIGNATION

Iodic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

Respiratory system irritates; skin and eye irritation;

severe internal irritation and damage.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, get medical attention; wash from skin and eyes; if swallowed - wash mouth, drink water, then milk of magnesia, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

At 300° C. decomposes to give I₂ vapor.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Face shield and rubber apron.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

1-2128B

PRODUCT DESIGNATION

03-001-2933
Nitric AcidMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Nitric Acid

FORMULA
 HNO_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀ PPM	
			ORAL	PERCUT.	SPECIES	CONC.
					Rat	49-4 hr.

SECTION III PHYSICAL DATA MW 63.02

BOILING POINT 86°C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -42°C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.42		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O ∞		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR	Transparent, colorless to yellow or red fuming - suffocation.	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Non-combustible	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water spray		

SPECIAL FIRE FIGHTING PROCEDURES

Use water spray, wear full-protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Reacts explosively with metallic powders, carbides, hydrogen sulfide and turpentine.

PRODUCT DESIGNATION

Nitric Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 2 PPM, 5 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of fumes, attack on skin, ingestion

SKIN AND EYE

IRRITATION Yes

REVELANT SYMPTOMS OF EXPOSURE

Respiratory difficulty, feeling of oppression in chest, dyspnea, cyanosis, and syncope.

EFFECTS OF CHRONIC EXPOSURE

Yellowing of skin and erosion of teeth.

EMERGENCY AND FIRST AID PROCEDURES

For ingestion - gastric lavage with water and emollients, obtain medical attention; wash skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Acetic, Chromic and Hydrocyanic acids, Aniline, Carbon, Hydrogen Sulfide, flammable media, fluids or gases and substances which are readily

HAZARDOUS DECOMPOSITION PRODUCTS

nitrated.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

Face shield, rubber apron.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Separate from metallic powders, carbides, hydrogen sulfide, turpentine, organic acids, and all combustible, organic or other readily oxidizable materials.

OTHER PRECAUTIONS

Provide good ventilation and avoid direct sunlight.

SIGNATURE

DATE

1-2933B

PRODUCT DESIGNATION

03-001-3703
Perchloric Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Perchloric Acid	FORMULA HClO ₄

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA MW 100.46

BOILING POINT 39°C. at 56 mm.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT -112°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.764		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O very soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid, odorless.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 72%
METHOD USED		LOWER 60%
EXTINGUISHING MEDIA Water spray		
SPECIAL FIRE FIGHTING PROCEDURES Wear full protective clothing.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Explodes on contact with most organic materials.		

PRODUCT DESIGNATION

Perchloric Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not established

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor or mist.

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Conjunctivitis, pulmonary edema, choking, headache, dizziness
cyanosis, ulceration of skin.

EFFECTS OF CHRONIC EXPOSURE

Possible jaw necrosis, erosion of teeth, bronchial irritation with chronic cough.

EMERGENCY AND FIRST AID PROCEDURES

Ingestion: give milk of magnesia. Inhalation: wash skin
and eyes - use artificial respiration if necessary - obtain medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Acetic anhydride, bismuth and its alloys, alcohol, paper,
wood.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with reducing agents such as bisulfites, transfer sludge into a
large container of water for disposal.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene rubber

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, full face shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect glass container from breaking. Keep from freezing and heat.

OTHER PRECAUTIONS

Keep away from combustibles, organics, strong dehydrating reducing, and oxidizing
materials.

SIGNATURE

DATE

1-3703B

PRODUCT DESIGNATION

3-001-3904
Periodic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Periodic Acid	FORMULA $\text{HIO}_4 \cdot 2\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA

BOILING POINT N/A	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
Decomp to HIO_4 above 100°C.			
SPECIFIC GRAVITY ($\text{H}_2\text{O} = 1$) 1.39		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H_2O 7.82		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR White crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water spray		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS Strong oxidizing agent - explosive properties unknown but assumed to be like perchloric acid.		

PRODUCT DESIGNATION
Periodic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

internal irritation and damage. Respiratory system irritated; skin and eye irritation; severe

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, get medical attention; wash from skin and eyes; if swallowed - wash from skin and eyes; if swallowed - wash mouth, drink water, then milk of magnesia, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

It is a stronger oxidizing agent than $KMnO_4$

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Avoid contact with strong reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Decomposed to oxide of iodine.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

1-3904B

CAS:001314563

TH 39450

PRODUCT DESIGNATION

P_2O_5 Phosphoric Anhydride
03-001-4506

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS	FORMULA
Phosphorus Pentoxide	P_2O_5

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA MW - 141.94

BOILING POINT sublimes easily at 300°C.	° F.	VAPOR PRESSURE at 384°C.	1 mm Hg.
MELTING POINT 657	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 2.39		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

White, fluffy, crystalline, deliquescent powder.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Avoid water		

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained respirator.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Phosphoric Anhydride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 1 mg/m³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of powder, ingestion

SKIN AND EYE
IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Coughing, choking, headache, dizziness, pulmonary edema,
corrosion of skin, possible cyanosis.

EFFECTS OF CHRONIC EXPOSURE Bronchial irritation, possible gastrointestinal disturbances,
erosion of teeth and jaw necrosis.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; if swallowed - give milk of magnesia,
get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) Hydrogen Fluoride, Perchloric Acid, (Perchloric Acid and
Chloroform), Potassium, Propargyl Alcohol, Sodium, Water (Water and Organic Matter).

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Add soda ash to spill. Add Water.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION Full protection

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Neoprene
SPECIAL	RESPIRATOR With appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, full face-shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

1-4506B

PRODUCT DESIGNATION

03-001-4516
Phosphoric AcidMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Phosphoric Acid

FORMULA

 H_3PO_4

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/Kg.		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1530		Rat	
				2740	Rabbit	
Note: Lowest published toxic concentration in air inhalation - human 100 mg/C.M.						

SECTION III PHYSICAL DATA MW 98.04

BOILING POINT	° F.	VAPOR PRESSURE at 20°C.	0.0285 mm Hg.
MELTING POINT 42.35°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.864 25°C.		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid or rhombic crystals.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION Phosphoric Acid	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL 1 mg/m ³	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation	SKIN AND EYE IRRITATION Severe
RELEVANT SYMPTOMS OF EXPOSURE Coughing, choking, headache, pulmonary edema, weakness.	
EFFECTS OF CHRONIC EXPOSURE Erosion of teeth, jaw necrosis. Bronchial irritation. Chronic cough.	
EMERGENCY AND FIRST AID PROCEDURES Use respiratory resuscitation, treat shock and pulmonary edema. Obtain medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Cover with sodium carbonate.	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR w/proper filter
OTHER PROTECTIVE EQUIPMENT Rubber apron, full face-shield.	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

1-4516B

PRODUCT DESIGNATION

03-001-4807
Phosphotungstic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS	FORMULA
Phosphotungstic Acid	$P_2O_5 \cdot 12WO_3 \cdot 42H_2O$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA MW-3680.94

BOILING POINT --	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT --	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) --		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Yellow-green crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Phosphotungstic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

1.7 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Ingestion (mainly), inhalation of dust

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Loss of appetite, colic, loss of coordination, trembling, difficulty in breathing, weight loss.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES If swallowed - wash mouth, induce vomiting, get medical aid; inhalation - rest; wash skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

1-4807B

CAS:007664939

WS56000

PRODUCT DESIGNATION

Sulfuric Acid
03-001-7212
03-001-7247
03-001-7242

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sulfuric Acid

FORMULA

 H_2SO_4

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			2140		Rat	
#1 lowest published toxic concentration in air - inhalation - human 0.8 mg/kg.						

SECTION III PHYSICAL DATA MW 98.08

BOILING POINT 338°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 3°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.841		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid, oily and dense.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing - keep water away from the acid.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Sulfuric Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV 1 mg/m³

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of vapor or mist.

SKIN AND EYE
IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Choking, coughing, headache, dizziness, cyanosis. Severe
ulceration of skin.

EFFECTS OF CHRONIC EXPOSURE
Possible jaw necrosis, erosion of teeth, bronchial irritation with chronic cough.

EMERGENCY AND FIRST AID PROCEDURES Ingestion: give milk or milk of magnesia. Inhalation:
artificial respiration if necessary - wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID) Water, chlorates, perchlorates, permangantes, picrates,
carbides, powdered metals, phosphorous.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES
Neoprene rubber

SPECIAL

RESPIRATOR
With appropriate filter

OTHER PROTECTIVE EQUIPMENT
Rubber apron, full face shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Keep away from water. Separate from carbides,
chlorates, fulminates, nitrates, picrates, powdered metals, and combustible
materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

1-7212B

CAS:007782992

WT27750

PRODUCT DESIGNATION

Sulfurous Acid
03-001-7262MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sulfurous Acid

FORMULA

 H_2SO_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.

SECTION III PHYSICAL DATA MW-8202

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Prs/100 pts H ₂ O yes		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Irritating odor, clear

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION Sulfurous Acid	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 2 ppm, 5 mg/c.m. (SO₂)	CARCINOGENIC no
PRINCIPLE ROUTES OF ABSORPTION Ingestion, inhalation	SKIN AND EYE IRRITATION Moderate
RELEVANT SYMPTOMS OF EXPOSURE Dermatitis, skin burn, irritation of nose and throat, bronchitis, nausea, vomiting	
EFFECTS OF CHRONIC EXPOSURE Pneumonitis, dental erosion, vomiting of blood and eroded tissue, perforation of GI tract.	
EMERGENCY AND FIRST AID PROCEDURES Irrigate eyes with water, wash skin, gastric lavage, oxygen, decogestants	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID) Reacts with alkaline materials	
HAZARDOUS DECOMPOSITION PRODUCTS Liberates SO₂ when heated	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety goggles
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Store in well-ventilated area .	
OTHER PRECAUTIONS	
SIGNATURE	DATE

1-7262B

CAS: 007446700

BD05250

PRODUCT DESIGNATION

3-006-1310 - (Anhydrous)
Aluminum ChlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Aluminum Chloride

FORMULA

AlCl₃

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/cm.		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			3700		Rat	
			3800		Mouse	

SECTION III PHYSICAL DATA

133.33

BOILING POINT

° F.

sublimes at 178°C.

VAPOR PRESSURE

mm Hg.

MELTING POINT

° F.

d 100°C.

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)

2.398

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

APPEARANCE AND ODOR

Colorless, deiquescent crystals.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

Not combustible

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

METHOD USED

EXTINGUISHING MEDIA

Dry chemical or foam.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Violent reaction if streams of water hit large quantities of chemical.

PRODUCT DESIGNATION

Aluminum Chloride (anhydrous)

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

5 PPM (HCl)

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Coughing, dizziness. Possible skin and eye irritation.

EFFECTS OF CHRONIC EXPOSURE

None

EMERGENCY AND FIRST AID PROCEDURES

Remove from area. Wash thoroughly from skin or eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Chlorinate hydrocarbons.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover spills with sodium bicarbonate.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry area.

OTHER PRECAUTIONS

SIGNATURE

DATE

6-1310B

CAS: 007789095

HX76500

PRODUCT DESIGNATION

03-008-1102
Ammonium BichromateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ammonium Dichromate

FORMULA

 $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO subcutaneous - guinea pig	30 mg/kg					

SECTION III PHYSICAL DATA MW - 252.10

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
Decomposes at 180° C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.15			
SOLUBILITY IN WATER	Pts/100 pts H ₂ O	VOLATILE	% Vol, % Wt.
47.2			
APPEARANCE AND ODOR			
Bright orange-red crystals, odorless			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
Water		

SPECIAL FIRE FIGHTING PROCEDURES

Use water but caution should be exercised against possibility of steam explosion.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Ammonium Bichromate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.13 mg/m³

CARCINOGENIC

Yes

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

Inhalation of dust, ingestion

IRRITATION

Yes

REVELANT SYMPTOMS OF EXPOSURE

Irritation of skin and eyes;

respiratory tract

irritation and internal damage.

EFFECTS OF CHRONIC EXPOSURE

Asthmatic symptoms - liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Wash from skin and eyes; if swallowed - wash mouth, give emetic, get medical attention; inhalation - rest and keep warm.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Powerful oxidizing agent.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Reducing materials

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

As needed

OTHER PROTECTIVE EQUIPMENT

Body shield

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store away from organic or easily oxidizable materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

8-1102B

CAS: 001341497

BQ92000

PRODUCT DESIGNATION

03-008-1503
Ammonium BifluorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Ammonium Hydrogen Fluoride

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ammonium Difluoride

FORMULA

 $(\text{NH}_4)\text{HF}_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
Decomposes on heating			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.21			
SOLUBILITY IN WATER	Pts/100 pts H ₂ O	VOLATILE	% Vol. % Wt.
VS			
APPEARANCE AND ODOR			
White solid - produces HF when heated.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
ot flammable		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
Water		
SPECIAL FIRE FIGHTING PROCEDURES		
Wear full protective clothing and self-contained mask.		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

Ammonium Bifluoride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 3 PPM (for HF), 2 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ADSORPTION

Inhalation of HF, skin absorption

SKIN AND EYE

IRRITATION

Yes

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of respiratory system; severe skin or eye burns.

EFFECTS OF CHRONIC EXPOSURE Weight loss, brittleness of bones, anemia, weakness, discoloration of teeth.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; wash from skin or eyes; if swallowed - wash mouth, drink water, then milk of magnesia, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Bismuthic Acid, Fluorine, Sodium

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

8-1503B

CAS012125018

BQ63000

PRODUCT DESIGNATION

03-008-4401
Ammonium FluorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ammonium Fluoride

FORMULA

NH₄F

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 - lowest published lethal dose oral guinea pig 150 mg/kg.						
#2 - lowest published lethal dose subcutaneous - guinea pig 200 mg/kg.						

SECTION III PHYSICAL DATA MW - 37.04

BOILING POINT

° F.

VAPOR PRESSURE

mm Hg.

MELTING POINT

° F.

VAPOR DENSITY (Air = 1)

decomposes on heating

SPECIFIC GRAVITY (H₂O = 1)

EVAPORATION RATE (_____ = 1)

1.21

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

VS

APPEARANCE AND ODOR

White crystal

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

Will not burn

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

METHOD USED

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

Wear protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

May react with arsenic, trioxide and phosphorous pentoxide.

PRODUCT DESIGNATION Ammonium Fluoride	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 2.5 mg/m ³	CARCINOGENIC no
PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion, skin absorption.	SKIN AND EYE IRRITATION Moderate
RELEVANT SYMPTOMS OF EXPOSURE Irritation of respiratory system; severe internal irritation and damage; skin and eye burns -	
EFFECTS OF CHRONIC EXPOSURE Increase in fluoride content of teeth.	
EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm, get medical attention; if swallowed - wash mouth, drink water, then milk of magnesia, get medical attention; wash from skin and eyes, get medical attention.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID) As ₂ O ₃ and P ₂ O ₅	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Store away from acids.	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES Rubber gloves
SPECIAL	RESPIRATOR
OTHER PROTECTIVE EQUIPMENT Wear face mask and coveralls.	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

8-4401B

CAS: 001336216

BQ96250

PRODUCT DESIGNATION

03-008-5123
03-008-5154
Ammonium Hydroxide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ammonia

FORMULA

NH₄OH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published toxic concentration in air			350		Rat	
ocular - human 700 PPM.						
TCLO inhalation - human 5000 PPM						
LCLO oral - human 43 mg/kg						

SECTION III PHYSICAL DATA MW - 35.05

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.88 - 35% solution			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
∞			

APPEARANCE AND ODOR

Water clear liquid with ammonia smell.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Ignition temperature 1204° F. for NH ₃		
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water, dry chemical, carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES

Use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION Ammonium hydroxide	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 25 PPM, 18 mg/C.M.	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion	SKIN AND EYE IRRITATION Severe
RELEVANT SYMPTOMS OF EXPOSURE Irritation of eyes and all parts of the respiratory system, skin burns, burning in digestive system, vomiting of blood.	
EFFECTS OF CHRONIC EXPOSURE	
EMERGENCY AND FIRST AID PROCEDURES Remove from exposure, rest, keep warm, get medical aid if needed; if swallowed - wash mouth, drink water, 1% acetic acid, get medical aid; wash from skin and eyes.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR General purpose gas mask
OTHER PROTECTIVE EQUIPMENT Face shield	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Store in cool place.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

8-5123B

PRODUCT DESIGNATION

03-008-6527
Ammonium Oxalate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Ammonium Oxalate	FORMULA (NH ₄) ₂ C ₂ O ₄ ·H ₂ O

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA

BOILING POINT ° F.	VAPOR PRESSURE mm Hg.
MELTING POINT ° F. d >70°C.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.501	EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 2.5	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR White crystals	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water spray, dry chemical, carbon dioxide, dry chemical.		
SPECIAL FIRE FIGHTING PROCEDURES Wear goggles and self-contained breathing apparatus.		
UNUSUAL FIRE AND EXPLOSION HAZARDS When heated to decomposition temperature may emit toxic fumes including NH ₃ .		

PRODUCT DESIGNATION
Ammonium Oxalate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV - 1 mg/C.M. oxalic acid CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION SKIN AND EYE
Ingestion IRRITATION Yes

REVELANT SYMPTOMS OF EXPOSURE Severe internal pain, collapse, kidney damage, lung edema.

EFFECTS OF CHRONIC EXPOSURE
May produce calcium oxalate crystals in the bladder.

EMERGENCY AND FIRST AID PROCEDURES If swallowed - wash mouth, give salt water to induce vomiting, get medical aid; wash from skin or eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
MECHANICAL (GENERAL)	Safety glasses.
SPECIAL	GLOVES
OTHER PROTECTIVE EQUIPMENT	RESPIRATOR

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE DATE

8-6527B

CAS: 012124991

BS49000

PRODUCT DESIGNATION

03-008-7851

Ammonium Sulfide Solution

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ammonium Sulfide

FORMULA

 $(\text{NH}_4)_2\text{S}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
				132	mouse	
Lowest published lethal dose						
oral - mouse 80 mg/kg						
skin - mouse 245 mg/c.m.						

SECTION III PHYSICAL DATA

MW-51.12

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
N/A			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-18°C decomposes		1.2	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
N/A			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Very soluble			
APPEARANCE AND ODOR			
Clear solution with H ₂ S odor.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
500° F. ignition temperature		45%
METHOD USED		LOWER
		4.3%
EXTINGUISHING MEDIA		
Use water spray alcohol foam, carbon dioxide or dry chemical.		

SPECIAL FIRE FIGHTING PROCEDURES

Wear goggles and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Produces inflammable gas upon heating.

PRODUCT DESIGNATION

Ammonium Sulfide Solution

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - (10 PPM H₂S value)

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor, ingestion of liquid.

SKIN AND EYE

IRRITATION

Yes

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of respiratory tract; headache, dizziness, pulmonary edema.

EFFECTS OF CHRONIC EXPOSURE

Low blood pressure, nausea, loss of appetite, weight loss, chronic cough.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure, rest, keep warm, get medical aid, if swallowed - wash mouth, give emetic, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

Self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

8-7851B

CAS007803556

YW08750

PRODUCT DESIGNATION

03-008-9336
Ammonium VanadateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ammonium Vanadate

FORMULA

 NH_4VO_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			18		Rat	

SECTION III PHYSICAL DATA MW - 116.99

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER 44 Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
at 18°C.			
APPEARANCE AND ODOR			
Colored crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Ammonium Vanadate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.5 mg/m³ (V₂O₅)

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Yes

REVELANT SYMPTOMS OF EXPOSURE Irritation of the respiratory system, vomiting, excessive salivation, diarrhea, nervous system damage.

EFFECTS OF CHRONIC EXPOSURE

Bronchial asthma

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm; if swallowed - wash mouth, give emetic, get medical attention; wash eyes with water.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Vacuum or wet clean; do not dry sweep.

WASTE DISPOSAL METHOD

In sealed plastic bag.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

8-9336B

CAS007440360

CC40250

PRODUCT DESIGNATION

03-010-0360
03-010-0390
Antimony

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Antimony

FORMULA

Sb

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published toxic concentration in air - inhalation - human 4.7 mg/C.M.			100		Rat	
			See Note 1			

SECTION III PHYSICAL DATA *Aw. 121.76*

BOILING POINT 1380°C.	° F.	VAPOR PRESSURE at 886°C.	mm Hg.
MELTING POINT 630°	° F.	VAPOR DENSITY (Air = 1)	1
SPECIFIC GRAVITY (H ₂ O = 1) 6.684 at 25°C.		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE. % Vol.	% Wt.
APPEARANCE AND ODOR Grey metal (powder).			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Carbon dioxide, dry chemicals.		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Antimony

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV-TWA 0.5 mg/m³

CARCINOGENIC No

PRINCIPAL ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION Skin

RELEVANT SYMPTOMS OF EXPOSURE

Acute pneumonitis, nausea, vomiting

EFFECTS OF CHRONIC EXPOSURE

Bleeding gums, conjunctivitis, laryngitis, headache, weight loss and anemia

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure - if ingested give gastric lavage, emesis and catharsis.
(Give dimercaprol). Administer oxygen if necessary.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Oxidizing materials

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles or safety glasses

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
With appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

10-0360B

CAS:010025919

CC49000

PRODUCT DESIGNATION

03-010-0600

Antimony Trichloride

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Antimony Butter

FORMULA
SbCl₃

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published toxic concentration in air			525		rat	
inhalation - human 73 mg/C.M.			574		guinea pig	

SECTION III PHYSICAL DATA MW 228.13

BOILING POINT 219. ⁰ C.	⁰ F.	VAPOR PRESSURE at 49.2 ⁰ C. sublimes	mm Hg. 1
MELTING POINT 73.4 ⁰ C.	⁰ F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 3.14 at 25 ⁰ C.		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Colorless, transparent crystalline mass.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Reacts readily with moisture to produce HCl gas.

PRODUCT DESIGNATION

Antimony Trichloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV-TWA 0.92 mg/m³

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION Mild to moderate

RELEVANT SYMPTOMS OF EXPOSURE

Circulatory or respiratory failure, contact dermatitis.

EFFECTS OF CHRONIC EXPOSURE

Lassitude, irritability, stomatitis, constipation, possible heart damage.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure. Give demercaprol. Obtain medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Perchloric Acid

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles or safety glasses.

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, protective shoes.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

10-0600B

CAS007440382

CG05250

PRODUCT DESIGNATION

03-013-0401
Arsenic MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA
As

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published lethal dose	oral-human	5 mg/kg				
intramuscular - rat	25 mg/kg.					
subcutaneous - rabbit	300 mg/kg					
subcutaneous - guinea pig	300 mg/kg					

SECTION III PHYSICAL DATA MW 74.92

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
subl. 613°C.			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
817°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
5.727			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Grey metal

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Arsenic (Metal)

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.5 mg/m³

Teratogen

CARCINOGENIC

Yes

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

Ingestion, inhalation, skin

IRRITATION

Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Ingestion: vomiting, headache, dizziness. Inhalation: pulmonary

edema, cyanosis, cough.

EFFECTS OF CHRONIC EXPOSURE

Anemia, weight loss, lung cancer, lymphatic cancer.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - give emetic, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Avoid bromates, chlorates and iodates, also fluorides, nitrates and peroxides.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Long sleeve coveralls.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in well-ventilated area.

OTHER PRECAUTIONS

SIGNATURE

DATE

13-0401B

CAS:00054306

AF45500

PRODUCT DESIGNATION

03-015-0102
Barium AcetateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Barium Acetate

FORMULA

 $\text{Ba}(\text{OC}_2\text{H}_5)_2 \cdot \text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published lethal dose			921		rat	
oral - rabbit 236 mg/kg						

SECTION III PHYSICAL DATA MW - 255.44

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
Looses water at 41°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.19			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR			
White crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
N/A		
SPECIAL FIRE FIGHTING PROCEDURES		
N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS		
N/A		

PRODUCT DESIGNATION Barium Acetate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.93 mg/C.M.	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Ingestion, inhalation of dust	SKIN AND EYE IRRITATION Moderate
REVELANT SYMPTOMS OF EXPOSURE Nausea, vomiting, stomach pains, diarrhea, headache, weakness, paralysis of central nervous system, digitalis like action on the heart.	
EFFECTS OF CHRONIC EXPOSURE	
EMERGENCY AND FIRST AID PROCEDURES If swallowed - wash mouth, drink 2 tablespoons of epsom salts in water, then emetic; rest, keep warm, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Rubber gloves
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

15-0102B

CAS:000513779

CQ86000

PRODUCT DESIGNATION

Barium Carbonate
03-015-0903MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Barium Carbonate	FORMULA BaCO ₃

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			630		Rat	
#1 lowest published lethal dose						
oral - human 57 mg/kg.						
oral-dog 400 mg/kg						

SECTION III PHYSICAL DATA MW-197.35

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
d-1450°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
4.29			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.	
0.0022			
APPEARANCE AND ODOR			
White powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		
METHOD USED		LOWER
N/A		
EXTINGUISHING MEDIA		
N/A		
SPECIAL FIRE FIGHTING PROCEDURES		
N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS		
N/A		

PRODUCT DESIGNATION Barium Carbonate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.72 mg/C.M.	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust, ingestion	SKIN AND EYE IRRITATION Moderate
RELEVANT SYMPTOMS OF EXPOSURE Nausea, vomiting, stomach pains, diarrhea, headache, weakness, paralysis of central nervous system, digitalis-like action on heart.	
EFFECTS OF CHRONIC EXPOSURE --	
EMERGENCY AND FIRST AID PROCEDURES If swallowed - wash mouth, drink glass of water with 2 tablespoons epsom salts, then an emetic; inhalation - rest, keep warm, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

15-0903B

CAS: 010361372

CQ87500

PRODUCT DESIGNATION

Barium Chloride
03-015-1904MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Barium Chloride

FORMULA

 $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg.		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published lethal dose oral - human 11.4 mg/kg.			118		Rat	
			76		guinea pig	

SECTION III PHYSICAL DATA MW - 244.28

BOILING POINT 35.7 ²⁰	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -2H ₂ O 113 ⁰ C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 3.097 (24 ⁰ /4 ⁰)		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 39.3 gr		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Barium Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV - 0.806 mg/m³ CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION Ingestion or inhalation of dust SKIN AND EYE IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Dermatitis, conjunctivitis and bronchial irritation, arterial hypertension, muscle twitching.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES If swallowed - give 2 tablespoons of epsom salts in water, then emetic, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR W/proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE DATE

15-1904B

<p align="center">PRODUCT DESIGNATION</p> <p>Barium Hydroxide 03-015-3706</p>
--

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE	
MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	

TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Barium Hydroxide	FORMULA Ba(OH) ₂ · 8H ₂ O

SECTION II HAZARDOUS INGREDIENTS						
BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA		MW 315.48
BOILING POINT -8 H ₂ O . 780° C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 78° C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.18		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Slightly soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA		
FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Barium Hydroxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 1.15 mg/m³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Ingestion or inhalation of dust

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Dermatitis, conjunctivis and bronchial irritation, tightness of face and neck muscles, vomiting, diarrhea, weakness, difficulty in breathing.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES Give artificial respiration if necessary, specifically with oxygen if available. Antidote to be administered as soon as possible 10% sodium sulfate slowly I.V. - repeat every 15 min. until symptom subsides. 30 Gm of sodium sulfate in 250 ml of

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY water orally.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
With appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in closed containers.

OTHER PRECAUTIONS

SIGNATURE

DATE

15-3706B

PRODUCT DESIGNATION

03-015-4607
Barium MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Barium

FORMULA

Ba

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not	available		

SECTION III PHYSICAL DATA AW - 137.34

BOILING POINT 1140°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 850°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O d		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Silver metal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA Carbon dioxide and dry chemical, dry graphite soda ash,
powdered NaCl.

SPECIAL FIRE FIGHTING PROCEDURES

Wear goggles and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Barium Metal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.5 mg/m³

CARCINOGENIC

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Nausea, vomiting, stomach pain, diarrhea, headache, weakness, paralysis of central nervous system - attack on eye and skin.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES If swallowed - wash mouth, drink glass of water with 2 tablespoons of epsom salt; inhalation - rest, keep warm; get medical attention; wash from eyes and skin with water.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Water, acids

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES
Rubber gloves

SPECIAL

RESPIRATOR
Self-contained breathing mask

OTHER PROTECTIVE EQUIPMENT

Rubber protective clothing, apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in tightly closed container under inert gas.

OTHER PRECAUTIONS

SIGNATURE

DATE

15-4607B

CAS: 010022318

CQ96250

PRODUCT DESIGNATION

03-015-5538
Barium NitrateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS
Barium NitrateFORMULA
 $\text{Ba}(\text{NO}_3)_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			355		Rat	
#1 LD ₅₀ Intravenous - mouse 8.5 mg/kg.						

SECTION III PHYSICAL DATA MW - 261.37

BOILING POINT Decomposes	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 592°C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 3.24 at 23°C.		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 5 at 0°C.		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Lustrous white crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In contact with easily oxidizable substances - may react rapidly enough to cause ignition, violent combustion, or explosion.

PRODUCT DESIGNATION
Barium Nitrate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.925 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Ingestion or inhalation dust

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE Dermatitis, conjunctivitis and bronchial irritation, tightness of face and neck muscles, vomiting, diarrhea, weakness, difficulty in breathing, possible peristalsis, arterial hypertension, muscle twitching and cardiac dysfunction.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES If necessary give artificial respiration - if ingested give 2 tablespoonfuls of magnesium sulfate in water then an emetic, rest and keep warm - obtain medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

In combination with Barium Dioxide, Magnesium and Zinc.

HAZARDOUS DECOMPOSITION PRODUCTS

Yields toxic gaseous oxides of nitrogen when involved in a fire.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Separate from combustible, organic or other readily oxidizable materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

15-5538B

CAS:007787555

DS36750

PRODUCT DESIGNATION

Beryllium Nitrate
03-017-6661MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Beryllium Nitrate

FORMULA

 $\text{Be}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 LD50 intraperitoneal	- rat 501 mg/kg.		See Note 1			

SECTION III PHYSICAL DATA MW - 187.08

BOILING POINT decomp. 100-200°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 60°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.557		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

White, yellowish crystals.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		

SPECIAL FIRE FIGHTING PROCEDURES

Wear protective clothing and self-contained respirator.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Beryllium Nitrate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.002 mg/m³

CARCINOGENIC

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of fume or dust.

SKIN AND EYE

IRRITATION Moderate to severe

RELEVANT SYMPTOMS OF EXPOSURE

Acute pneumonitis, chest pain, bronchial spasms, fever.

EFFECTS OF CHRONIC EXPOSURE

Berylliosis, weight loss and marked dyspnea, variable fever and probable heart failure, eczematous dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - give oxygen if necessary, rest. Obtain medical help.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION Full Protection

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With ultra filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

17-6661B

CAS:007726956

EF-91000

PRODUCT DESIGNATION

03-024-5204
BromineMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Bromine

FORMULA

Br

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO oral - human 14 mg/kg						
LCLO - inhalation - humans 1000 ppm						
#1 LD ₅₀ intraperitoneal - rat 85.2 mg/kg.						
lowest published lethal concentration in air						
inhalation - rabbit 180 PPM - 7 hours						

SECTION III PHYSICAL DATA MW 159.81

BOILING POINT 58.78° C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -7.2° C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.928		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Slightly soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Reddish-brown fuming liquid or vapor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Non-flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA
Large amounts of water

SPECIAL FIRE FIGHTING PROCEDURES

Wear special protective clothing and gas mask.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Strong oxidizing materials.

PRODUCT DESIGNATION

Bromine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.1 ppm

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor and gas

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Severe irritant to all parts of respiratory system, can produce pulmonary edema, irritation of eyes and ulceration of skin. Pneumonia.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Remove from exposure - give artificial respiration if necessary - Body contact - irrigate thoroughly with water - if ingested, swallow large quantities of water - obtain medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID) Acetaldehyde, acetylene, acrylonitrile, aluminum, antimony, calcium Nitride, cesium, acetylene carbide, cesium monoxide, copper hydride, copper carbide, fluorine.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Hypo solution (sodium thiosulfate) or time water poured over small spills. Anhydrous Ammonia vapor releases a safe distance. Can be used to neutralize large quantities of bromine vapor.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Tight fitting goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene rubber

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Special protective clothing, rubber apron, full face-shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry area out of direct sunlight, away from combustible, organic or readily oxidizable materials.

OTHER PRECAUTIONS

Keep above 20° C.

SIGNATURE

DATE

24-5204 B

PRODUCT DESIGNATION

03-026-2805
Cadmium Chloride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Cadmium Chloride

FORMULA

CdCl₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			88		Rat	
			175		mouse	
			63		guinea pig	

SECTION III PHYSICAL DATA MW - 183.32

BOILING POINT

° F.

VAPOR PRESSURE

At 656°C.

10^{mm} Hg.

MELTING POINT

568°C.

° F.

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)

4.047 at 25°C.

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

APPEARANCE AND ODOR

Hexagonal, colorless crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

Not flammable

FLAMMABLE
(EXPLOSIVE)

UPPER

METHOD USED

LIMITS

LOWER

EXTINGUISHING MEDIA

N/A

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION	
Cadmium Chloride	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL	neoplastic
TLV 0.082 mg/m ³	CARCINOGENIC Yes
PRINCIPLE ROUTES OF ABSORPTION	Teratoge
Inhalation	SKIN AND EYE IRRITATION Slight
REVELANT SYMPTOMS OF EXPOSURE	Dryness of throat, irritation of lungs, increased salivation, stomach pains and vomiting, and pulmonary edema.
EFFECTS OF CHRONIC EXPOSURE	Damage to the lungs and kidneys and discoloration of teeth. Liver trouble also.
EMERGENCY AND FIRST AID PROCEDURES	Remove from exposure, rest and keep warm; in severe cases, seek medical attention. (Calcium edetate orally appears effective).
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR W/proper filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

PRODUCT DESIGNATION

03-026-4805 Granular
03-026-4865 Sticks
Cadmium (Metal)

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Cadmium	FORMULA Cd

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See Note 1			
#1 Lowest published toxic concentration in air						
Inhalation - Man 0.088 mg/c.m. - 6 years						

SECTION III PHYSICAL DATA MW - 112.41

BOILING POINT 767±2° C.	° F.	VAPOR PRESSURE at 394° C.	1 mm Hg.
MELTING POINT 320.9° C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

Hexagonal crystals or silver-white malleable metal.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA None available		
SPECIAL FIRE FIGHTING PROCEDURES Use self-contained breathing apparatus.		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

Cadmium

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.05 mg/m³

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation or ingestion of dust or fume

SKIN AND EYE

IRRITATION

RELEVANT SYMPTOMS OF EXPOSURE Inhalation causes a metallic taste in mouth, shortness of breath, chest pains, ingestion: nausea, vomiting, diarrhea, headache, muscle aches, salivation abdominal pain, shock, liver damage and renal failure.

EFFECTS OF CHRONIC EXPOSURE Inhalation - loss of sense of smell, cough, dyspnea, weight loss, anemia, irritability and yellowstained teeth. Probable liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES Remove from exposure; treat pulmonary edema, liver and kidney damage if any. Calcium edetate orally is effective for inhalation. Obtain medical treatment.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Ammonium Nitrate, Tellurium, Zinc

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles or safety glasses

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
Mechanical filter respirator

OTHER PROTECTIVE EQUIPMENT

Protective coveralls and face shield

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in closed containers, protect containers
against physical damage.

OTHER PRECAUTIONS

SIGNATURE

DATE

26-4505B

PRODUCT DESIGNATION

03-028-3516
Calcium Fluoride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Calcium Fluoride	FORMULA CaF ₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Oral - mouse TDLO 28 mg/kg (11-21 days)			Not	available		

SECTION III PHYSICAL DATA MW-7808

BOILING POINT ° F.	VAPOR PRESSURE mm Hg.
MELTING POINT ° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1360° C. 3.18	EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR White crystals	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION

Calcium Fluoride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - TWA - 2.5 mg/M³

Teratogen

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION

Light

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of nasal passages, nausea, vomiting, diarrhea, abdominal pains, irritation of eyes and skin.

EFFECTS OF CHRONIC EXPOSURE

Pulmonary fibrosis, increase radiographic density of bones.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm, get medical attention; if swallowed - wash mouth, give emetic, get medical attention; wash from skin or eyes, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

28-3516B

CAS:001305788

EW31000

PRODUCT DESIGNATION

03-028-5926
Calcium OxideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Unslaked lime, quick lime

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Calcium Oxide

FORMULA

CaO

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.

SECTION III PHYSICAL DATA

MW - 56.08

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
2850			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
2570			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.62			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
0.185			
APPEARANCE AND ODOR			
White powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Will not burn		LOWER
METHOD USED		
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES Avoid water unless necessary to use on other burning materials, in that case flood with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Calcium Oxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 2 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ADSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Chemical pneumonia, irritation of upper respiratory tract,
ingestion - severe pain, vomiting and collapse.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; if swallowed - drink diluted vinegar,
get medical aid; wash eyes and skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Avoid maleic anhydride, nitroparafins and phosphorous.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Sweep into large bucket and dispose of.

WASTE DISPOSAL METHOD

Dilute with water and neutralize with HCl before discharging into waste system.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With particulate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry place away from acids and oxidizing materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

28-5926B

CAS:007440473

GB42000

PRODUCT DESIGNATION

03-040-3400
Chromium MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Chromium

FORMULA

Cr

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published toxic dose						
Intraperitoneal - rat 504 mg/kg.						
TCLO inhalation - human 4.5 mg/c.m. - 5 years.						

SECTION III PHYSICAL DATA AW-52.00

BOILING POINT 2200° C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 1615° C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) N/A		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

Silver metal powder.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

N/A

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION
Chromium Metal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 1 mg/CM

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION

Mild

RELEVANT SYMPTOMS OF EXPOSURE

--

EFFECTS OF CHRONIC EXPOSURE

May produce tumors, dermatitis.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm, get medical aid; if swallowed - wash mouth, give emetic - get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

40-3400B

CAS:007789028

GB-63000

PRODUCT DESIGNATION

03-040-4550
Chromic NitrateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Chromic Nitrate

FORMULA

 $\text{Cr}(\text{NO}_3)_3 \cdot 9 \text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			3250		Rat	

SECTION III PHYSICAL DATA MW - 400.15

BOILING POINT d 100 ⁰ C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 60 ⁰ C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Purple crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION

Chromic Nitrate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 3.84 mg/m³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE

Lesions of the skin and mucous membrane.

EFFECTS OF CHRONIC EXPOSURE

Possible hepatitis, jaundice and kidney lesions.

EMERGENCY AND FIRST AID PROCEDURES After ingestion; induce vomiting or give gastric lavage;
if inhaled - rest, keep warm, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

--

INCOMPATABILITY (MATERIALS TO AVOID)

Avoid contact with strong reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of nitrogen.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

MECHANICAL (GENERAL)

Safety glasses
GLOVES

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

40-4550B

PRODUCT DESIGNATION

03-040-5600
03-040-5650
Chromium Potassium Sulfate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Chromium Potassium Sulfate	FORMULA $\text{CrK}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LD50 - intervenous - rat	112 mg/kg					

SECTION III PHYSICAL DATA MW 499.13

BOILING POINT N/A	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT N/A	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.81		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

Dark violet-red crystals.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION

Chromium Potassium Sulfate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 4.78 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION Mild

RELEVANT SYMPTOMS OF EXPOSURE

--

EFFECTS OF CHRONIC EXPOSURE

Skin ulcers and dermatitis.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm; if swallowed - wash mouth, give emetic, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

40-5600B

CAS:007440484

GF8750

PRODUCT DESIGNATION

03-042-4001
Cobalt MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Cobalt

FORMULA
Co

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See Note 1			
#1 lowest published lethal dose						
oral - rat 1500 mg/kg.						

SECTION III PHYSICAL DATA MW 58.93

BOILING POINT 2900° C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 1495° C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 8.9 20°/4° C.		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Silver-gray metal

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION

Cobalt Metal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.1 mg/m³

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust

SKIN AND EYE

IRRITATION mild

RELEVANT SYMPTOMS OF EXPOSURE Inhalation - shortness of breath, lung densities, dermatitis with hyperemia and vesiculation. Ingestion - hypotension, pain, vomiting, nerve deafness,

EFFECTS OF CHRONIC EXPOSURE

Possible pneumoconiosis

EMERGENCY AND FIRST AID PROCEDURES Remove from exposure, rest. Keep warm - eye contact - wash with water. Obtain medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

In the powdered state of cobalt - avoid ammonium nitrate, acetylene.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

42-4001B

CAS:012069691

GL-69100

PRODUCT DESIGNATION

03-046-2903
Cupric CarbonateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Cupric Carbonate

FORMULA

 $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			159		Rat	
			810		bird	

SECTION III PHYSICAL DATA MW - 221.17

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
d 200° C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
4.0			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Green powder

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		LOWER
METHOD USED		

EXTINGUISHING MEDIA

N/A

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION
Cupric Carbonate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 3.35 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust (mainly), ingestion

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE Irritation of eyes and mucous membranes, vomiting, diarrhea, abdominal pain, collapse.

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm; if swallowed - wash mouth, give emetic, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

With acids

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

46-2903B

CAS:001344678

GL70000

PRODUCT DESIGNATION

03-046-3433
Cupric ChlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Cupric chloride

FORMULA

 Cu Cl_2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			140		Rat	
Lowest published lethal dose			190		mouse	
oral - human 200 mg/kg			31		guinea pig	

SECTION III PHYSICAL DATA

MW - 134.48

BOILING POINT

° F.

VAPOR PRESSURE

mm Hg.

Forms Cu Cl_2 at 993° C

MELTING POINT

° F.

VAPOR DENSITY (Air = 1)

498° C.

SPECIFIC GRAVITY (H₂O = 1)

EVAPORATION RATE (_____ = 1)

3.094

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

70.7

APPEARANCE AND ODOR

Brown-yellow powder

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

Will not burn

FLAMMABLE
(EXPLOSIVE)

UPPER

METHOD USED

LIMITS

LOWER

EXTINGUISHING MEDIA

N/A

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION

Cupric Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - TWA - 2.11 mg/M³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust (mainly) ingestion

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE

Irritation of mucous membranes, irritation of eyes,
vomiting, diarrhea, abdominal pain, collapse.

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm; if swallowed - wash mouth,
give emetic, get medical attention; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

46-3433B

PRODUCT DESIGNATION

03-046-4403
Cupric NitrateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Cupric Nitrate

FORMULA

 $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			940		Rat	

SECTION III PHYSICAL DATA MW - 241.63

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts./100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR			

114.5

2.047 at 3.9°C.

381

Blue Crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE)	UPPER
Not available	LIMITS	LOWER
METHOD USED		

EXTINGUISHING MEDIA

Use flooding of water in early stages of fire.

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Gives off toxic nitrogen oxides when heated.

PRODUCT DESIGNATION
Cupric Nitrate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - TWA 3.40 mg/M³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust (mainly) ingestion

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE

Irritation of mucous membranes, irritation of eyes,
vomiting, diarrhea, abdominal pain, collapse.

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm. If swallowed - wash mouth,
give emetic, get medical attention, wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Strong oxidizing agent.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

May react violently with reducing agent.

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of nitrogen.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

46-4403B

PRODUCT DESIGNATION

03-046-4953
Cupric Oxide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Cupric Oxide	FORMULA CuO

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA

MW - 79.5

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-d at 1026		EVAPORATION RATE (_____ = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		VOLATILE	% Vol. % Wt.
SOLUBILITY IN WATER Pts/100 pts H ₂ O			
I			
APPEARANCE AND ODOR			
Black Crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE)	UPPER
Not flammable	LIMITS	LOWER
METHOD USED		
N/A		
EXTINGUISHING MEDIA		
N/A		
SPECIAL FIRE FIGHTING PROCEDURES		
N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

Cupric Oxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 1.25 Mg/M³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust (mainly), ingestion

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of mucous membranes, irritation of eyes, vomiting, diarrhea, abdominal pain, collapse.

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm; if swallowed - wash mouth, give emetic, get medical attention, wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

46-4953B

CAS:007758987

GL88000

PRODUCT DESIGNATION

03-046-6403
Cupric SulfateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Cupric Sulfate	FORMULA $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Oral - child TDLO	200 mg/kg		300		Rat	
Oral - human LDLO	50 mg/kg					

SECTION III PHYSICAL DATA MW-249.71

BOILING POINT ° F.	VAPOR PRESSURE mm Hg.
MELTING POINT ° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.286	EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 14.3	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Blue Crystal	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Will not burn	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION Cupric Sulfate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 3.93 Mg/M ³	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust (mainly) ingestion	SKIN AND EYE IRRITATION Moderate
REVELANT SYMPTOMS OF EXPOSURE Irritation of mucous membranes, irritation of eyes, vomiting, diarrhea, abdominal pain, collapse.	
EFFECTS OF CHRONIC EXPOSURE Liver and kidney damage.	
EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm, if swallowed - wash mouth, give emetic, get medical aid, wash from skin and eyes.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

46-6403B

CAS:007758896

GL69900

PRODUCT DESIGNATION

03-046-8423
Cuprous ChlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Cuprous Chloride

FORMULA

 Cu_2Cl_2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Oral - human LDLO 50 mg/kg						
#1 more toxic than Cu Cl ₂						
LD ₅₀ for Cu Cl ₂ oral - rat 140 mg/kg						

SECTION III PHYSICAL DATA $M_w - 99.00$

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
1366°C.			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
422°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
3.53			
SOLUBILITY IN WATER Pts./100 pts H ₂ O		VOLATILE	% Vol. % Wt.
1.52			

APPEARANCE AND ODOR

White crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		

EXTINGUISHING MEDIA

N/A

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION

Cuprous Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 1.56 Mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE Irritation of mucous membranes and eyes, gastroenteric pain, vomiting, diarrhea, abdominal pain, collapse.

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm; if swallowed - wash mouth, give emetic, get medical aid, wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

,W/appropriate filter

OTHER PROTECTIVE EQUIPMENT:

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

46-8423B

CAS:000544923

GL71500

PRODUCT DESIGNATION

Cuprous Cyanide
03-046-8721MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Cuprous Cyanide

FORMULA

 $\text{Cu}_2 \text{Cn}_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA

MW - 89.56

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
Decomposes			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
474°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.9			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Insoluble			
APPEARANCE AND ODOR			
White crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		LOWER
METHOD USED		

EXTINGUISHING MEDIA

 CO_2 , Nonalkaline dry chemical or foam.

SPECIAL FIRE FIGHTING PROCEDURES

H CN from $\text{Cu}_2(\text{CN})_2$, produces an explosive mixture with air.

UNUSUAL FIRE AND EXPLOSION HAZARDS

 CO_2 from air may cause acid hydrolyses to form HCN.

PRODUCT DESIGNATION Cuprous Cyanide	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 1.41 Mg/C.M.	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Ingestion, inhalation, skin	SKIN AND EYE IRRITATION Yes
RELEVANT SYMPTOMS OF EXPOSURE Small amount of cyanide - instant collapse, lower doses - weakness, headache, confusion, nausea and vomiting.	
EFFECTS OF CHRONIC EXPOSURE Produce goiters or thiocyanate intoxication.	
EMERGENCY AND FIRST AID PROCEDURES Ingestion - give warm water to induce vomiting, repeat until water is clear; inhalation - breathe amyl nitrate or ammonia vapor; wash from skin.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID) Reacts with incandescence when heated with magnesium.	
HAZARDOUS DECOMPOSITION PRODUCTS Reacts with acid to produce HCN.	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Flush area with water to clean, do not use acid.	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR W/proper filter
OTHER PROTECTIVE EQUIPMENT Do not store near acids.	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Store in cool, well-ventilated area.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

46-8721B

CAS:001317391

GL80500

PRODUCT DESIGNATION

03-046-9303
Cuprous OxideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA
 Cu_2O

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			470		Rat	

SECTION III PHYSICAL DATA MW - 143.13

BOILING POINT ° F.	VAPOR PRESSURE mm Hg.
decomposes 1800° C.	
MELTING POINT ° F.	VAPOR DENSITY, (Air = 1)
1235° C.	
SPECIFIC GRAVITY (H ₂ O = 1)	EVAPORATION RATE (_____ = 1)
6.0	
SOLUBILITY IN WATER Pts/100 pts H ₂ O	VOLATILE % Vol. % Wt.
Insoluble	
APPEARANCE AND ODOR	
Dark red crystals.	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		
N/A		
SPECIAL FIRE FIGHTING PROCEDURES		
N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS		
N/A		

PRODUCT DESIGNATION

Cuprous Oxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 2.26 Mg/M³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust (mainly) ingestion

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE

Irritation of mucous membranes, irritation of eyes, vomiting, diarrhea, abdominal pain, collapse.

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm; if swallowed - wash mouth, give emetic, get medical attention; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

May react violently with alkali and alkaline earth metals.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

46-9303B

CAS:010025771

NO54250

PRODUCT DESIGNATION

03-053-2624
Ferric ChlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ferric Chloride

FORMULA

Fe Cl₃.6 H₂O

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO - oral - rat	900 mg/kg					

SECTION III PHYSICAL DATA MW-270.32

BOILING POINT 280°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 37°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.88		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 246		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Red-yellow crystalline lumps		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water spray

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained mask.

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated, gives off H Cl fumes.

PRODUCT DESIGNATION

Ferric Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

4.8 mg/c.m. (Fe)

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation and ingestion

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE Respiratory tract irritation, nausea, vomiting, gastric hemorrhage, shortness of breath, eye and skin irritation

EFFECTS OF CHRONIC EXPOSURE

None indicated

EMERGENCY AND FIRST AID PROCEDURES

Ingestion - get medical aid, gastric lavage, inhalation rest; wash skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

Heating to decomposition produces HCl fumes

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

Contact environmental control officer

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry place.

OTHER PRECAUTIONS

SIGNATURE

DATE

53-2624B

CAS:007782618

NO71750

PRODUCT DESIGNATION

03-053-3804
Ferric NitrateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Ferric Nitrate	FORMULA $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			3250		rat	

SECTION III PHYSICAL DATA MW-404.02

BOILING POINT d100 ° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 47 ° C ° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.7	EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O very soluble	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Pale violet deliquescent crystals	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water spray		

SPECIAL FIRE FIGHTING PROCEDURES
Wear self-contained breathing apparatus.UNUSUAL FIRE AND EXPLOSION HAZARDS
When heater gives off toxic nitrogen oxide fumes.

PRODUCT DESIGNATION Ferric Nitrate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 7.2 mg/c.m.	CARCINOGENIC
PRINCIPLE ROUTES OF ABSORPTION Inhalation and ingestion	SKIN AND EYE IRRITATION yes
RELEVANT SYMPTOMS OF EXPOSURE Ingestion - gastrointestinal irritation, respiratory tract irritation, headache, vomiting, dizziness.	
EFFECTS OF CHRONIC EXPOSURE Nothing indicated.	
EMERGENCY AND FIRST AID PROCEDURES Ingestion - get medical aid; inhalation - rest; wash skin and eyes.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS When heated gives off toxic nitrogen oxide fumes.	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD Call environmental control officer.	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety goggles
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Store in cool, dry place.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

53-3804B

CAS-007790990 *e*

NN 15750

PRODUCT DESIGNATION

Iodine
03-074-1009MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Iodine

FORMULA

 I_2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO oral - human 5 mg/kg.						

SECTION III PHYSICAL DATA MW 253.84

BOILING POINT 183 ⁰ C.	⁰ F.	VAPOR PRESSURE at 38.7 ⁰	mm Hg.
MELTING POINT 112.9 ⁰ C.	⁰ F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
4.93			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

Rhombic, violet-black crystals, metallic luster - characteristic odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Non-flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Emits toxic fumes.

PRODUCT DESIGNATION
Iodine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.1 PPM, 1 mg/CM. (Ceiling value)

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

Inhalation

IRRITATION

Possible skin sensitizer

RELEVANT SYMPTOMS OF EXPOSURE

Lachrymation, blephoritis, rhinitis, catarrhal

stomatitis, and pharyngitis, eye irritation.

EFFECTS OF CHRONIC EXPOSURE

Irritation and nervousness.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure; rest and keep warm; obtain medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Certain Carbides, Acetaldehyde, Acetylene, Aluminum,

Ammonia, Antimony, Bromine Penta fluoride, Cesium Monoxide, Cuprous Acetylide.

HAZARDOUS DECOMPOSITION PRODUCTS

When heated releases highly toxic fumes of Iodine.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with weak reducing agent such as hypobisulfite or ferrous salts. Transfer sludge into large container of water and neutralize with soda ash.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Self-contained breathing apparatus.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect container against physical damage; store in cool, dry area away from sunlight.

OTHER PRECAUTIONS

SIGNATURE

DATE

CAS: 000301042

AI52500

PRODUCT DESIGNATION
03-082-0102
Lead Acetate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Lead Acetate

FORMULA

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Note:			See Note			
Lowest published lethal dose						
Oral - rat 11 mg/kg.						
Oral - rat TDLO 240 mg/kg						

SECTION III PHYSICAL DATA MW 379.33

BOILING POINT d 200°C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -H ₂ O, 75°C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.55		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 45.6 at 15°C.		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR White crystals, slight odor acetic acid		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

None available

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated, it emits acrid fumes.

PRODUCT DESIGNATION Lead acetate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.078 mg/cm	CARCINOGENIC Yes
PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion, skin	SKIN AND EYE IRRITATION Slight
REVELANT SYMPTOMS OF EXPOSURE Abdominal pain, diarrhea, constipation, loss of appetite, muscular weakness, headache, blue line on gums, vomiting.	
EFFECTS OF CHRONIC EXPOSURE Loss of appetite, constipation, blue line on gums, loss of weight.	
EMERGENCY AND FIRST AID PROCEDURES Ingestion - give egg white and milk, also gastric lavage with magnesium sulfate solution; inhalation - rest, keep warm, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Add soda ash and sweep up into box for disposal.	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT Self-contained respirator.	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

82-0102B

CAS:007758954

OF94500

PRODUCT DESIGNATION

03-082-1802
Lead ChlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Lead chloride

FORMULA

 PbCl_2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published lethal dose oral - guinea pig 2000 Mg/kg.						

SECTION III PHYSICAL DATA MW 278.1

BOILING POINT 950° C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 501° C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 5.85		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR White crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION
Lead Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV 0.067 mg/C.M. CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion SKIN AND EYE IRRITATION No

REVELANT SYMPTOMS OF EXPOSURE Abdominal pain, diarrhea, constipation, loss of appetite, muscular weakness, headache, blue line on gums, vomiting.

EFFECTS OF CHRONIC EXPOSURE Loss of appetite, constipation, blue line on gums, loss of weight.

EMERGENCY AND FIRST AID PROCEDURES If swallowed - give egg white, milk or tannin, also gastric lavage with solution of magnesium sulfate; if inhaled - rest, keep warm, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

82-1802B

CAS: 001309600

OG 07000

PRODUCT DESIGNATION

03-082-3002
Lead DioxideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

Lead Dioxide

PbO₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Oral - human LDLO 50 mg/kg						
Lowest published lethal dose						
intraperitoneal - guinea pig 115 mg/kg.						

SECTION III PHYSICAL DATA MW 239.19

BOILING POINT	° F.	VAPOR PRESSURE,	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
d 290° C.		EVAPORATION RATE (_____ = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)			
9.375			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Brown crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		

EXTINGUISHING MEDIA

N/A

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION Lead Dioxide	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.058 mg/cm	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion	SKIN AND EYE IRRITATION No
REVELANT SYMPTOMS OF EXPOSURE Abdominal pain, diarrhea, constipation, loss of appetite, muscular weakness, headache, blue line on gums, pyorrhea, vomiting.	
EFFECTS OF CHRONIC EXPOSURE Loss of appetite, constipation, blue line on gums, loss of weight.	
EMERGENCY AND FIRST AID PROCEDURES If swallowed - give egg white, milk or tannin, also gastric lavage with solution of magnesium sulfate if inhaled - rest, keep warm, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY Oxidizing agent	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID) Aluminum carbide, barium sulfide, boron, calcium sulfide, hydrogen sulfide, hydroxylamine, molybdenum, Phenyl hydrazine, phosphorous.	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

82-3002B

CAS:007439921

OF75250

PRODUCT DESIGNATION

03-082-4802
Lead MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Lead

FORMULA

Pb

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Oral - woman - TDLO 450 mg/kg - 6Y						
#1 Lowest published lethal dose						
intraperitoneal - guinea pig 100 mg/kg.						

SECTION III PHYSICAL DATA MW 207.19

BOILING POINT 1744° C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 327.5	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 11.3436		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Silver blue soft metal.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Not available		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Lead Metal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.05 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust or fume, ingestion

SKIN AND EYE

IRRITATION

No

REVELANT SYMPTOMS OF EXPOSURE

Abdominal pain, constipation, diarrhea, loss of appetite, muscular weakness, headache, line on gums, pyorrhea.

EFFECTS OF CHRONIC EXPOSURE

Loss of appetite, muscular weakness, loss of weight, blue line on gums.

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - give egg white, milk or tannin, also gastric lavage with 1% solution of magnesium sulfate if inhaled - rest, keep warm, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Ammonium nitrate, hydrogen peroxide, zirconium.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

82-4802B

CAS:010099748

OG 21000

PRODUCT DESIGNATION

03-082-5402
Lead NitrateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Lead Nitrate

FORMULA

 $\text{Pb}(\text{NO}_3)_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published lethal dose						
intraperitoneal - rat	270 mg/kg.					
LDLO oral - guinea pig -	500 mg/kg.					

SECTION III PHYSICAL DATA 331.21 - MW

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
d - 470° C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
4.53			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
38.8			
APPEARANCE AND ODOR			
Colorless crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Water		

SPECIAL FIRE FIGHTING PROCEDURES Flood with water early in fire. Wear self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Decomposes at 410° F. to give off toxic nitrogen oxide fumes.

PRODUCT DESIGNATION Lead Nitrate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.08 mg/M ³	CARCINOGENIC no
PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust or ingestion	SKIN AND EYE IRRITATION Moderate
REVELANT SYMPTOMS OF EXPOSURE Headache, muscular weakness, constipation, collapse, gastroenteric symptoms, abdominal pain, vomiting.	
EFFECTS OF CHRONIC EXPOSURE Loss of appetite, anemia, loss of weight, blue line on gums.	
EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest, get medical attention; if swallowed - wash mouth, give emetic, then epsom salts 30g/250 ml warm water; get medical attention, wash from skin and eyes.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID) Reacts with sparks on red hot carbon.	
HAZARUOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR With appropriate filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

82-5402B

CAS:001317368

OG17500

PRODUCT DESIGNATION

03-082-6002
Lead Oxide (mono)MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
C.I. 77577, C.I. Pigment yellow 46	
CHEMICAL NAME AND SYNONYMS	FORMULA
Litharge	PbO

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Intraperitoneal - rat	LD50 450 mg/kg.		See Note			

SECTION III PHYSICAL DATA MW-223.19

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
888° C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
9.53			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
0.0068			
APPEARANCE AND ODOR			
Yellow powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Will not burn		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Flood with water		
SPECIAL FIRE FIGHTING PROCEDURES		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION
Lead Oxide (mono)

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - TWA - 0.054 mg/m³

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of dust or ingestion

SKIN AND EYE
IRRITATION No

REVELANT SYMPTOMS OF EXPOSURE Headache, muscular weakness, constipation, collapse, gastro-enteric symptoms, abdominal pain, vomiting.

EFFECTS OF CHRONIC EXPOSURE
Loss of appetite, anemia, loss of weight, blue line on gums.

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest, get medical attention; if swallowed - wash mouth, give emetic, then epsom salts 30 g/250 ml. of hot water, get medical attention; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Face shield

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR
With appropriate filter

OTHER PROTECTIVE EQUIPMENT
Face shield

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

82-6002B

CAS: 007446142

OG43750

PRODUCT DESIGNATION

03-082-7202
Lead SulfateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
C I pigment white 3	
CHEMICAL NAME AND SYNONYMS	FORMULA
White lead	PbSO ₄

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LD ₅₀ intraperitoneal - guinea pig	300 mg/kg.					
LDLO - oral - guinea pig	30 mg/kg.					

SECTION III PHYSICAL DATA 303.27 - MW

BOILING POINT N/A	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 1170	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 6.2		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 0.0028		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR White powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Will not burn	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION

Lead Sulfate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.073 mg/m³

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust or ingestion

SKIN AND EYE

IRRITATION No

RELEVANT SYMPTOMS OF EXPOSURE

Headache, muscular weakness, constipation, collapse, gastro-enteric symptoms, abdominal pain, vomiting.

EFFECTS OF CHRONIC EXPOSURE

Loss of appetite, anemia, loss of weight, blue line on gums.

EMERGENCY AND FIRST AID PROCEDURES

If inhaled - rest, get medical attention. If swallowed - wash mouth, give emetic, then epsom salts 30 g/250 ml. hot water, get medical attention; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts with lithium carbide exothermally.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

82-7202B

CAS:001302303

BD01000

PRODUCT DESIGNATION

03-084-1003
Lithium Aluminum HydrideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Lithium Aluminum Hydride

FORMULA

 LiAlH_4

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT d 125°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.917			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
d			
APPEARANCE AND ODOR			
White powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Suitable dry chemical		
SPECIAL FIRE FIGHTING PROCEDURES		
Do not use water. Wear full protective clothing.		
UNUSUAL FIRE AND EXPLOSION HAZARDS		
Decomposes at 257 to form LiH, aluminum and hydrogen gas.		

PRODUCT DESIGNATION

Lithium Aluminum Hydride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - TWA 0.119 mg/M³

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE

Salivation, nausea, vomiting, diarrhea, loose or bloody stools, irritation of skin and eyes.

EFFECTS OF CHRONIC EXPOSURE

Emphysema, kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm, get medical attention. If swallowed - wash mouth, drink water, then 1% acetic acid, get medical attention. Wash skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Violent reaction with oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Produces hydrogen.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

Face shield and protective clothing.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

84-1003B

PRODUCT DESIGNATION

03-084-5003
Lithium FluorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Lithium Fluoride

FORMULA

LiF

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published lethal dose						
oral guinea pig 200 mg/kg						
subcutaneous - guinea pig 2000 mg/kg.						

SECTION III PHYSICAL DATA MW-25.94

BOILING POINT 1670° C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 870° C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.295		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 0.13 at 0° C.		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR White powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Does not burn	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

May produce HF with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Wear self-contained mask.

PRODUCT DESIGNATION

Lithium Fluoride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 2.4 mg/M³

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust (mainly) ingestion

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE

Vomiting, abdominal pain, diarrhea, convulsions, muscular weakness, salivation, nausea, irritation of respiratory system.

EFFECTS OF CHRONIC EXPOSURE

Increase in fluoride content of teeth.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm, get medical attention; if swallowed - wash mouth, drink water, then milk of magnesia, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

May produce HF with water.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Face shield and protective clothing.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

84-5003B

PRODUCT DESIGNATION

03-084-5953
03-084-6003
Lithium Hydroxide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Lithium Hydroxide	FORMULA $\text{LiOH} \cdot \text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			none available			

SECTION III PHYSICAL DATA

BOILING POINT 925° C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 445° C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.54		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 22.3		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR White crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER LOWER
METHOD USED		
EXTINGUISHING MEDIA Water		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION

Lithium Hydroxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available 2 mg/C.M. (NaOH)

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE

Severe attack of membranes in digestive tract and stomach, anorexia, nausea, vomiting, diarrhea, salivation, irritation of skin and eyes.

EFFECTS OF CHRONIC EXPOSURE

Kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Wash from skin and eyes - if swallowed - wash mouth, drink water, then 1% vinegar, get medical aid, if inhaled - rest, keep warm, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts with acids

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

84-6003 B

PRODUCT DESIGNATION

03-084-8003
Lithium MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Lithium

FORMULA

Li

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		
TDLO intraperitoneal - rat	-360 mg/kg					

SECTION III PHYSICAL DATA A.W - 6.939

BOILING POINT 1330° C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 180.55° C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 0.534		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Reacts		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Silver metal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT --	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Use dry graphite, soda ash or sodium chloride.

SPECIAL FIRE FIGHTING PROCEDURES

Wear protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Reacts with water to produce hydrogen gas.

Lithium Metal

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

IRRITATION

Severe

REVELANT SYMPTOMS OF EXPOSURE

Salivation, nausea, vomiting, diarrhea, severe internal attack,
on of respiratory system, severe skin and eye attack.

EFFECTS OF CHRONIC EXPOSURE

Emphysema, kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm, get medical aid; if swallowed -
ter, then 1% vinegar, get medical aid; wash skin and eyes,

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts rapidly with water, fluorinated hydrocarbons.

HAZARDOUS DECOMPOSITION PRODUCTS

Produces hydrogen gas when it reacts with water.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
--

Face shield

MECHANICAL (GENERAL)

GLOVES	
--------	--

Leather

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Protective clothing.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in moisture free place; protect against physical damage.

OTHER PRECAUTIONS

SIGNATURE

DATE _____

PRODUCT DESIGNATION

03-091-2006
Mercuric Chloride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Corrosive sublimate

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Mercuric Chloride

FORMULA

 Hg Cl_2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			37		Rat	
			10	23	Mouse	
#1 lowest published toxic dose						
Oral - human 1 mg/kg.						
LCLO inhalation - mouse 300 mg/c.m. - 10 min.						

SECTION III PHYSICAL DATA MW - 271.52

BOILING POINT 302° C.	° F.	VAPOR PRESSURE at 136.2° C.	1 mm Hg.
MELTING POINT 276° C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 5.44		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 6.9		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

White powder

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Not available		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Mercuric Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.067 Mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Skin and eyes ingestion, inhalation

SKIN AND EYE

IRRITATION Severe injury to cornea

RELEVANT SYMPTOMS OF EXPOSURE Ingestion - immediate severe gastroenteric distress; skin absorption - irritation, dermatitis, decolorization of nails, ulcerization of mucous membranes and eyes, severe systemic effects.

EFFECTS OF CHRONIC EXPOSURE Liver and kidney damage, neurological disorders, psychic disturbance (timidity) loosening of teeth.

EMERGENCY AND FIRST AID PROCEDURES Repeated soap and water wash to remove from skin; if swallowed - give teaspoon salt in warm water to induce vomiting, then milk or egg white, get medical aid; inhalation of dust - rest, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts with acetylene to produce explosive compounds.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in tightly closed containers in well-ventilated area.

OTHER PRECAUTIONS

SIGNATURE

DATE

91-2006B

PRODUCT DESIGNATION

Mercuric Iodide
03-091-3006

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Mercuric Iodide

FORMULA

$$\text{HgI}_2$$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			40		Rat	
			80		Mouse	
Lowest published lethal dose						
Oral - human - 357 mg/kg.						

SECTION III PHYSICAL DATA MW 454.45

BOILING POINT subl. 354° C.	° F.	VAPOR PRESSURE at 157.5° C.	mm Hg.
MELTING POINT 259° C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 6.36		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 0.01		VOLATILE % Vol,	% Wt.
APPEARANCE AND ODOR Red, tetrahedral crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
N/A		
SPECIAL FIRE FIGHTING PROCEDURES		
N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS		
N/A		

PRODUCT DESIGNATION
Mercuric Iodide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.113 mg/m³

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Skin absorption, ingestion, inhalation

SKIN AND EYE

IRRITATION Slight

REVELANT SYMPTOMS OF EXPOSURE Ingestion produces immediate severe gastroenteric distress, excessive salivation, pain on chewing, extreme timidity, dermatitis on skin and inflammation of mucous membranes and eyes.

EFFECTS OF CHRONIC EXPOSURE Liver and kidney damage, neurological disorders. Psychic disturbances (timidity), dermatitis, and inflammation of mucous membranes, loosening of teeth.

EMERGENCY AND FIRST AID PROCEDURES If conscious, give teaspoon salt in glass warm water. To induce vomiting, give milk or egg white afterward. If on skin, remove by washing with soap and water.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

91-3006B

PRODUCT DESIGNATION

03-091-4006
03-091-4016
Mercuric Nitrate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Mercuric Nitrate

FORMULA

 $\text{Hg}(\text{NO}_3)_2 \cdot \text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 LD ₅₀ Intraperitoneal	- mouse 8 mg/kg.					

SECTION III PHYSICAL DATA

MW - 342.4

BOILING POINT decomposes	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 79° C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 4.3		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O V.S.		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR White deliquescent powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		

SPECIAL FIRE FIGHTING PROCEDURES

Wear mask to protect from NO₂ fumes.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Decomposes to produce NO₂ fumes.

PRODUCT DESIGNATION

Mercuric Nitrate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.08 mg/C.M.

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Skin, ingestion inhalation

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Excessive salivation, pain on chewing followed by tremors, extreme timidity, inflammation of mucous membranes and eyes.

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage, dermatitis, loosening of teeth.

EMERGENCY AND FIRST AID PROCEDURES If swallowed - give teaspoon of salt in glass of warm water, to induce vomiting, then milk or egg white, get medical aid, wash from skin with soap and water; inhalation - rest, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Acetylene, ethyl alcohol, phosphene, sulfur, unsaturated aromatics.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

91-4006B

PRODUCT DESIGNATION

03-091-8006
Mercurous NitrateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS
Mercurous NitrateFORMULA
 $\text{Hg}_2(\text{NO}_3)_2 \cdot 2\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 LD ₅₀ intraperitoneal	- mouse		297		rat	
	5 mg/kg.		388		mouse	

SECTION III PHYSICAL DATA MW 561.22

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
70° C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
4.79			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Crystalline, colorless

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Water - best		

SPECIAL FIRE FIGHTING PROCEDURES

Water in form of fine droplets or spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Strong oxidizing agent - moderate fire hazard by chemical reaction with reducing agents.

PRODUCT DESIGNATION

Mercurous Nitrate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.07 mg/m³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Ingestion, absorption through the skin, inhalation

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Excessive salivation, gingivitis, with loosening of teeth, tremors, stomatitis and psychic disturbances.

EFFECTS OF CHRONIC EXPOSURE Tremor and psychic disturbances, liver and kidney damage, loosening of teeth.

EMERGENCY AND FIRST AID PROCEDURES If conscious, give teaspoon salt in warm water to induce vomiting, then milk or egg white in water; remove from skin by soap and water washing.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Avoid contact mercurous nitrate with strong reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of nitrogen.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety glasses or goggles

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

91-8006B

CAS:007439976

OV45500

PRODUCT DESIGNATION

03-091-9026
Mercury MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

Quicksilver

Hg

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
TCLO- inhalation - human	169 mg/c.m.					
inhalation - rabbit	LCLO 29 mg/c.m.					

SECTION III PHYSICAL DATA

MW - 200.59

BOILING POINT

° F.

356.73°C.

VAPOR PRESSURE

at 126.2°C.

mm Hg.

1

MELTING POINT

° F.

-38.87°C.

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)

EVAPORATION RATE (_____ = 1)

13.645

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

insoluble

APPEARANCE AND ODOR

Silver liquid.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

none available

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

METHOD USED

EXTINGUISHING MEDIA

none available

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION Mercury	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.05 mg/m ³	CARCINOGENIC neoplastic
PRINCIPLE ROUTES OF ABSORPTION Inhalation of vapor (mainly)	SKIN AND EYE IRRITATION no
REVELANT SYMPTOMS OF EXPOSURE Bronchiolitis, pulmonary edema, metallic taste, nausea, abdominal pain.	
EFFECTS OF CHRONIC EXPOSURE Inhalation, ingestion and skin contact, get medical attention.	
EMERGENCY AND FIRST AID PROCEDURES Inhalation, ingestion and skin contact, get medical attention.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID) Mercury with NH ₃ can produce explosive compounds.	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Add powdered Cd metal. Sweep up Cd metal for disposal.	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES Gloves
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Store in closed container in well-ventilated area.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

91-9026B

CAS-013463393

QR63000

PRODUCT DESIGNATION

Nickel Carbonyl

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Nickel Carbonyl

FORMULA

Ni(CO)₄

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀ mg/C.M	
			ORAL	PERCUT.	SPECIES	CONC.
					Rat	240
					Mouse	67
					Cat	1900

SECTION III PHYSICAL DATA MW - 170.75

BOILING POINT 43°C	° F.	VAPOR PRESSURE at 25.8°C	400 ^{mm} Hg.
MELTING POINT -25°C	° F.	VAPOR DENSITY (Air = 1) Heavier than Air	
SPECIFIC GRAVITY (H ₂ O = 1) 1.31		EVAPORATION RATE (_____ = 1) <u>Rapid</u>	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

Colorless Volatile Liquid

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT -4°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER 2%

EXTINGUISHING MEDIA

Water, Foam, Carbon Dioxide, Dry Chemical

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing, self contained breathing apparatus

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Nickel Carbonyl

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.001 PPM, 0.007 MG/C.M.

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation (mainly)

SKIN AND EYE

IRRITATION

No

REVELANT SYMPTOMS OF EXPOSURE Induced gastroenteric symptoms; respiratory distress due to delayed pulmonary edema; headache, nausea, weakness, convulsions.

EFFECTS OF CHRONIC EXPOSURE

May produce cancer in lungs - lung inflammation

EMERGENCY AND FIRST AID PROCEDURES Complete bed rest and oxygen for pulmonary edema; for intoxication--give dimercaprol (4 mg/kg every 4 hrs. first day) wash contaminated areas of body with soap and water.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID) May decompose and ignite in presence of air may explode with butane-air mixture at (20-40°C).

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

Self contained

OTHER PROTECTIVE EQUIPMENT

Wear full protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect cylinders against physical damage.

OTHER PRECAUTIONS

SIGNATURE

DATE

97-0001B

PRODUCT DESIGNATION

03-097-2848
Nickel MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Nickel

FORMULA

Ni

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Notes:						
Lowest published toxic concentration in air						
Inhalation - guinea pig 15 mg/c.m./91 weeks						
Lowest published lethal dose						
Oral - guinea pig 5 mg/kg.						

SECTION III PHYSICAL DATA 58.71

BOILING POINT 2835°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 1445°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 8.9		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 1		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Silver colored metal.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED N/A		LOWER
EXTINGUISHING MEDIA N/A		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Powder may burn.

PRODUCT DESIGNATION

Nickel Metal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 1 mg/m³

CARCINOGENIC

yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation (mainly) ingestion

SKIN AND EYE

IRRITATION

slight

RELEVANT SYMPTOMS OF EXPOSURE

Nausea, vomiting, diarrhea, central nervous system depression.

EFFECTS OF CHRONIC EXPOSURE

Cancer of the lungs, dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - give emetic, get medical attention; wash from eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Vigorous reaction of Ni powder with S or Se.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

97-2848B

PRODUCT DESIGNATION

03-097-3508
Nickelous Ammonium Sulfate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Nickelous Ammonium Sulfate	FORMULA $(\text{NH}_4)_2\text{Ni}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			not available			

SECTION III PHYSICAL DATA 395.02

BOILING POINT N/A	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT N/A	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.923		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 2.5 at 3.5°C.		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Blue-green crystals.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION
Nickelous Ammonium Sulfate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 0.66 + mg/m³

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of dust (mainly) ingestion

SKIN AND EYE
IRRITATION Slight

REVELANT SYMPTOMS OF EXPOSURE
Giddiness, nausea and vomiting.

EFFECTS OF CHRONIC EXPOSURE
Dermatitis.

EMERGENCY AND FIRST AID PROCEDURES If swallowed - wash mouth, give emetic, get medical attention
if inhaled - rest, get medical attention, wash from eyes and skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

97-3508B

CAS:007791200

QR64800

PRODUCT DESIGNATION

03-097-4908
Nickelous ChlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Nickel chloride	FORMULA $\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LD ₅₀ intraperitoneal - mouse 48 mg/kg						

SECTION III PHYSICAL DATA 237.72

BOILING POINT -- ° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -- ° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)	EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 180	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR green crystals	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION
Nickelous chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 0.49 mg/m³ CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of dust (mainly) ingestion SKIN AND EYE
IRRITATION Slight

REVELANT SYMPTOMS OF EXPOSURE
Giddiness, nausea, vomiting

EFFECTS OF CHRONIC EXPOSURE
Dermatitis

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest, get medical attention. If swallowed -
wash mouth, give emetic, get medical attention, wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
--	---

MECHANICAL (GENERAL)	GLOVES
----------------------	--------

SPECIAL	RESPIRATOR With appropriate filter
---------	---------------------------------------

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE	DATE
-----------	------

97-4908B

CAS: 013478007

QR73000

PRODUCT DESIGNATION

03-097-6958
03-097-7008
Nickelous Nitrate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Nickelous Nitrate

FORMULA

 $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1620		rat	

SECTION III PHYSICAL DATA 290.82

BOILING POINT 136.7°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 56.7°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 2.05		EVAPORATION RATE (____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 243 at 0°C.		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Green crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Flood with water		
SPECIAL FIRE FIGHTING PROCEDURES Wear self-contained breathing apparatus.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Oxidizing material.		

PRODUCT DESIGNATION Nickelous nitrate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.49 l mg/m ³	CARCINOGENIC no
PRINCIPLE ROUTES OF ABSORPTION Inhalation (mainly) ingestion	SKIN AND EYE IRRITATION slight
REVELANT SYMPTOMS OF EXPOSURE Giddiness, nausea and vomiting.	
EFFECTS OF CHRONIC EXPOSURE Dermatitis.	
EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest. If swallowed, wash mouth, give emetic, get medical attention, wash from eyes and skin.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID) Explosion hazard with aluminum powder and organic material.	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR With appropriate filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

CAS: 010101970

OR96000

PRODUCT DESIGNATION

03-097-8508
Nickelous SulfateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Nickelous Sulfate	FORMULA $\text{Ni}(\text{SO}_4) \cdot 6\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Note: Intraperitoneal - mouse	LD50 21 mg/kg					
LDLO - subcutaneous - dog	500 mg/kg					

SECTION III PHYSICAL DATA MW - 280.89

BOILING POINT -6H ₂ O, 280°C	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 53°C	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 2.07		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 63.5		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Green crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION
Nickelous Sulfate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 0.48 mg/m³ CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of dust (mainly) ingestion SKIN AND EYE
IRRITATION Slight

REVELANT SYMPTOMS OF EXPOSURE
Giddiness, nausea, vomiting

EFFECTS OF CHRONIC EXPOSURE
Dermatitis

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest, get medical attention; if swallowed -
wash mouth, give emetic, get medical attention; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
--	---

MECHANICAL (GENERAL)	GLOVES
----------------------	--------

SPECIAL	RESPIRATOR With appropriate filter
---------	---------------------------------------

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE	DATE
-----------	------

97-8508B

PRODUCT DESIGNATION

03-106-5001
Phosphorous Pentachloride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Phosphorous Pentachloride

FORMULA

PCl₅

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ mg/cm	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published lethal concentration in air inhalation - mouse - 120 ppm.			660		rat	205

SECTION III PHYSICAL DATA MW 208.31

BOILING POINT 162° C. sublimes	° F.	VAPOR PRESSURE at 55.5° C.	mm Hg.
MELTING POINT 148° C. under pressure	° F.	VAPOR DENSITY (Air = 1)	1
SPECIFIC GRAVITY (H ₂ O = 1) 1.6 g/l		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Decomposes in water		VOLATILE	% Vol. % Wt
APPEARANCE AND ODOR Yellowish-white, fuming, cryatalline.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Will not burn	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Avoid water		
SPECIAL FIRE FIGHTING PROCEDURES Wear self-contained respirator.		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

Phosphorous Pentachloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 1 mg/m³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion, skin.

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritant to mucous membranes and all parts of respiratory system. Coughing, choking, etc.

EFFECTS OF CHRONIC EXPOSURE

Possible damage to lungs, pulmonary edema.

EMERGENCY AND FIRST AID PROCEDURES

Inhaled - rest, wash skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) Chlorine Trioxide, Fluorine, Hydroxylamine, Magnesium Oxide, Phosphorous

HAZARDOUS DECOMPOSITION PRODUCTS

Heated to decomposition, emits highly toxic fumes of chlorides.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with sodium bicarbonate, then water spray, transfer into large container of water for disposal.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

Rubber (Neoprene)

RESPIRATOR

W/proper filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect the sealed glass bottles in which material is stored.

OTHER PRECAUTIONS

SIGNATURE

DATE

106-5001B

CAS: 007784410

CG11000

PRODUCT DESIGNATION

Potassium Arsenate
03-110-0452MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Potassium Arsenate

FORMULA

 KH_2AsO_4

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1140		rat	

SECTION III PHYSICAL DATA

MW - 180.02

BOILING POINT

° F.

VAPOR PRESSURE

mm Hg.

MELTING POINT

° F.

VAPOR DENSITY (Air = 1)

288°C.

SPECIFIC GRAVITY (H₂O = 1)

2.867

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

APPEARANCE AND ODOR

Colorless crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

Not available

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

METHOD USED

EXTINGUISHING MEDIA

None available

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION Potassium Arsenate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV 0.25 mg/m ³	CARCINOGENIC no
PRINCIPLE ROUTES OF ABSORPTION Ingestion or inhalation of dust or fume.	SKIN AND EYE IRRITATION Moderate
REVELANT SYMPTOMS OF EXPOSURE Acute pulmonary edema, restlessness, dyspnea, cyanosis. If ingested - gastroenteritis, vomiting, diarrhea, drop in blood pressure.	
EFFECTS OF CHRONIC EXPOSURE Optic neuritis, anesthesia, edema and dermatitis, anemia, loss of weight, nausea, salivation.	
EMERGENCY AND FIRST AID PROCEDURES Inhalation rest; if ingested - give emetic (antidote - dimer caprol)- obtain medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses or goggles
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With particulate filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

110-0452B

PRODUCT DESIGNATION

03-110-0802
Potassium Bichromate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS Neutral potassium chromate, Potassium Chromate VI	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Potassium dichromate	FORMULA $K_2Cr_2O_7$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published lethal dose						
Oral - human 50 mg/kg						
LDLO - oral - child 26 mg/kg						

SECTION III PHYSICAL DATA 294.22

BOILING POINT d 500	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 398°C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (____ = 1)
2.676		
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.
4.9		
APPEARANCE AND ODOR red crystals		

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		

SPECIAL FIRE FIGHTING PROCEDURES

Material may form hot viscous foam. Possible steam explosion.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Furnishes oxygen - container may explode in fire.

PRODUCT DESIGNATION
Potassium Bichromate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 0.15 mg/m³

CARCINOGENIC yes

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of dust by mouth.

SKIN AND EYE
IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE Irritation of skin and eyes, irritation of respiratory tract;
internal irritation and damage.

EFFECTS OF CHRONIC EXPOSURE Asthmatic symptoms - liver and kidney damage; lung cancer.

EMERGENCY AND FIRST AID PROCEDURES Wash from skin and eyes; if swallowed - wash mouth, give
emetic, get medical attention; inhalation - rest and keep warm.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY
Powerful oxidizing agent.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) May react with organic materials to produce a fire
(acetic acid, acetic anhydride, anthracene, ethyl alcohol)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Cover with weak reducing agent such as sodium bisulfite. Transfer slurry
to large water container for disposal.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Store in cool, dry place away from easily oxidizable substances.

OTHER PRECAUTIONS

SIGNATURE

DATE

110-0802B

CAS-007789229

TS66500

PRODUCT DESIGNATION

03-110-1032
Potassium BifluorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Potassium acid fluoride

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Potassium difluoride

FORMULA

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published lethal dose						
Oral - guinea pig 150 mg/kg.						
#2 Lowest published lethal dose						
Subcutaneous - guinea pig 250 mg/kg.						

SECTION III PHYSICAL DATA MW - 78.11

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
41 at 21°C.			
APPEARANCE AND ODOR			
Colorless crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing and respirator.

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION

Potassium Bifluoride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 3 PPM (for HF)

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of HF, skin absorption

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of respiratory system, skin absorption and eye burns.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, brittleness of bones, anemia, weakness, discoloration of teeth.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, give oxygen if necessary, get medical attention; wash from skin and eyes, get medical attention; if swallowed - wash mouth, drink water, then milk of magnesia, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

110-1032B

PRODUCT DESIGNATION

03-110-2902
Potassium Chromate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Potassium Chromate

FORMULA

 K_2CrO_4

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published lethal dose oral - human 50 mg/kg						
#2 - lowest published lethal dose subcutaneous - rabbit 12 mg/kg.						

SECTION III PHYSICAL DATA MW-194.20

BOILING POINT --	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 975	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 2.732		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 58		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Yellow crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

Material will form hot viscous foam. Possible steam explosion.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Furnishes oxygen. Container may explode in a fire.

PRODUCT DESIGNATION
Potassium Chromate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV - 0.19 mg/m³ CARCINOGENIC yes

PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust (mainly) ingestion SKIN AND EYE IRRITATION moderate

REVELANT SYMPTOMS OF EXPOSURE Irritation of skin and eyes, irritation of respiratory tract, internal irritation and damage.

EFFECTS OF CHRONIC EXPOSURE Asthmatic symptoms - liver and kidney damage, lung cancer.

EMERGENCY AND FIRST AID PROCEDURES Wash from skin and eyes; if swallowed - wash mouth, give emetic, get medical attention; inhalation - rest, keep warm.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY Powerful oxidizing agent.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID) May react with organic materials to produce a fire. (Acetic anhydride, acetic acid, anthracene, ethyl alcohol).

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

110-2902B

CAS:000151508

TS87500

PRODUCT DESIGNATION

03-110-3532
03-110-3502
Potassium Cyanide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Potassium Cyanide

FORMULA

KCN

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO - oral - human	2.857 mg/kg		10		Rat	
				6	Mouse	
			5		Rabbit	

SECTION III PHYSICAL DATA MW-65.12

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
634.5°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.52			
SOLUBILITY IN WATER Pts/100 pts H ₂ O	soluble	VOLATILE	% Vol. % Wt.
122.2 in hot water			
APPEARANCE AND ODOR			
White crystals	bitter almonds		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Non-combustible		LOWER
METHOD USED		

EXTINGUISHING MEDIA

None available

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Releases HCN with water or acids.

PRODUCT DESIGNATION
Potassium Cyanide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 5 mg/C.M. CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of HCN, skin and ingestion SKIN AND EYE
IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Giddiness, dizziness, rapid heart action followed by unconsciousness; if swallowed - rapid respiration - becoming slow - unconsciouness and death.

EFFECTS OF CHRONIC EXPOSURE Dizziness, weakness, congestion of lungs, loss of appetite, loss of weight.

EMERGENCY AND FIRST AID PROCEDURES If inhaled - breathe amyl nitrate; if swallowed - breath amyl nitrate, wash from eyes or skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)
Avoid acids.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Sweep with broom onto a sheet of paper. Ready for disposal.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
	Face shield
MECHANICAL (GENERAL)	GLOVES
	Rubber
SPECIAL	RESPIRATOR
	With proper filter

OTHER PROTECTIVE EQUIPMENT
Overalls and aprons.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Store in cool, dry place away from acids or oxidizing materials.

OTHER PRECAUTIONS

SIGNATURE	DATE
-----------	------

110-3502B

CAS:007789233

TT07000

PRODUCT DESIGNATION

03-110-4522
Potassium FluorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Potassium Fluoride

FORMULA

KF

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			245		Rat	

SECTION III PHYSICAL DATA

MW - 58.10

BOILING POINT

° F.

VAPOR PRESSURE

mm Hg.

880°C.

1 mm at 885°C.

MELTING POINT

° F.

VAPOR DENSITY (Air = 1)

1500°C.

SPECIFIC GRAVITY (H₂O = 1)

EVAPORATION RATE (_____ = 1)

2.48

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

92.3 at 18°C.

APPEARANCE AND ODOR

White solid

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

Not flammable

FLAMMABLE
(EXPLOSIVE)

UPPER

METHOD USED

LIMITS

LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION Potassium Fluoride	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL 2.5 mg/m ³	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust, ingestion skin.	SKIN AND EYE IRRITATION Moderate
REVELANT SYMPTOMS OF EXPOSURE Irritation of respiratory system; severe internal irritation and damage; skin and eye burns.	
EFFECTS OF CHRONIC EXPOSURE Increase in fluoride content of teeth.	
EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm, get medical aid; if swallowed - wash mouth, drink water, then milk of magnesia, get medial aid, wash from skin and eyes, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Sweep into container for disposal.	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Store away from contacts with acids.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

110-4522B

CAS:001310583

TT21000

PRODUCT DESIGNATION

Potassium Hydroxide
03-110-5042MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Potassium Hydroxide

FORMULA
KOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			365		rat	

SECTION III PHYSICAL DATA MW - 56.11

BOILING POINT 1320-1324°C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 360	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.044		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

White

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Flood with water

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing - do not splash or splatter material.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Potassium Hydroxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

2 mg/m³ ceiling valueneoplastic
CARCINOGENIC effects

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust or mist, ingestion.

SKIN AND EYE

IRRITATION severe

REVELANT SYMPTOMS OF EXPOSURE

Corrosive action on skin, eyes and mucous membranes - If
ingested - severe pain, vomiting, diarrhea and collapse.

EFFECTS OF CHRONIC EXPOSURE

Chronic dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

Wash from skin; Ingestion; give milk or fruit juice to
drink - obtain medical help.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Acetic Acid, Maleic Anhydride, Nitropropane, Phosphorous,
Trichloroethylene.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron and full face shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in dry place; protect against moisture and water. Separate from acids,
metals, explosives, organic peroxides, and easily ignitable materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

110-5042B

PRODUCT DESIGNATION

03-110-5602
Potassium MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

Potassium, Kalium

K

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
See KOH			None available			

SECTION III PHYSICAL DATA MW - 39.10

BOILING POINT 774°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 3.65°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 0.86		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Reacts with water		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Silver metal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Use metal "X" extinguisher.		

SPECIAL FIRE FIGHTING PROCEDURES

Smother fire with powder (no water).

UNUSUAL FIRE AND EXPLOSION HAZARDS

Explosive action with water, forms KO₂ or K₂O₄ (yellow) with oxygen which explodes on contact with organics.

PRODUCT DESIGNATION
Potassium Metal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
Not available (2 mg/C.M. KOH)

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of smoke ingestion.

SKIN AND EYE
IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Swallowing - from KOH, swallowing painful and difficult burning
pain down from esophagus to stomach, pulse rapid and feeble, irritation of skin.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Wash mouth, dilute alkali by drinking water, then give
olive oil, milk or egg white; if on skin - remove bulk before water washing with
large quantities of water. Get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY Reacts violently with water, potassium with KO_2 (yellow)
reacts explosively with water or organic liquids.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) Fluorocarbons, halogens, air, oxygen, potassium nitrate,
water, potassium superoxide, chlorinated hydrocarbons.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Face shield

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

Face shield with protective clothing.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store under kerosens or mineral oil. Keep away from water.

OTHER PRECAUTIONS

SIGNATURE

DATE

110-5602B

PRODUCT DESIGNATION

03-110-6402
Potassium Oxalate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Potassium Oxalate

FORMULA

 $K_2C_2O_4 \cdot H_2O$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			not available			

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR			

2.13

28.7

White crystal

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		
SPECIAL FIRE FIGHTING PROCEDURES		

N/A

N/A

N/A

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated to decomposition temperature may emit toxic fumes.

PRODUCT DESIGNATION
Potassium Oxalate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV - 1 mg/C.M. (Oxalic Acid) CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION SKIN AND EYE
Ingestion IRRITATION Yes

REVELANT SYMPTOMS OF EXPOSURE If swallowed - severe internal pain, collapse,
kidney damage.

EFFECTS OF CHRONIC EXPOSURE May produce calcium oxalate crystals in bladder.

EMERGENCY AND FIRST AID PROCEDURES Skin or eye - flush with water. If swallowed, wash
out mouth, and give salt water to induce vomiting, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Avoid oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES
SPECIAL	RESPIRATOR With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

110-6402B

PRODUCT DESIGNATION

03-110-6802
Potassium Periodate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Potassium Periodate	FORMULA KIO ₄

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			not available			

SECTION III PHYSICAL DATA

BOILING POINT ° F.	VAPOR PRESSURE at 300°C.	mm Hg.
MELTING POINT 582°C. ° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 3.618 at 15°C.	EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 0.66 at 13°C.	VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR White crystal		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED N/A		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION

Potassium Periodate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust, ingestion

SKIN AND EYE

IRRITATION

Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of respiratory system; eye irritation,

internal irritation.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical attention; wash from eyes;
if swallowed - wash mouth, induce vomiting, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Strong oxidizing agent.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reducing materials.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

110-6802B

PRODUCT DESIGNATION

03-121-2905
03-121-2910
Ruthenium Chloride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Ruthenium Chloride	FORMULA $\text{RuCl}_4 \cdot 2\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LD ₅₀ intraperitoneal - rat	360 mg/kg					

SECTION III PHYSICAL DATA MW 207.42

BOILING POINT -- ° F.	VAPOR PRESSURE -- mm Hg.
MELTING POINT -- ° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)	EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Soluble	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Dark colored powder	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Will not burn.	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Ruthenium Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Lacrimation, disturbance of vision, headache, eye

irritation, cough.

EFFECTS OF CHRONIC EXPOSURE

Pulmonary edema

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - induce vomiting,
get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

121-2905B

CAS:007782492

VS77000

PRODUCT DESIGNATION

Selenium Metal
Powder 99% Pure
03-125-4006

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Selenium

FORMULA

Se

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Note:			See Note			
Lowest published lethal concentration in air						
inhalation - rat 33 mg/C.M.						

SECTION III PHYSICAL DATA An 78.96 Se₈ 631.68

BOILING POINT 688°C.	° F.	VAPOR PRESSURE at 356°C.	1 mm Hg.
MELTING POINT 170 - 217°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 4.26 - 4.79		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O insoluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR steel grey, non-metallic element.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT none available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Use water spray.		

SPECIAL FIRE FIGHTING PROCEDURES

Small fires extinguished with sand. Self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Same as sulfur. Burning Se produces SeO₂.

PRODUCT DESIGNATION Selenium Metal	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV 0.2 mg/m ³	
CARCINOGENIC neoplastic	
PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust, ingestion	SKIN AND EYE IRRITATION Slight
REVELANT SYMPTOMS OF EXPOSURE Nervousness, fear, vomiting, difficult respiration, central nervous system depression.	
EFFECTS OF CHRONIC EXPOSURE Possible liver damage, nervousness, tremor, metallic taste, garlic-like odor of breath.	
EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, oxygen as needed; if swallowed - give emetic, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID) Barium Carbide, Bromine Pentafluoride, Calcium Carbide, Chromium Trioxide, Fluorene, Lithium, Silicide, Nickel, Nitric Acid, Nitrogen	
HAZARDOUS DECOMPOSITION PRODUCTS Trichloride.	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Plastic or rubber
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Store in place free from water.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

125-4006B

CAS:007784465

CG36750

PRODUCT DESIGNATION

Sodium Arsenite
03-131-1068MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Metaarsenite

FORMULA

Na AsO₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg.		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO - oral - human 5 mg/kg			41		rat	
				150	rabbit	
			10		mouse	

SECTION III PHYSICAL DATA MW 129.91

BOILING POINT --	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT --	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (____ = 1)	
SOLUBILITY IN WATER 1.87 Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Colorless or grayish-white powder.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
None available		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Sodium Arsenite

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.25 mg/m³

CARCINOGENIC
Teratogen no

PRINCIPLE ROUTES OF ABSORPTION

Ingestion or inhalation of dust or fume.

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Acute pulmonary edema, restlessness, dyspnea, cyanosis.

If ingested - gastroenteritis, vomiting, drop in blood pressure.

EFFECTS OF CHRONIC EXPOSURE

Optic neuritis, anesthesia, edema and dermatitis, anemia,
loss of weight, nausea, salivation.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if ingested give emetic; (antidote -
dimercaprol). Get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

131-1068B

CAS:026628228

VY80500

PRODUCT DESIGNATION

03-131-1108
Sodium AzideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Azide

FORMULA

NaN₃

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published lethal dose			27		mouse	
oral - rat 42 mg/kg.						
subcutaneous - rat 35 mg/kg.						
oral - human 5 mg/kg						

SECTION III PHYSICAL DATA

MW - 65.02

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
decomp. in vacuum			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.85			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
39			
APPEARANCE AND ODOR			

Colorless, hexagonal crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		
METHOD USED		LOWER

EXTINGUISHING MEDIA

N/A

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Sodium Azide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV - 0.1 PPM, 0.3 Mg/K.m. (ceiling value) CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION SKIN AND EYE
Inhalation, ingestion IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Dizziness, weakness, blurred vision, shortness of
breath, eye irritation.

EFFECTS OF CHRONIC EXPOSURE
May lower blood pressure.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; if swallowed - give emetic,
get medical aid; wash eyes and hands.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) May react violently with bromine, carbon disulfide
dibromomalononitrile, and dimethyl sulfate.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
MECHANICAL (GENERAL)	Safety goggles
SPECIAL	GLOVES
OTHER PROTECTIVE EQUIPMENT	RESPIRATOR
	With proper filter

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE DATE

131-1108B

PRODUCT DESIGNATION

03-131-3158
03-131-3168
Sodium Calcium Hydrate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Soda lime	FORMULA --

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
CaO+ (5-20% NaOH)			not available			

SECTION III PHYSICAL DATA MW - 22.90

BOILING POINT N/A	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT N/A	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) --		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR
White granules

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED N/A		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION	
Sodium Calcium Hydrate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL	
TLV - 2 mg/C.M. (from NaOH)	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION	
Ingestion	SKIN AND EYE IRRITATION Yes
REVELANT SYMPTOMS OF EXPOSURE Severe irritation of skin and eyes, severe internal irritation and damage, vomiting, diarrhea and collapse.	
EFFECTS OF CHRONIC EXPOSURE --	
EMERGENCY AND FIRST AID PROCEDURES Flush with water and vinegar; if swallowed, wash mouth and give water to drink, then vinegar, get medical attention.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID)	
Acids	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
MECHANICAL (GENERAL)	Safety glasses
SPECIAL	GLOVES
OTHER PROTECTIVE EQUIPMENT	RESPIRATOR
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

CAS: 007775113

GB29550

PRODUCT DESIGNATION

Sodium Chromate
03-131-3608MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Chromate

FORMULA

 Na_2CrO_4

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published lethal dose						
subcutaneous - rat 243 mg/kg.						
LDLO oral human 50 mg/kg						
TCLO - inhalation - man 0.8 mg/c.m. - 7 years						

SECTION III PHYSICAL DATA MW - 162.0

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
792			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.723			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
32			
APPEARANCE AND ODOR			
Yellow crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
Water		

SPECIAL FIRE FIGHTING PROCEDURES Material may form hot viscous foam. Possible steam explosion.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Source of oxygen (container may explode in fire).

PRODUCT DESIGNATION
Sodium Chromate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV - 0.1 mg/C.M. CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust (mainly) ingestion SKIN AND EYE IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Irritation of respiratory tract; internal irritation and damage; irritation of skin and eyes.

EFFECTS OF CHRONIC EXPOSURE Asthmatic symptoms; liver and kidney damage, lung cancer.

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest keep warm; if swallowed - wash mouth, give emetic, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY Powerful oxidizing agent.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID) May react with organic materials to produce a fire (acetic acid, acetic anhydride, anthracene and ethyl alcohol).

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

131-3608B

CAS:000143339

V275250

PRODUCT DESIGNATION

Sodium Cyanide
03-131-4008MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Cyanide

FORMULA

NaCN

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published lethal dose			6440		rat	
subcutaneous - mouse 10 mg/kg						
subcutaneous - rabbit 2.2 mg/kg						
LDLO - oral - human 2.857 mg/kg.						

SECTION III PHYSICAL DATA MW 49.02

BOILING POINT 1496°C.	° F.	VAPOR PRESSURE at 817°C.	mm Hg.
MELTING POINT 563.7°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.86		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O soluble		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

White solid in form of granules, flakes, or eggs.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT not combustible	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In contact with acids releases highly flammable hydrogen cyanide gas.

PRODUCT DESIGNATION
Sodium Cyanide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 5 mg/m³

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

Inhalation of dust, ingestion, skin

IRRITATION

Moderate to severe

REVELANT SYMPTOMS OF EXPOSURE Giddiness, dizziness, rapid heart action, shortness of breath, drop in blood pressure.

EFFECTS OF CHRONIC EXPOSURE Possible dizziness, weakness, congestion of lungs, hoarseness, loss of appetite, loss of weight.

EMERGENCY AND FIRST AID PROCEDURES Give amyl nitrate inhalation, 0.2 ml 3 min. - give artificial respiration with 100% oxygen to maintain high blood oxygen tension - wash skin and eyes - obtain medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Nitrates, nitrites

HAZARDOUS DECOMPOSITION PRODUCTS

In contact with acids, releases HCN gas.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Collect by sweeping with a broom on to a sheet of paper.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry place separated from acids and oxidizing materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

131-4008B

PRODUCT DESIGNATION

Sodium Dichromate
03-131-4108
03-131-4138

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Sodium Acid Chromate

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Bichromate

FORMULA

 $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 Lowest published lethal dose						
Subcutaneous - guinea pig 51 mg/kg.						
LDLO - oral - human - 50 mg/kg						

SECTION III PHYSICAL DATA MW - 298.00

BOILING POINT decomposes 400°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT -2H ₂ O at 100°C. anhydrous at 320°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 2.52		EVAPORATION RATE (____ - 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 238		VOLATILE % Vol.	% Wt.
APPEARANCE AND ODOR Red crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES Material may form hot viscous foam.

Possible steam explosion.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Source of oxygen (container may explode in fire).

PRODUCT DESIGNATION Sodium Dichromate	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.30 mg/C.M.	CARCINOGENIC Yes
PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust (mainly) ingestion	SKIN AND EYE IRRITATION moderate
REVELANT SYMPTOMS OF EXPOSURE Irritation of respiratory tract; internal irritation and damage; irritation of skin and eyes.	
EFFECTS OF CHRONIC EXPOSURE Asthmatic symptoms, liver and kidney damage, lung cancer.	
EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm, get medical aid; if swallowed - wash mouth, give emetic, get medical aid; wash from skin and eyes.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY Powerful oxidizing agent.	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID) May react with organic materials to produce a fire (acetic anhydride and acid, anthracene, ethyl alcohol)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety glasses
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT Protective work clothing.	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Keep container away from combustibles and easily oxidized materials.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

131-4108B

PRODUCT DESIGNATION

Sodium Fluoride
03-131-4808
03-131-4848

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS Villiaumite	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Sodium Fluoride	FORMULA NaF

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/Kg.		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published toxic dose oral - human 4 mg/kg.			180		Rat	
#2 lowest published lethal dose Oral - human 75 mg/kg						
#3 lowest published lethal dose oral - guinea pig - 250 mg/kg.						

SECTION III PHYSICAL DATA MW - 41.99

BOILING POINT 1700°C.	° F.	VAPOR PRESSURE 1 mm at 1077°C.	mm Hg.
MELTING POINT 980 - 997°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 2.79		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER 4 Pts/100 pts H ₂ O at 0°C.		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR White powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS --		

PRODUCT DESIGNATION
Sodium Fluoride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL 2.5 mg/C.M. - TLV Teratogen CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION Inhalation of dust, ingestion, skin SKIN AND EYE IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE Irritation of respiratory system; severe internal irritation and damage; skin and eye burns.

EFFECTS OF CHRONIC EXPOSURE Increase in fluoride content of teeth.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm; get medical aid; if swallowed - wash mouth, drink water, then milk of magnesia, get medical aid; wash from skin and eyes, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Sweep into beaker for disposal.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
MECHANICAL (GENERAL)	Safety glasses
SPECIAL	GLOVES Rubber
OTHER PROTECTIVE EQUIPMENT	RESPIRATOR With proper filter

Coveralls

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store away from acid materials.

OTHER PRECAUTIONS

SIGNATURE DATE

131-4808B

PRODUCT DESIGNATION

03-131-5323
Sodium Hydroxide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Lye, caustic soda

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium hydroxide

FORMULA
NaOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published lethal dose						
oral - rabbit 500 mg/kg.						

SECTION III PHYSICAL DATA MW 40.01

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
1390°C.			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
318.4°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.13			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
42			
APPEARANCE AND ODOR			
White, deliquescent pellets.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
Flood with water		
SPECIAL FIRE FIGHTING PROCEDURES		
Don't splash or splatter material.		
UNUSUAL FIRE AND EXPLOSION HAZARDS		
--		

PRODUCT DESIGNATION
Sodium Hydroxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 2 mg/m³ (ceiling value) CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of dust or mist. SKIN AND EYE
IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Corrosive on skin, eyes and mucous membranes - pulmonary irritation. If ingested - severe pain, vomiting, diarrhea, and collapse.

EFFECTS OF CHRONIC EXPOSURE
Chronic dermatitis

EMERGENCY AND FIRST AID PROCEDURES Ingestion: give milk or fruit juice - obtain medical help; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) Acetaldehyde, Acrolein, Acrylonitrile, Allyl Alcohol, Aluminum, Chloronitrotoluenes, Maleic Anhydride, Nitroethane, Nitromethane

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION Full protection

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR W/appropriate filter

OTHER PROTECTIVE EQUIPMENT
Rubber apron and full face shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Store in dry place; protect against moisture and water. Separate from acids, metals, explosives, organic peroxides, and easily ignitable materials.

OTHER PRECAUTIONS

SIGNATURE	DATE
-----------	------

131-5323B

PRODUCT DESIGNATION

03-131-5508
Sodium HypochloriteMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Hypochlorite

FORMULA

Na O Cl

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LD50 intraperitoneal - mouse	1580 mg/kg		Not available			

SECTION III PHYSICAL DATA MW - 74.45

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
decomposes			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
26			

APPEARANCE AND ODOR

Pale yellow in solution.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION Sodium Hypochlorite	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL 1 PPM, 3 Mg/C.M. (Chlorine)	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion	SKIN AND EYE IRRITATION Severe
REVELANT SYMPTOMS OF EXPOSURE Skin and eye irritation, upper respiratory tract irritation, pulmonary edema; digestive tract damage.	
EFFECTS OF CHRONIC EXPOSURE --	
EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; wash from skin & eyes; if swallowed - wash mouth, drink water, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID) Amines and oxidizable material such as oxalic acid.	
HAZARDOUS DECOMPOSITION PRODUCTS May produce explosive chloramines with amines.	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Cover with weak reducing agent such as sodium bisulfite. Transfer slurry into water and dispose of.	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT Coveralls	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Store in cool, dry place away from combustible materials.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

131-5508B

CAS:007440235

VY06860

PRODUCT DESIGNATION

03-131-6028
Sodium MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

Sodium

Na

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		
			See	NaOH1		

SECTION III PHYSICAL DATA AW - 22.997

BOILING POINT 892°C.	° F.	VAPOR PRESSURE at 432°C.	1 mm Hg.
MELTING POINT 97.8°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 0.9684		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O reacts		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Silver white metal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Ignites above 115°C. in air	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA	Dry inert powder such as soda ash or Sodium Chlorate, (no water, CO ₂ or Carbon tetrachloride).	
SPECIAL FIRE FIGHTING PROCEDURES	Cover burning sodium with powder to smother fire - use self-contained respirator.	
UNUSUAL FIRE AND EXPLOSION HAZARDS	Reacts violently with water to produce hydrogen and sodium hydroxide.	

PRODUCT DESIGNATION Sodium Metal	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL Not available - TLV (2 mg/C.M. NaOH)	CARCINOGENIC no
PRINCIPLE ROUTES OF ABSORPTION Inhalation of smoke ingestion	SKIN AND EYE IRRITATION Severe
RELEVANT SYMPTOMS OF EXPOSURE Severe skin and eye burns; extreme irritation of nose, throat and respiratory passages; ingestion - severe pain, vomiting and collapse.	
EFFECTS OF CHRONIC EXPOSURE Dermatitis may follow repeated skin contact with alkalies.	
EMERGENCY AND FIRST AID PROCEDURES Wash from skin with large amounts of water. If swallowed - dilute by giving water to drink, then fruit juices or diluted vinegar, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID) Reacts violently with water and hydrocarbons	
HAZARDOUS DECOMPOSITION PRODUCTS Sodium Hydroxide	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT Protective clothing	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Protect from physical damage, keep from water, store under nitrogen, kerosene or mineral oil.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

131-6028B

CAS:000062760

KI17500

PRODUCT DESIGNATION

03-131-6908
Sodium OxalateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Oxalate

FORMULA

 $\text{Na}_2\text{C}_2\text{O}_4$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO oral - human	50 mg/kg					
Lowest published lethal dose						
Subcutaneous - mouse	100 mg/kg.					

SECTION III PHYSICAL DATA MW 136.02

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
decomposes			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.27 at 20°C.			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
3.7			
APPEARANCE AND ODOR			
White crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
N/A		
SPECIAL FIRE FIGHTING PROCEDURES		
N/A		

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated to decomposition temperature may emit toxic fumes.

PRODUCT DESIGNATION

Sodium Oxalate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

1 Mg/C.M. (oxalic acid value)

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Ingestion (mainly)

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

If swallowed - severe internal pain and collapse;
kidney damage.

EFFECTS OF CHRONIC EXPOSURE

May produce calcium oxalate crystals in bladder.

EMERGENCY AND FIRST AID PROCEDURES

Skin or eye - flush with water. If swallowed, wash mouth
and give salt water to induce vomiting, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

131-6908B

CAS:001313606

WD34500

PRODUCT DESIGNATION

03-131-7338
Sodium PeroxideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Peroxide

FORMULA

Na₂O₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA MW - 77.99

BOILING POINT --	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT d (460°C.)	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.805			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
5			

APPEARANCE AND ODOR

White powder

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Reacts with water to produce oxygen.

PRODUCT DESIGNATION

Sodium Peroxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 2 Mg/C.M. (NaOH) (ceiling value)

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion (mainly)

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Extremely corrosive to skin, eyes and mucous membranes, pulmonary irritation.

EFFECTS OF CHRONIC EXPOSURE

Chronic dermatitis.

EMERGENCY AND FIRST AID PROCEDURES Wash from skin and eyes; if swallowed - wash mouth, drink 1% vinegar, orange juice or lemon juice, get medical aid; if inhaled - rest, keep warm, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Strong oxidizing agent.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reducing agents, water, strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with (9.1) sand to soda ash

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store away from sources of water.

OTHER PRECAUTIONS

SIGNATURE

DATE

131-7338B

CAS:006834920

VV92750

PRODUCT DESIGNATION

03-131-8148
03-131-8188
Sodium Silicate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Water glass

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium Silicate

FORMULA

 Na_2OSiO_2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			13		Rat	
			7		Mouse	
			2		Rabbit	

SECTION III PHYSICAL DATA

MW-122.07

BOILING POINT --	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT --	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) --		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O V.S.		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

Clear solution

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Sodium Silicate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV - 2 Mg/C.M. (NaOH) CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION Inhalation of mist, ingestion SKIN AND EYE IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Extremely corrosive to skin, eyes and mucous membranes;
also pulmonary irritation.

EFFECTS OF CHRONIC EXPOSURE
Chronic dermatitis

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm, get medical aid; if swallowed -
wash mouth, drink 1% vinegar, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)
Strong Acids

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

131-8148B

CAS:010102202

WY24500

PRODUCT DESIGNATION

03-131-8758
Sodium TelluriteMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Disodium Telluric Acid

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sodium tellurite

FORMULA

 Na_2TeO_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			20		Mouse	
Note:			83		Rat	
Lowest published lethal dose			67		Rabbit	
Oral - human 29 mg/kg.			45		Guinea Pig	

SECTION III PHYSICAL DATA MW-221.58

BOILING POINT N/A	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT N/A	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) N/A		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR White powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION
Sodium Tellurite

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
0.1 Mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION
Inhalation, ingestion

SKIN AND EYE
IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Sleepiness, loss of appetite, nausea, metallic taste,
garlic odor to breath.

EFFECTS OF CHRONIC EXPOSURE
Fatigue, loss of appetite, bronchitis, dermatitis.

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest, keep warm, get medical aid. If
swallowed, wash mouth, give emetic, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety glasses

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

131-8758B

CAS:007646788

XP87500

PRODUCT DESIGNATION

Stannic Chloride
03-133-3008MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Tin Tetrachloride

FORMULA

 $\text{SnCl}_4 \cdot 5\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES.	CONC.
Note: Intraperitoneal -	mouse LD ₅₀ 46 mg/kg.			21	mouse	

SECTION III PHYSICAL DATA

MW - 350.58

BOILING POINT
114.1°C.

° F.

VAPOR PRESSURE
at 10°C.

10 mm Hg.

MELTING POINT
-33°C.

° F.

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)
2.232

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

APPEARANCE AND ODOR

Colorless, fuming liquid or crystals.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

Not flammable

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

METHOD USED

EXTINGUISHING MEDIA

Do not use hand-held water-base extinguishers.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Stannic Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 4 mg/C.M.

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of dust, ingestion.

SKIN AND EYE
IRRITATION moderately severe skin & eyes.

RELEVANT SYMPTOMS OF EXPOSURE

Respiratory and mucous membrane irritant, may cause skin burns.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Inhaled - wash skin & eyes; if swallowed - induce vomiting,
get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Turpentine

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in dry, well-ventilated area - Protect against water and
direct sunlight.

OTHER PRECAUTIONS

Do not store with combustible materials.

SIGNATURE

DATE

133-3008B

PRODUCT DESIGNATION

Stannous Chloride
03-133-6008

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Tin dichloride

FORMULA

 $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1200	41	mouse	
Note: Intraperitoneal - mouse 66 mg/kg.			700		rat	

SECTION III PHYSICAL DATA

MW 225.65

BOILING POINT

° F.

VAPOR PRESSURE

mm Hg.

Decomposes

MELTING POINT

37.7°C.

° F.

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)

2.71 at 15.5°C.

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

APPEARANCE AND ODOR

Colorless crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

None available

FLAMMABLE
(EXPLOSIVE)

UPPER

METHOD USED

LIMITS

LOWER

EXTINGUISHING MEDIA

None available

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Stannous Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 3.2 mg/CM.

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust or ingestion.

SKIN AND EYE

IRRITATION Mild

RELEVANT SYMPTOMS OF EXPOSURE Pain of mouth and throat, vomiting, diarrhea, tenesmus, retching, anuria, liver damage.

EFFECTS OF CHRONIC EXPOSURE

Possible erythematous, papular and granulomatous reactions.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, keep warm, get medical aid; if swallowed - wash mouth, drink water, milk of magnesia, get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Calcium Carbide, Ethylene Oxide, Hydrazine Hydrate, Nitrates.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses or goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

W/appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

133 - 6008B

PRODUCT DESIGNATION

03-141-5902
Tellurium MetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Tellurium

FORMULA

Te

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See Note			
Note:						
Lowest published lethal dose						
subcutaneous - dog 290 mg/kg.						

SECTION III PHYSICAL DATA A wt. - 127.61

BOILING POINT 987 ⁰ C.	⁰ F.	VAPOR PRESSURE mm Hg.
MELTING POINT 450 ⁰ C.	⁰ F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 6.24		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Grey-white powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Use water spray		

SPECIAL FIRE FIGHTING PROCEDURES

Straight water streams will scatter molten Te.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Burning produces toxic TeO₂ gas.

PRODUCT DESIGNATION Tellurium Metal	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL TLV - 0.1 mg/CM.	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion	SKIN AND EYE IRRITATION Moderate
REVELANT SYMPTOMS OF EXPOSURE Sleepiness, loss of appetite, nausea, metallic taste and garlic odor to breath.	
EFFECTS OF CHRONIC EXPOSURE Fatigue, loss of appetite, bronchitis, dermatitis.	
EMERGENCY AND FIRST AID PROCEDURES If inhaled - keep warm; if swallowed - wash mouth, give emetic, get medical aid; wash from skin and eyes.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

141-5902B

CAS:007550450

XR19250

PRODUCT DESIGNATION

03-150-4003
Titanium ChlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Titanium Tetrachloride

FORMULA

 $TiCl_4$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See Notes			
Lowest published lethal concentration in air						
inhalation - mouse 10 mg/C.M. - 2 hours.						

SECTION III PHYSICAL DATA MW - 189.73

BOILING POINT 136°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT -30°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.726		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O S		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

Colorless to light yellow liquid - fumes in moist air.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

Water spray if necessary to keep container cool - full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Reacts with water to produce HCl.

PRODUCT DESIGNATION Titanium Chloride	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL Not available TLV (5 PPM HCl)	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion	SKIN AND EYE IRRITATION Yes
RELEVANT SYMPTOMS OF EXPOSURE Vapor irritating to skin and respiratory system, severe irritation to digestive tract.	
EFFECTS OF CHRONIC EXPOSURE Repeated exposure can cause symptoms similar to silicosis.	
EMERGENCY AND FIRST AID PROCEDURES Wash from skin immediately; inhalation - artificial respiration and shock treatment if needed; if swallowed drink water or milk immediately, give milk of magnesia, get medical aid.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY Reacts with moisture of the air to produce HCl fumes.	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID) Water	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Cover spills with sodium bicarbonate. Remove to container for disposal.	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST Handle in hood	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Face shield
MECHANICAL (GENERAL)	GLOVES Rubber gloves
SPECIAL	RESPIRATOR With proper filter
OTHER PROTECTIVE EQUIPMENT Wear protective clothing.	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Keep bottle tightly closed.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

150-4003B

CAS:001314621

YW24500

PRODUCT DESIGNATION

03-154-6035
Vanadium PentoxideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Vanadic Anhydride

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Vanadium Pentoxide

FORMULA

 V_2O_5

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO oral - human	5 mg/kg					
#1 Lowest published toxic concentration in air			10		Rat	
inhalation - human	0.1 mg/C.M./8 hours.					
TCLO Inhalation - human	346 mg/c.m. pulmonary effect					

SECTION III PHYSICAL DATA

BOILING POINT d-1750°C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 800°C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 3.357		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 0.07 at 25°C.		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Yellow to red powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION
Vanadium Pentoxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.5 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritation of eyes, nose, throat and lungs; if swallowed -
vomiting, diarrhea, nervous system damage, convulsions.

EFFECTS OF CHRONIC EXPOSURE

Bronchial asthma

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical aid; if swallowed - wash
mouth, give emetic, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

154-6035B

PRODUCT DESIGNATION

Yttrium Metal
03-159-5006

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Yttrium	FORMULA Y

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA AW - 88.91

BOILING POINT 3200° C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 1500° C.	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 5.51		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Slow reaction		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Grey to black metal.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Sand, dry powder.		
SPECIAL FIRE FIGHTING PROCEDURES Smother with suitable dry powder, no water.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Moderate fire hazard.		

PRODUCT DESIGNATION
Yttrium Metal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV - 1 Mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION
Inhalation, ingestion

SKIN AND EYE
IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Irritation to respiratory system and eyes; kidney damage,
internal damage if swallowed.

EFFECTS OF CHRONIC EXPOSURE
--

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest, get medical aid; if swallowed - wash mouth,
give emetic, get medical aid; wash eyes as needed.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)
Oxidizing materials

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

159-5006B

PRODUCT DESIGNATION

03-159-8006
Yttrium OxideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Yttrium Oxide

FORMULA

 Y_2O_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 LD ₅₀ intraperitoneal	- rat	500 mg/kg.	See Note 1			

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
4300			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
2410			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
4.84			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
1.			
APPEARANCE AND ODOR			
Yellow to white powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
Water		

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION

Yttrium Oxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 1 Mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Irritation of eyes and respiratory tract; kidney damage;
internal damage if swallowed.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest; wash from skin and eyes; if swallowed -
wash mouth, give emetic, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

159-8006B

CAS:007646857

ZH14000

PRODUCT DESIGNATION

Zinc Chloride
03-161-2007MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Zinc chloride

FORMULA

 ZnCl_2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published toxic concentration in air						
inhalation - man	4800 mg/C.M. -	30 months	350		rat	
#2 lowest published lethal dose			350		mouse	
intravenous - rat - 30 mg/kg.						
#3 lowest published toxic dose						
parenteral - chicken - 15 mg/kg. neoplastic						

SECTION III PHYSICAL DATA MW - 136.29

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
732°C.		at 428°C.	1
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
262°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
2.9 at 25°C.			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Cubic, white, deliquescent crystals.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
not flammable		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Water		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Zinc chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 1 mg/m³

CARCINOGENIC

neoplastic
effects

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust or fume.

SKIN AND EYE

IRRITATION Can be moderately severe.

RELEVANT SYMPTOMS OF EXPOSURE

Gastrointestinal tract & respiratory tract irritation, pulmonary edema.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

Treat pulmonary edema, give prednisone or other
corticosteroid 25 to 50 mg. orally daily. - obtain medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Glasses

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Dust mask.

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, well-ventilated place.

OTHER PRECAUTIONS

SIGNATURE

DATE

161-2007B

CAS:007664417

B008750

PRODUCT DESIGNATION
 Ammonia (anhydrous)
 03-910-4030
 03-910-4080
 03-910-4150

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ammonia

FORMULA

NH₃**SECTION II HAZARDOUS INGREDIENTS**

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀ PPM	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published lethal concentration in air					Mouse	4837/1H
10,000 PPM/3 hr. inhalation - human.					Cat	10066/1H
Lowest published toxic concentration in air -						
20 PPM inhalation - human - irritant						

SECTION III PHYSICAL DATA MW - 17.04

BOILING POINT -33.3°C.	° F.	VAPOR PRESSURE at 26°C.	10 mm Hg.
MELTING POINT -77.7°C.	° F.	VAPOR DENSITY (Air = 1) 0.6	
SPECIFIC GRAVITY (H ₂ O = 1) 0.77		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

Colorless gas, with irritating odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 25%
METHOD USED		LOWER 16%

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

Stop flow of gas, cool tank with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Ammonia

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL TLV - 25 PPM, 18 mg/C.M. CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION Inhalation, skin SKIN AND EYE IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Eye, skin and mucous membrane irritation, respiratory system irritation.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES Flush eyes and skin with water for 15 minutes; remove from source, artificial respiration and oxygen as needed.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID) Acetaldehyde, acrolein, bromine, chlorine, chromic acid, ethylene dichloride, fluorine, iodine.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Goggles
MECHANICAL (GENERAL)	GLOVES Impervious gloves
SPECIAL	RESPIRATOR Self-contained

OTHER PROTECTIVE EQUIPMENT
Full protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Store in cool place, detached storage is preferred.

OTHER PRECAUTIONS

SIGNATURE	DATE
-----------	------

910-4030B

PRODUCT DESIGNATION

03-927-5550
Carbon monoxide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Carbon monoxide	FORMULA CO

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀ ppm/4 hr	
			ORAL	PERCUT.	SPECIES	CONC.
					Rat	1807
					Mouse	2444
					Guinea Pig	5718
Lowest published toxic concentration in air.						
Inhalation - man 650 PPM/45 min.						
Lowest published lethal concentration in air						
inhalation - man 4000 PPM/30 minutes.						

SECTION III PHYSICAL DATA MW - 28.01

BOILING POINT -191°C.	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -207°C.	° F.	VAPOR DENSITY (Air = 1) 1.0
SPECIFIC GRAVITY (H ₂ O = 1) --		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Yes		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless, odorless gas.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT --	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 74.2% LOWER 12.5%
METHOD USED		
EXTINGUISHING MEDIA Carbon dioxide, dry chemical, water spray.		
SPECIAL FIRE FIGHTING PROCEDURES		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

Carbon monoxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

50 PPM, 55 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION

None

RELEVANT SYMPTOMS OF EXPOSURE

Loss of coordination ocular muscles, aching limbs, headache, nausea, vomiting, collapse, death.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure - artificial respiration, administer oxygen with 5% CO₂ or hyperbaric oxygen.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

927-5550B

PRODUCT DESIGNATION

03-934-4000
03-934-4040
03-934-4080
Chlorine, liquid, compressed

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Chlorine	FORMULA Cl_2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀ PPM	
			ORAL	PERCUT.	SPECIES	CONC.
Notes:					Rat	293/1 hr.
Lowest published toxic concentration in air -					Mouse	137/1 hr.
Inhalation - human 15 PPM				See Notes		
Lowest published lethal concentration in air						
Inhalation - human 430 PPM/30 min.						

SECTION III PHYSICAL DATA MW - 70.91

BOILING POINT -35°C.	° F.	VAPOR PRESSURE at 28°C.	4800	mm Hg.
MELTING POINT -101°C.	° F.	VAPOR DENSITY (Air = 1)	2.49	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)		
1.47 (liquid)				
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol.	% Wt.

APPEARANCE AND ODOR

Pungent, irritating, greenish-yellow gas. (inhalation threshold 0.2 ppm)

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not comubustible (supports combustion)		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Apply water to keep surrounding or tanks cool. Do not apply directly to leaks.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Chlorine, liquid, compressed

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - .1 PPM, 3 mg/C.M.

CARCINOGENIC
no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Skin and eye burns, upper respiratory tract irritation,
pulmonary edema.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, get medical aid, wash from
hands and skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

May support combustion of flammable materials.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES
Impervious

SPECIAL

RESPIRATOR
Self-contained

OTHER PROTECTIVE EQUIPMENT

Far less than 25 ppm - chemical cartridge respirators.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in well-ventilated room shielded from direct rays of sun.

OTHER PRECAUTIONS

SIGNATURE

DATE

934-4000B

PRODUCT DESIGNATION

Hydrogen Sulfide
03-950-9405
03-950-9425
03-950-9445

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Hydrogen Sulfide

FORMULA

 H_2S

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀ PPM/IH	
			ORAL	PERCUT.	SPECIES	CONC.
					Rat	713
#1 lowest published toxic concentration in air - inhalation - human 600 ppm/30 min.					Mouse	673

SECTION III PHYSICAL DATA MW - 34.08

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
-60.4°C.		at 25.5°C. 20 at m.	
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-85.5°C.		1.189	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.539 at 0°C.			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
2.9 vol. gas/vol. water			

APPEARANCE AND ODOR

Colorless; flammable gas, offensive odor. (odor threshold 0.02 ppm)

SECTION IV FIRE AND EXPLOSION HAZARD DATA % by vol.

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		45
METHOD USED		LOWER
		4.3

EXTINGUISHING MEDIA

Stop flow of gas. Dry chemical, carbon dioxide, water spray.

SPECIAL FIRE FIGHTING PROCEDURES

Wear goggles and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Forms explosive mixtures with air.

PRODUCT DESIGNATION
Hydrogen Sulfide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 10 PPM, 15 mg/C.M.

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor

SKIN AND EYE

IRRITATION mild to moderate

REVELANT SYMPTOMS OF EXPOSURE

Headache, anosmia, nausea, cough, dizziness, drowsiness,
and pulmonary edema, eye irritation

EFFECTS OF CHRONIC EXPOSURE

Low blood pressure, loss of appetite, weight loss;
conjunctivitis and chronic cough.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure; give artificial respiration with
oxygen if necessary. Obtain medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

(Soda Lime and Air) mixture - explosion hazard.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

W/proper filter

OTHER PROTECTIVE EQUIPMENT

Self-contained breathing apparatus.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Outside storage is preferred away from sources of ignition. Keep away from
nitric acid, strong oxydizing materials.

OTHER PRECAUTIONS

Keep from direct sunlight and excessive heat.

SIGNATURE

DATE

950-9425B

PRODUCT DESIGNATION

03-988-2020
03-988-2130
Sulfur Dioxide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

Sulfurous Acid Anhydride

CHEMICAL NAME AND SYNONYMS

FORMULA

Sulfur Dioxide

SO₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LCLO inhalation human	400 ppm - 1 min.					
Lowest published toxic concentration in air -						
Inhalation - human - 3	PPM					
TCLO inhalation - man	4 ppm - 1 min.					

SECTION III PHYSICAL DATA MW - 64.07

BOILING POINT	° F.	VAPOR PRESSURE	
-10°C.		21°C.	2538 mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-76°C.		2.26	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.43 (liquid)			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
22.8			

APPEARANCE AND ODOR

Highly irritating, colorless gas.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Non-combustible		LOWER
METHOD USED		
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Sulfur Dioxide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 5 PPM, 13 mg/C.M.

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION moderate - severe

RELEVANT SYMPTOMS OF EXPOSURE

Eye irritation, nose and throat irritation, bronchitis, asphyxia.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical aid, wash from eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in well-ventilated area free of combustibles.

OTHER PRECAUTIONS

SIGNATURE

DATE

988-2020B

PRODUCT DESIGNATION

03-609-2050
03-609-2075
Asbestos Fiber

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS	FORMULA

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published toxic dose inhalation - human 1.2 fibers 1 CC						

SECTION III PHYSICAL DATA

BOILING POINT N/A	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT N/A	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Grey-white fibers		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA N/A		
SPECIAL FIRE FIGHTING PROCEDURES N/A		
UNUSUAL FIRE AND EXPLOSION HAZARDS N/A		

PRODUCT DESIGNATION

Asbestos Fibers

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

5 fibers/CC >5 μ long

CARCINOGENIC

yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION NO

RELEVANT SYMPTOMS OF EXPOSURE

None

EFFECTS OF CHRONIC EXPOSURE

Asbestosis, lung cancer

EMERGENCY AND FIRST AID PROCEDURES

Not available

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

N/A

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

N/A

INCOMPATIBILITY (MATERIALS TO AVOID)

N/A

HAZARDOUS DECOMPOSITION PRODUCTS

N/A

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Vacuum or wet clean only. No dry sweeping allowed.

WASTE DISPOSAL METHOD

In sealed plastic bag.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

Advise of Ind. Hygiene Dept.

MECHANICAL (GENERAL)

" "

SPECIAL

" "

OTHER PROTECTIVE EQUIPMENT

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

None

GLOVES

None

RESPIRATOR

> 5 fiber/CC >5 μ long

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

609-2050B

PRODUCT DESIGNATION

50-201-1400
Gold Cyanide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Gold Cyanide

FORMULA

 $\text{HAu(CN)}_4\cdot 3\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.

SECTION III PHYSICAL DATA MW - 356.33

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
D 50°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
7.12			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Very soluble			
APPEARANCE AND ODOR			
Light yellow, crystalline powder.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Gold Cyanide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 5 mg/C.M. (CN)

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, skin and ingestion

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Giddiness, dizziness, rapid heart action followed by unconsciousness; if swallowed - rapid respiration becoming slow.

EFFECTS OF CHRONIC EXPOSURE Dizziness, weakness, lung congestion, appetite loss, weight loss.

EMERGENCY AND FIRST AID PROCEDURES If inhaled - breathe amyl nitrite, artificial respiration and oxygen as needed; if swallowed same; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Avoid acids.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Overalls and aprons

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry place away from acids.

OTHER PRECAUTIONS

SIGNATURE

DATE

5201-1400B

PRODUCT DESIGNATION

50-201-4000
Sel-Rex Bright Gold B1

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	

TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
-------------------------	-----------------

CHEMICAL NAME AND SYNONYMS	FORMULA Au CN
----------------------------	------------------

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Au Cn			None available			
K Cm						

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Yes APPEARANCE AND ODOR Gold colored powder.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE)	UPPER
Not flammable		
METHOD USED	LIMITS	LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Sel-Rex bright gold B-1

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

5 mg/C.M. (CN)

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Dizziness, rapid heart action, unconsciousness and death; rapid respiration - becoming slow, coma and death.

EFFECTS OF CHRONIC EXPOSURE

Dizziness, weakness, lung congestion, loss of appetite, weight loss.

EMERGENCY AND FIRST AID PROCEDURES

If inhaled or swallowed - breathe amyl nitrite 30 sec. every 2 minutes; artificial respiration as needed.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Avoid contact with acids.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Apron and clothes

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

5201-4000B

PRODUCT DESIGNATION

50-201-4050
Sel-Rex Bright Gold M²

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA
Au Cn

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Au Cn			Not available			
K Cm						

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Gold colored powder.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Sel-Rex Bright Gold M²

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

5 mg/C.M. (CN)

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

Moderate

REVELANT SYMPTOMS OF EXPOSURE

Dizziness, rapid heart action, unconsciousness and death. Rapidrespiration - becoming slow, coma and death.

EFFECTS OF CHRONIC EXPOSURE

Dizziness, weakness, lung congestion, appetite loss, weight loss.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation or ingestion - breathe amyl nitrate, every 2 min., artificial respiration as needed.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts with acids.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Coveralls and apron.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry place away from acids.

OTHER PRECAUTIONS

SIGNATURE

DATE

5201-4050B

PRODUCT DESIGNATION

50-201-6200
Gold(ous) Potassium Cyanide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Gold Potassium Cyanide	FORMULA $\text{KAu(CN)}_2 \cdot 2\text{H}_2\text{O}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.

SECTION III PHYSICAL DATA MW - 324.36

BOILING POINT ° F.	VAPOR PRESSURE mm Hg.
MELTING POINT ° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)	EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR White crystalline powder	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Gold Potassium Cyanide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 5 mg/C.M. (CN)

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE

Giddiness, dizziness, rapid heart action followed by unconsciousness; if swallowed - rapid respiration - becoming slow, coma.

EFFECTS OF CHRONIC EXPOSURE

Dizziness, weakness, lung congestion, appetite loss, weight loss.

EMERGENCY AND FIRST AID PROCEDURES

If inhaled or ingested - breathe amyl nitrite - artificial respiration and oxygen as needed.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

Avoid contact with acids, produces HCN.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Overalls and aprons.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry place away from acids.

OTHER PRECAUTIONS

SIGNATURE

DATE

5201-6200B

CAS-020816120

RN11400

PRODUCT DESIGNATION

50-401-0401
Osmic Acid AnhydrideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Osmium Tetraoxide

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Osmic Acid Anhydride

FORMULA

OsO₄

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published toxic concentration in air inhalation - human 0.1 mg/C.M.			14		Rat	
			162		Mouse	

SECTION III PHYSICAL DATA

MW - 254.26

BOILING POINT

° F.

130°C.

VAPOR PRESSURE

mm Hg.

at 26°C.

10

MELTING POINT

° F.

40°C.

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)

4.91

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

APPEARANCE AND ODOR

Monoclinic colorless crystals, chlorine-like odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

Not flammable

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

METHOD USED

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Osmic Acid Anhydride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.002 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION

Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritation of respiratory system, eye and skin irritation; if swallowed severe internal irritation.

EFFECTS OF CHRONIC EXPOSURE

Disturbances of vision, dermatitis and skin ulceration.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - drink water, milk of magnesia, get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR
With chemical filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

5401-0401B

PRODUCT DESIGNATION

50-601-0801
Chloroplatinic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Chloroplatinic Acid	FORMULA $H_2PtCl_6 \cdot 6H_2O$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
None available						

SECTION III PHYSICAL DATA MW - 517.92

BOILING POINT ° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 60°C. ° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 2.41	EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Soluble	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Brownish-yellow	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Chloroplatinic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.002 Mg/CM

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Inflammation of mucous membranes in the nose, lacramation
and burning in the eyes.

EFFECTS OF CHRONIC EXPOSURE Running of the nose, sneezing, tightness of chest, cyanosis,
wheezing, cough, dermatitis.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - remove to fresh air, rest, treat asthmatic
attack; ingestion - drink water, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

5601-0801B

CAS: 010025657

TP22750

PRODUCT DESIGNATION

50-601-1120
Platinum ChlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Chloroplatinic Acid

FORMULA

H₂PL Cl₆ · 6H₂O

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO intravenous - rabbit	23 mg/Kg.					

SECTION III PHYSICAL DATA MW - 517.92

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR			

2.41

Soluble

Brownish-yellow

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Platinum Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.002 mg/CM

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation (dust)

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE

Inflammation of mucous membranes in nose, lacramation and
~~burning in the eyes.~~

EFFECTS OF CHRONIC EXPOSURE

Running of the nose, sneezing, tightness of chest, cyanosis,
~~wheezing, cough, dermatitis.~~

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - remove to fresh air, rest, treat asthmatic
symptoms; drink water, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

5601-1120B

PRODUCT DESIGNATION

50-601-1510
Diamino Platinum Nitrite

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Diamino Platinum Nitrite	FORMULA (NH ₄) ₂ Pt (NO ₂) ₆

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
None available						

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Yes APPEARANCE AND ODOR			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Ammonium Platinum Nitrite

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.002 mg/c.m.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Inflammation of mucous membranes in nose, lacrimation and
burning in the eyes.

EFFECTS OF CHRONIC EXPOSURE

Running of the nose, sneezing, tightness of chest, cyanosis,
wheezing, cough, dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - drink water, get medical aid; inhalation -
rest, treat asthmatic symptoms.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

MECHANICAL (GENERAL)

Goggles
Gloves

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

5601-1510B

CAS-010049077

VI92750

PRODUCT DESIGNATION

50-801-1105
Rhodium TrichlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Rhodium Trichloride

FORMULA

Rh Cl₃

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LD50-intravenous-rat	198 mg/kg					
LD50-intravenous-rabbit	215 mg/kg					

SECTION III PHYSICAL DATA MW - 209.26

BOILING POINT	° F.	VAPOR PRESSURE	n.m Hg.
sublimes (800°C)			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
450°C (decomp.)			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Insoluble			
APPEARANCE AND ODOR			
Dark red powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Use water on fire

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Rhodium Trichloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.001 mg/C.M.

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Slight

RELEVANT SYMPTOMS OF EXPOSURE

Possible allergic asthma

EFFECTS OF CHRONIC EXPOSURE

Possible allergic asthma

EMERGENCY AND FIRST AID PROCEDURES If swallowed - induce vomiting, get medical aid;
inhalation - rest; wash skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With particulate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

5801-1105B

PRODUCT DESIGNATION

50-901-1101
Silver Carbonate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Silver Carbonate	FORMULA Ag_2CO_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
None available						

SECTION III PHYSICAL DATA MW - 275.8

BOILING POINT -- ° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 218°C. (decomp.) ° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 6.08	EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 0.003	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Yellow powder	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not flammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Use water in area		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Silver Carbonate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.05 mg/CM

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION

Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Ingestion - abdominal pain; skin and respiratory
system irritation.

EFFECTS OF CHRONIC EXPOSURE

Blue-grey discoloration of skin, mucous membrane and eyes.

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - give emetic, get medical aid;
wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With particulate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

5901-1101B

CAS - 000506649

VW38500

PRODUCT DESIGNATION

50-901-1251
Silver CyanideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Silver Cyanide

FORMULA

AgCn

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/CM		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			123		Rat	

SECTION III PHYSICAL DATA MW - 133.89

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
320°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
3.95			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Slightly soluble			
APPEARANCE AND ODOR			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not flammable		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Silver Cyanide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.016

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Violent abdominal pain on ingestion, rapid respiration, then gasping; dizziness, shortness of breath.

EFFECTS OF CHRONIC EXPOSURE Blue-grey discoloration of skin, mucous membranes and eyes.

EMERGENCY AND FIRST AID PROCEDURES If swallowed - amyl nitrite inhalation, followed by immediate vomiting or gastric lavage.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Fluorine and silver cyanide - may result in violent explosion.

HAZARDOUS DECOMPOSITION PRODUCTS

H Cn with acids.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safely glasses

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With particulate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store away from acids.

OTHER PRECAUTIONS

SIGNATURE

DATE

5901-1251B

CAS-007761888

VW47250

PRODUCT DESIGNATION

50-901-5621
Silver NitrateMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Silver Nitrate

FORM III, A
 AgNO_3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			50		mouse	

SECTION III PHYSICAL DATA MW - 169.87

BOILING POINT 444°C. (Decomp.)	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 212°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 4.35		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 132		VOLATILE % Vol.	% Wt.
APPEARANCE AND ODOR White crystalline solid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Non inflammable	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Use water

SPECIAL FIRE FIGHTING PROCEDURES

Wear goggles for fire fighting.

UNUSUAL FIRE AND EXPLOSION HAZARDS May increase flammability of combustible, organic or other readily oxidizable materials.

PRODUCT DESIGNATION

Silver Nitrate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - .015 mg/CM

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Skin and respiratory system irritation; ingestion, violent abdominal pain.

EFFECTS OF CHRONIC EXPOSURE

Blue-grey discoloration of skin, mucous membranes and eyes.

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - give emetic, get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) Ammonium hydroxide, acetylene, calcium carbide, charcoal, ethyl alcohol, plastics.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Do not store with combustible, organic or other readily oxidizable materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

5901-5621B

CAS:000108247

AK19250

PRODUCT DESIGNATION

Acetic Anhydride
03-201-0100MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ethanoic Anhydride

FORMULA

(CH₃CO)₂O

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
		5 ppm	1780	4000	Rat Rabbit	

SECTION III PHYSICAL DATA Mol. Wt. 102.09

BOILING POINT 140°C	° F.	VAPOR PRESSURE at 36°C	10 mm Hg.
MELTING POINT -73.1°C	° F.	VAPOR DENSITY (Air = 1) 3.52	
SPECIFIC GRAVITY (H ₂ O = 1) 1.082 at 30°/4°C		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Infinite		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Colorless liquid; very strong acid odor (acetic).

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 129°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 10.1
METHOD USED Closed Cup		LOWER 2.7

EXTINGUISHING MEDIA

Water spray, carbon dioxide, dry chemical, "alcohol" foam.

SPECIAL FIRE FIGHTING PROCEDURES

In advanced fires, fight from a distance or protected position.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapors may form explosive mixture with air.

PRODUCT DESIGNATION
Acetic Anhydride (can sensitize skin)

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL
TLV 5 ppm, 20 mg/C.M. (ceiling value)

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION
Inhalation of vapor

SKIN AND EYE
IRRITATION Severe
Corrosive to tissue

RELEVANT SYMPTOMS OF EXPOSURE Conjunctivitis, photophobia, lacrimation, irritation of nose and throat, and contact dermatitis due to primary irritation.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Remove from exposure, rest and keep warm; give soothing drinks to relieve irritation; if necessary use respiratory resuscitation measures, treat shock and pulmonary edema.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID) Chromic acid, chromic anhydride, glycerol, water, nitric acid, nitrogen tetroxide, perchloric acid, sodium peroxide and permanganates.

HAZARDOUS DECOMPOSITION PRODUCTS
Heated to decomposition, releases toxic fumes.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water - water spray.

WASTE DISPOSAL METHOD
Burial - call Safety Department.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST
Call Industrial Hygiene Department.

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)
Call Industrial Hygiene Department.

GLOVES
Rubber, neoprene

SPECIAL
Call Industrial Hygiene Department.

RESPIRATOR
Organic filter

OTHER PROTECTIVE EQUIPMENT
Self-contained breathing apparatus

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, well ventilated outside storage cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

201-0100B

CAS:000064197

AF12250

PRODUCT DESIGNATION

Acetic Acid
03-201-0200MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Vinegar acid Ethanoic Acid

CHEMICAL FAMILY

Organic acid

CHEMICAL NAME AND SYNONYMS

Acetic acid

FORMULA

CH₃COOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ PPM	
			ORAL	PERCUT.	SPECIES	CONC.
			3310		Rat	
			4910		Mouse	5620 /1 hr
			1060		Rabbit	
Notes: Lowest published toxic dose, oral human - 1.47 mg/kg;						
Lowest published toxic concentration in air, inhalation human - 816 ppm/3M						

SECTION III PHYSICAL DATA MW-60.05

BOILING POINT 118.1°C	° F.	VAPOR PRESSURE at 20°C.	mm Hg.
MELTING POINT 16.6°C	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.049		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Infinite		VOLATILE % Vol.	% Wt.
APPEARANCE AND ODOR Clear liquid with strong vinegar odor			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 104°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED Closed Cup		LOWER
EXTINGUISHING MEDIA Water spray, dry chemical, carbon dioxide or alcohol foam.		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Emits flammable vapors above 104°F. May form explosive mixture with air.

PRODUCT DESIGNATION

Acetic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 10 ppm, 25 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritation of eyes, skin and respiratory system; destruction of mucous membranes of the digestive tract.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - remove from exposure, rest, keep warm, get medical aid; if swallowed - wash mouth, drink water, milk of magnesia, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Chromic acid, sodium peroxide, nitric acid.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

Consult Industrial Hygiene Department

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

Consult Industrial Hygiene Department

GLOVES

Rubber gloves

SPECIAL

Consult Industrial Hygiene Department

RESPIRATOR

with organic filter

OTHER PROTECTIVE EQUIPMENT

Rubber protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Outside or detached storage is preferred. Keep from oxidizing materials. Keep above freezing point.

OTHER PRECAUTIONS

SIGNATURE

DATE

201-0200B

CAS:000098500

CF78750

PRODUCT DESIGNATION

P-Arsanilic Acid
03-201-2102MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

P-Aminobenzenearsonic acid

FORMULA

 $\text{NH}_2\text{C}_6\text{H}_4\text{AsO}(\text{OH})_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			216		Rat	

SECTION III PHYSICAL DATA Mol. Wt. 217.0

BOILING POINT N/A	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 232°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) N/A		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

White crystalline powder

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED N/A		LOWER
EXTINGUISHING MEDIA N/A		

SPECIAL FIRE FIGHTING PROCEDURES

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

Decomposed by heat to yield flammable vapors

PRODUCT DESIGNATION
P-Arsanilic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.72 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin absorption

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Burning of mouth and throat, gastroenteric pain, vomiting, diarrhea, hematuris, dehydration, oliguria and collapse

EFFECTS OF CHRONIC EXPOSURE

Arsenic poisoning and skin ulceration, falling out of hair, loss of appetite

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical attention; if swallowed - wash mouth, gastric lavage with 1% sodium thiosulfate; wash skin and eyes, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

with appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

201-2102B

CAS:000079083

AF59500

PRODUCT DESIGNATION

Bromoacetic Acid
03-201-4004MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Bromacetic Acid

FORMULA

BrCH2COOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			100		Mouse	

SECTION III PHYSICAL DATA MW - 138.96

BOILING POINT 208°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 50°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.94		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Use water spray, dry chemical, carbon dioxide alcohol foam.

SPECIAL FIRE FIGHTING PROCEDURES

Wear goggles & self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Bromoacetic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE

Severe eye & skin burns; severe respiratory and digestive system irritation

EFFECTS OF CHRONIC EXPOSURE

-

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - drink water, milk of magnesia, get medical aid; inhalation - rest; wash eyes & skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Reacts with alkalis.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Pour sodium bicarbonate on spill.

WASTE DISPOSAL METHOD

Dissolve in combustible solvent and burn.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in dry, air-excluded place.

OTHER PRECAUTIONS

SIGNATURE

DATE

201-4004B

PRODUCT DESIGNATION

B-Bromopropionic Acid
03-201-4454

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

3 Bromopropionic Acid

 $\text{BrCH}_2\text{CH}_2\text{COOH}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Note:						
Lowest published lethal dose -						
intraperitoneal - mouse 500 mg/kg.						

SECTION III PHYSICAL DATA

MW - 152.99

BOILING POINT	° F.	VAPOR PRESSURE	
--		at 142°C.	45 mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
63°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.48			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
very soluble			
APPEARANCE AND ODOR			
white solid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Water, foam, carbon dioxide or dry chemical.		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

B-Bromopropionic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Severe eye or skin burns, irritation of respiratory and digestive systems.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - drink water, milk of magnesia, get medical aid; inhalation - rest; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

201-4454B

CAS:000079118

AF85750

PRODUCT DESIGNATION

Chloroacetic Acid
03-201-5905MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
---------------------	-------------------------

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Monochloroacetic acid

FORMULA

ClCH2COOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			76		Rat	
Lowest published lethal dose - human - oral 50 mg/kg				5	Rat	
			165		Mouse	
Note: Subcutaneous - rat LD50 - 5 mg/kg.						

SECTION III PHYSICAL DATA Mol. Wt. 94.50

BOILING POINT 189°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 63°C	° F.	VAPOR DENSITY (Air = 1) 3.26
SPECIFIC GRAVITY (H ₂ O = 1) 1.58		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Use water spray, dry chemical, CO₂, or alcohol foam.

SPECIAL FIRE FIGHTING PROCEDURES

Wear goggles & self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Chloroacetic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Severe eye & skin burns, severe respiratory and digestive system irritation.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - drink water, milk of magnesia, get medical aid; inhalation - rest; wash eyes & skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts with alkalies.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

Dissolve in combustible liquid and burn.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
w/proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep containers closed, store in a cool place.

OTHER PRECAUTIONS

SIGNATURE

DATE

201-5905B

PRODUCT DESIGNATION

03-201-6186
Chloromaleic Anhydride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Chloromaleic Anhydride

FORMULA

COCHOCOC1

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
None available						

SECTION III PHYSICAL DATA

MW - 132.5

BOILING POINT	° F.	VAPOR PRESSURE	
		at 95°C.	25 mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR			
Corrosive fumes, liquid.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT		FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available			
METHOD USED			LOWER

EXTINGUISHING MEDIA

Alcohol foam, dry chemical, carbon dioxide.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Chloromaleic Anhydride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION

Severe

RELEVANT SYMPTOMS OF EXPOSURE

Coughing, choking, headache, dizziness, cyanosis, pulmonary edema.

EFFECTS OF CHRONIC EXPOSURE

Gastric pain, erosion of teeth, jaw necrosis, bronchial irritation.

EMERGENCY AND FIRST AID PROCEDURES

Use respiratory resuscitation measures; treat shock; get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Alkali metals, amines, calcium hydroxide, potassium hydroxide, sodium hydroxide, pyridine, tertiary amines.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene

SPECIAL

RESPIRATOR

W/chemical filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, full-face shield

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect from moisture and oxidizing materials. Store in cool, dry, well-ventilated area where fire hazard is not acute.

OTHER PRECAUTIONS

SIGNATURE

DATE

201-6186B

CA-007790945

FX57300

PRODUCT DESIGNATION

03-201-6706
Chlorosulfonic AcidMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Sulfuric Chlorohydrin

FORMULA

HOSO₂Cl

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			10-99		Rat	

SECTION III PHYSICAL DATA MW-116.52

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
151.5		at 18°C.	1
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-80°C.		4.02	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.787			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
decomposes			
APPEARANCE AND ODOR			

Colorless to brown fuming liquid.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Non flammable		
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water may be used in an area but not directly on the chemical.

SPECIAL FIRE FIGHTING PROCEDURES

Avoid water contact with chlorosulfonic acid since reaction can proceed with explosive violence.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Chlorosulfonic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

MAC - 10 PPM

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Yes

REVELANT SYMPTOMS OF EXPOSURE

Irritation of eyes and respiratory passages ; internal - severe
local attack on air passage.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest, keep warm, get medical aid; if swallowed -
wash mouth, drink water, then milk of magnesia; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Strong oxidizing agent

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Decomposes with explosive violence, with water, liberates HCl on hydrolysis.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Neutralize with soda ash or slaked lime.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

201-6706B

CAS:000064186

LQ49000

PRODUCT DESIGNATION

Formic Acid
03-202-1400
03-202-1402

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Methanoic Acid

FORMULA

HCOOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1210		Rat	
			1110		Mouse	
			4000		Dog	

SECTION III PHYSICAL DATA Mol. Wt. 46.03

BOILING POINT 100.7°C	° F.	VAPOR PRESSURE at 25°C	43 mm Hg.
MELTING POINT 8.4°C	° F.	VAPOR DENSITY (Air = 1) 1.03	
SPECIFIC GRAVITY (H ₂ O = 1) 1.214 (20°C)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Colorless, fuming liquid, pungent, penetrating odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA % Vol.

FLASH POINT 156°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 57%
METHOD USED Open Cup		LOWER 18%

EXTINGUISHING MEDIA

Water spray, dry chemical, "alcohol" foam, or carbon dioxide.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Formic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 5 ppm, 9 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION Percutaneous absorption of

SKIN AND EYE

liquid or inhalation of vapor, ingestion

IRRITATION

Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritating to mucous membranes, salivation, burning sensation in mouth and pharynx, vomiting, hematemesis, diarrhea, severe abdominal pain.

EFFECTS OF CHRONIC EXPOSURE conjunctival edema.

Erosion of teeth, jaw neurosis, bronchial irritation, Possible gastrointestinal disturbances.

EMERGENCY AND FIRST AID PROCEDURES Remove from exposure - rest, keep warm, obtain medical attention. Use respiratory resuscitation measure if necessary. For skin contact - flood effected area with H₂O, treat shock if necessary.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Furfuryl alcohol, hydrogen peroxide.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Use water spray.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber neoprene

SPECIAL

RESPIRATOR

w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Apron & face shield

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against freezing - store in cool, dry, well-ventilated place; avoid heat; separate from sulfuric acid.

OTHER PRECAUTIONS

SIGNATURE

DATE

202-1400B

PRODUCT DESIGNATION

03-202-2903
8 Hydroxy-5-Quinoline
Sulfonic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
<u>Oxyquinoline Sulfate</u>	
CHEMICAL NAME AND SYNONYMS	FORMULA
8 hydroxy -5 - quinoline sulfonic acid	$C_9H_7NO_4S$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			none available			

SECTION III PHYSICAL DATA MW - 225.22

BOILING POINT	- ° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	275°C ° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)	-	EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O	Slightly soluble	VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR	Pale yellow needle-like crystals.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER LOWER
METHOD USED			
EXTINGUISHING MEDIA	Carbon dioxide, dry chemical		
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

PRODUCT DESIGNATION

8 hydroxy - 5 Quinoline Sulfonic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Retina damage, eye & mucous membrane irritation, cyanosis, headache, dizziness.

EFFECTS OF CHRONIC EXPOSURE

Possible liver damage

EMERGENCY AND FIRST AID PROCEDURES If swallowed - induce vomiting, get medical aid; inhalation - rest; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

202-2903B

CAS:000110167

CM96250

PRODUCT DESIGNATION

Maleic Acid
03-202-4405MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Toxic acid

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Maleinic acid

FORMULA

HOOCCH=CH-COOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			708		Rat	
				1560	Rabbit	
			2400		Mouse	

SECTION III PHYSICAL DATA Mol. Wt. 116.1

BOILING POINT 135°C - decomposes	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 130.5°C	° F.	VAPOR DENSITY (Air = 1) 4.0
SPECIFIC GRAVITY (H ₂ O = 1) 1.590		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 79		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

White crystals with acidulous odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Use alcohol foam, carbon dioxide or dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Volatile solid gives off flammable vapor when solid.

UCN-11322

(3 10-74)

202-4405A

PRODUCT DESIGNATION
Maleic acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION

Severe

RELEVANT SYMPTOMS OF EXPOSURE

Gastric pain, headache, nausea and vomiting, cough, tearing and respiratory depression.

EFFECTS OF CHRONIC EXPOSURE

Erosion of teeth, bronchial irritation, gastrointestinal disturbances

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical aid if necessary; ingestion - wash mouth, drink water, get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Alkali metals, amines, calcium hydroxide, potassium hydroxide, sodium hydroxide and pyridine

HAZARDOUS DECOMPOSITION PRODUCTS

Gives off flammable vapors when heated

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

w/proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in a cool, dry, well-ventilated location away from fire hazards.

OTHER PRECAUTIONS

SIGNATURE

DATE

202-4405B

CAS:000108316

ON36750

PRODUCT DESIGNATION

Maleic Anhydride
03-202-4505MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Toxic Anhydride

FORMULA

(COCH)₂O

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			465		Mouse	
			481		Rat	

SECTION III PHYSICAL DATA Mol. Wt. 98.1

BOILING POINT 202°C (sublimes)	° F.	VAPOR PRESSURE at 44°C	mm Hg.
MELTING POINT 58°C	° F.	VAPOR DENSITY (Air = 1) 3.4	
SPECIFIC GRAVITY (H ₂ O = 1) 0.934 20°/4°C		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Hydrolyzes slowly in water		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Fused black or white crystals, irritating odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 218°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 7.1%
METHOD USED Closed Cup		LOWER 1.4%
EXTINGUISHING MEDIA		

"Alcohol" foam, carbon dioxide, or dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Dust cloud may be exploded by flame or spark.

PRODUCT DESIGNATION

Maleic Anhydride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.25 ppm, 1 mg/C.M.

CARCINOGENIC Carcinogen

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of dust (crystals), fumes

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Coughing, choking, headache, dizziness, pulmonary edema, cyanosis

EFFECTS OF CHRONIC EXPOSURE

Gastric pain, erosion of teeth, jaw necrosis; bronchial irritation

EMERGENCY AND FIRST AID PROCEDURES

Use respiratory resuscitation measures; treat shock; get further medical attention; remove from exposure.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Alkali metals, amines, calcium hydroxide, potassium hydroxide, sodium hydroxide, pyridine or other tertiary amines.

HAZARDOUS DECOMPOSITION PRODUCTS

Volatile solid which gives off flammable vapors when molten.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene

SPECIAL

RESPIRATOR

w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, full-face shield

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect from moisture and oxidizing materials. Keep separate from other storage, especially alkali metals and amines. Store in cool, dry area, well ventilated where fire hazard isn't as acute.

OTHER PRECAUTIONS

SIGNATURE

DATE

202-4505B

CAS:000141822

00-01750

PRODUCT DESIGNATION

Malonic Acid
03-202-4805MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Propanedioic acid

FORMULA

HOOCCH₂COOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1310		Rat	
			4000		Mouse	
Note: LD ₅₀ intraperitoneal - rat 1540 mg/kg						
LD ₅₀ intraperitoneal - mouse 300 mg/kg						

SECTION III PHYSICAL DATA Mol. Wt. 104.06

BOILING POINT ° F.	VAPOR PRESSURE mm Hg.
Decomposes	
MELTING POINT ° F.	VAPOR DENSITY (Air = 1)
132-134°C	
SPECIFIC GRAVITY (H ₂ O = 1)	EVAPORATION RATE (_____ = 1)
1.67	
SOLUBILITY IN WATER Pts/100 pts H ₂ O V.S.	VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR
White solid

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not available		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide, dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Malonic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC NO

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Gastric pain, headache, nausea and vomiting, cough, tearing
and respiratory oppression.

EFFECTS OF CHRONIC EXPOSURE

Erosion of teeth, bronchial irritation, gastrointestinal disturbance.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical aid if needed; ingestion -
wash mouth, drink water, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

Gives off flammable vapor when heated.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety glasses

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

w/proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

202-4805B

PRODUCT DESIGNATION

03-202-5206
Methoxyacetic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Methoxyacetic Acid	FORMULA CH ₃ OCH ₂ COOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None available			

SECTION III PHYSICAL DATA

BOILING POINT 198 ⁰ C.	⁰ F.	VAPOR PRESSURE 20 ⁰ C.	0.2 mm Hg.
MELTING POINT	⁰ F.	VAPOR DENSITY (Air = 1) 3.1	
SPECIFIC GRAVITY (H ₂ O = 1) 1.18		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Completely		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless, hygroscopic liquid, acetic acid odor.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 236 ⁰ F.	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER LOWER 3.6%
METHOD USED		
EXTINGUISHING MEDIA Carbon dioxide, dry chemical, water.		
SPECIAL FIRE FIGHTING PROCEDURES Air mask should be worn.		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

Methoxyacetic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

Eye irritation, skin irritation, if swallowed may cause internal irritation.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

Wash from skin & eyes; if swallowed - drink water, milk of magnesia, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

None

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove source of ignition, absorb spilled material on vermiculite. Place in fiber carton and burn.

WASTE DISPOSAL METHOD

Incinerate

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

Wash after handling

SIGNATURE

DATE

202-5206B

PRODUCT DESIGNATION

03-202-9610
Nitrophthalic Anhydride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Nitro-3-phthalic Anhydride	FORMULA NO ₂ C ₆ H ₃ CO ₂ O

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None available			

SECTION III PHYSICAL DATA MW - 193.11

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
163°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Soluble in hot water			
APPEARANCE AND ODOR			
Needle-like crystals.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE)	UPPER
None available	LIMITS	LOWER
METHOD USED		
EXTINGUISHING MEDIA		
Water, carbon dioxide, dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES Foam or direct water spray on molten nitrophthalic anhydride may cause foaming or spattering.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Nitrophthalic Anhydride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Coughing, sneezing, burning in respiratory system, dermatitis, skin irritation, if swallowed - digestive tract irritation.

EFFECTS OF CHRONIC EXPOSURE

Bronchitis, eye irritation, inflammation of respiratory tract; bloody nasal discharge.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - give milk of magnesia, get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with soda ash, mix and add water.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against physical damage, store in cool, well-ventilated location.

OTHER PRECAUTIONS

SIGNATURE

DATE

202-9610B

CAS:000144627

R024500

PRODUCT DESIGNATION

Oxalic Acid
03-203-0302
03-203-0312
03-203-0372
03-203-0382

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Oxalic Acid

FORMULA

 $H_2C_2O_4$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See Note			
Note: Lowest published lethal dose, oral - human 71 µg/kg.						

SECTION III PHYSICAL DATA Mol. Wt. 90.04

BOILING POINT Sublimes 150°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 101°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) D = 1.653		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Slightly		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

Transparent, colorless, crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Use water spray, carbon dioxide, dry chemical, or alcohol foam.

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus and goggles.

UNUSUAL FIRE AND EXPLOSION HAZARDS

May produce carbon monoxide when heated.

PRODUCT DESIGNATION

Oxalic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 1 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of mist or powder

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of eyes and upper respiratory tract, ulceration of mucous membranes, headache,

EFFECTS OF CHRONIC EXPOSURE irritability & nervousness.

Inhalation of fumes - oxalic acid poisoning; skin contact - cyanosis & gangrene by local

EMERGENCY AND FIRST AID PROCEDURES corrosive effect.

Remove from exposure, rest & keep warm; obtain medical help; if ingested - give emetic, large quantities of water, get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Silver, sodium chlorite, sodium hypochlorite.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with soda ash or sodium bicarbonate to neutralize.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

store in cool, dry well-ventilated area away from fire hazard. Outside storage preferred.

OTHER PRECAUTIONS

SIGNATURE

DATE

203-0302B

CY31500

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

EMERGENCY TELEPHONE NO.

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

$$\text{C}_6\text{H}_5\text{AsO}(\text{OH})_2$$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/C.M.		LC 50	
			ORAL	PERCUT.	SPECIES	CONC.
			.270		Mouse	
Note: Lowest published lethal dose, oral - rat 50 mg/kg.						

SECTION III PHYSICAL DATA Mol. Wt. 202

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 160°C decomposes	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.760		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O 3.3 at 28°C		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

None available

METHOD USED

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical, foam

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Decomposes to yield flammable vapor.

PRODUCT DESIGNATION

Phenylarsonic acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.68 mg/C.M.

Teratogen

CARCINOGENIC

Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Yes

REVELANT SYMPTOMS OF EXPOSURE Burning of mouth and throat, gastroentric pain, vomiting, diarrhea, hematuria, dehydration, oliguria and collapse.

EFFECTS OF CHRONIC EXPOSURE Arsenic poisoning and skin ulceration, falling out of hair, loss of appetite.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, keep warm, get medical aid; if swallowed - wash mouth, gastric lavage with 1% sodium thiosulfate; wash skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR
w/proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

203-1303B

CAS:000085449

TI31500

PRODUCT DESIGNATION

Phthalic Anhydride
03-203-2024MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Phthalandione

FORMULA

 $(C_6H_4)(CO)_2O$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			4020		Rat	
			800		Cat	

SECTION III PHYSICAL DATA Mol. Wt. 148.11

BOILING POINT 284.5°C sublimes	° F.	VAPOR PRESSURE at 96.5°C	1 mm Hg.
MELTING POINT 131.2°C	° F.	VAPOR DENSITY (Air = 1) 5.10	
SPECIFIC GRAVITY (H ₂ O = 1) 1.527		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O No		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

White crystalline needles

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 305°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 10.5 %
METHOD USED Open Cup		LOWER 1.7 %
EXTINGUISHING MEDIA Water, carbon dioxide, dry chemical. Foam or direct water spray on molten phthalic anhydride may cause foaming or spattering.		
SPECIAL FIRE FIGHTING PROCEDURES N/A		

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Phthalic Anhydride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 2 ppm, 12 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION

Severe

RELEVANT SYMPTOMS OF EXPOSURE

Coughing, sneezing, burning in respiratory system, dermatitis, eye irritation.

EFFECTS OF CHRONIC EXPOSURE Bronchitis, eye irritation, inflammation of respiratory tract; bloody nasal discharge.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, give oxygen to relieve respiratory distress; wash from skin and eyes; get medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with soda ash, mix and add water.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against physical damage. Store in bags in cool, dry, well-ventilated location.

OTHER PRECAUTIONS

SIGNATURE

DATE

203-2024B

PRODUCT DESIGNATION

03-203-2504
Picramic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

 FORMULA $(\text{NH}_2)(\text{OH})\text{C}_6\text{H}_2(\text{NO}_2)_2$

2 amino-4,6 Dinitro Phenol

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None available			

SECTION III PHYSICAL DATA MW - 199.13

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
-			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
169°C			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Soluble			
APPEARANCE AND ODOR			
Red crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER

EXTINGUISHING MEDIA

Explosive - do not fight fire except for unmanned equipment - use water.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing for rescue operation.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Severe explosion hazard

PRODUCT DESIGNATION

Picramic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Headache, drowsiness, weakness, cyanosis, respiratory distress.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, possible liver damage, dermatitis

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - give epsom salt solution, get medical aid,
inhalation - rest; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Explosive (keep from oxidizing materials)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self contained

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep away from oxidizing materials, combustables and sources of heat.

OTHER PRECAUTIONS

SIGNATURE

DATE

203-2504B

CAS:000088891

TJ78750

PRODUCT DESIGNATION

Picric Acid
03-203-2704MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Nitroxanthic acid

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Carbazotic acid

FORMULA

 $\text{HOC}_6\text{H}_2(\text{NO}_2)_3$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See Note			
Note: Lowest published lethal concentration subcutaneous frog - 200 mg/kg.						
" "	" "	oral	dog	- 120	mg/kg.	
" "	" "	dose-oral-human	-	5	mg/kg.	

SECTION III PHYSICAL DATA Mol. Wt. 229.11

BOILING POINT Explodes >300°C	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 121.8°C	° F.	VAPOR DENSITY (Air = 1) 7.9	
SPECIFIC GRAVITY (H ₂ O = 1) 1.763		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Yellow crystals or yellow liquid, intensely bitter taste.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 302°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

Fight from explosion-resistant location

UNUSUAL FIRE AND EXPLOSION HAZARDS

Highly explosive

PRODUCT DESIGNATION

Picric Acid (skin)

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.1 mg/m³

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Percutaneous absorption of

SKIN AND EYE

dust or inhalation of dust

IRRITATION

Severe

RELEVANT SYMPTOMS OF EXPOSURE

Dermatitis, headache, shivering, fever, insomnia

EFFECTS OF CHRONIC EXPOSURE

Diarrhea, ulceration of eyes, headache, nausea, vomiting, skin eruptions, jaundice and severe inflammation of kidneys.

EMERGENCY AND FIRST AID PROCEDURES

Remove from skin, by washing thoroughly with water, remove contaminated clothing. If ingested - induce vomiting; if necessary give artificial respiration; obtain medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Copper, lead, zinc, ammonia, bases, concrete

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Mix sodium bicarbonate or a mixture of 9:1 sand - soda ash and transfer to cardboard carton for disposal.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

Rubber (butyl)

RESPIRATOR

w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Apron, face shield, self-contained breathing apparatus

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against physical damage

OTHER PRECAUTIONS

SIGNATURE

DATE

203-2704B

CAS:000087661

OX28000

PRODUCT DESIGNATION

03-203-3455
Pyrogalllic AcidMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Pyrogallol

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

1,2,3 Trihydroxy benzene

FORMULA

 $C_6H_3(OH)_3$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published lethal dose -			789		Rat	
unspecified - man 120 mg/kg			1600		Rabbit	
Oral - human 50 mg/kg						

SECTION III PHYSICAL DATA MW - 126.11

BOILING POINT 309°C.	° F.	VAPOR PRESSURE at 168°C.	mm Hg.
MELTING POINT 134°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.45		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very soluble		VOLATILE % Vol.	% Wt.
APPEARANCE AND ODOR White solid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, water		
SPECIAL FIRE FIGHTING PROCEDURES		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

Pyrogallic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Vomiting, diarrhea, convulsions, circulatory collapse,
sensitizes, pulmonary edema.

EFFECTS OF CHRONIC EXPOSURE

Kidney and liver damage.

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - induce vomiting, give milk or egg white,
get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with soda ash, then add water.

WASTE DISPOSAL METHOD

Dissolve in flammable solvent and burn.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

MECHANICAL (GENERAL)

Safety goggles

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

203-3455B

CAS-001401554

W050750

PRODUCT DESIGNATION

03-203-7229
03-203-7309
Tannic Acid

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Tannin

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Tannic Acid

FORMULA

 $C_{76}H_{52}O_{46}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			5000		Rabbit	
LDLO - oral - human	500 mg/kg		2260		Rat	

SECTION III PHYSICAL DATA MW - 1701.2

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
200°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Soluble			
APPEARANCE AND ODOR			
Brown powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE)	UPPER
390°C.	LIMITS	LOWER
METHOD USED		
O.C.		
EXTINGUISHING MEDIA		
Water, carbon dioxide, dry chemical.		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Tannic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None Available

CARCINOGENIC

Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Thirst, nausea, vomiting, diarrhea, cyanosis, stupor, abdominal pain, convulsions

EFFECTS OF CHRONIC EXPOSURE

Dermatitis, liver damage, liver cancer.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; ingestion - drink milk, emetic, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

203-7309B

CAS:000068111

A159500

PRODUCT DESIGNATION

03-203-8310
Thioglycolic AcidMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Mercaptoacetic Acid

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Thioglycolic Acid

FORMULA

 HSCH_2COOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			250		Rat	
			126		Rabbit	
			126		Guinea pig	

SECTION III PHYSICAL DATA MW - 92.11

BOILING POINT

° F.

123°C at 29 mm.

VAPOR PRESSURE

mm Hg.

106°C

11

MELTING POINT

° F.

-16.5°C

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)

EVAPORATION RATE (_____ = 1)

1.33

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

Soluble

APPEARANCE AND ODOR

Colorless liquid, disagreeable odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

None available

FLAMMABLE
(EXPLOSIVE)

UPPER

METHOD USED

LIMITS

LOWER

EXTINGUISHING MEDIA

Water

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Thioglycolic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

Severe

RELEVANT SYMPTOMS OF EXPOSURE

Weakness, gasping, respiration, convulsions, severe eye and skin irritant.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - drink water, milk of magnesia, get medical aid; inhalation - rest; wash eyes and skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter.

OTHER PROTECTIVE EQUIPMENT

Coveralls

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

203-8310B

CAS:000076039

AJ78750

PRODUCT DESIGNATION

Trichloro Acetic Acid
03-203-9202
03-203-9262

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Trichloroacetic

FORMULA

CCl₃COOH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			3320		Rat	
			5640		Mouse	

SECTION III PHYSICAL DATA Mol. Wt. 163.4

BOILING POINT 197.5°C	° F.	VAPOR PRESSURE at 51°C	1 mm Hg.
MELTING POINT 57.5°C	° F.	VAPOR DENSITY (Air = 1)	5.65
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.6298			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Very soluble			
APPEARANCE AND ODOR			
Colorless, rhombic deliquescent crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Non-Combustible		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Use water spray, dry chemical, CO₂ or alcohol foam.

SPECIAL FIRE FIGHTING PROCEDURES

Wear goggles and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Trichloroacetic Acid

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

1 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor, ingestion

SKIN AND EYE

IRRITATION

Severe damage

REVELANT SYMPTOMS OF EXPOSURE Coughing, choking, headache, dizziness, pulmonary edema, very severe damage to tissue.

EFFECTS OF CHRONIC EXPOSURE Erosion of teeth, possible jaw necrosis, bronchial irritation with chronic cough, gastrointestinal disturbances are possible.

EMERGENCY AND FIRST AID PROCEDURES Skin - drench with water, remove & wash contaminated clothing; inhalation - respiratory resuscitation, treat for shock, and treat pulmonary edema, receive further medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Put sodium bicarbonate on spill. Transfer to container of water for 24 hrs. before draining.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

Water eye bubbler, fountain & showers available.

RESPIRATOR

with appropriate filter

OTHER PROTECTIVE EQUIPMENT

Apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep in tightly closed bottles. Store in cool, dry place.

OTHER PRECAUTIONS

SIGNATURE

DATE

203-9202B

CAS:000105517^e

AB28000

PRODUCT DESIGNATION

03-205-1550
AcetalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Acetaldehydediethylacetal

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Acetal

FORMULA

 $(C_2H_5O)_2CHCH_3$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			4570		Rat	
			2582		Rabbit	
Lowest published lethal concentration in air -						
inhalation - rat 4000 PPM/4H						
Lowest published lethal dose						
oral - human - 500 mg/kg						

SECTION III PHYSICAL DATA MW - 118.17

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
102° F.			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
		4.1	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.82			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
6			
APPEARANCE AND ODOR			
Liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
-50 F.		10.4%
METHOD USED		LOWER
		1.6%

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical, alcohol foam.

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Former explosive peroxides

PRODUCT DESIGNATION

Acetal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Slight

RELEVANT SYMPTOMS OF EXPOSURE

Central nervous system depression.

EFFECTS OF CHRONIC EXPOSURE

Dermatitis

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - give emetic; get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Reacts with oxygen to produce explosive peroxides shelf life - 12 months.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

Canister type

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

205-1550B

PRODUCT DESIGNATION

Acetaldehyde
03-205-2000

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Ethyl aldehyde Ethanal

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Acetic aldehyde

FORMULA

CH₃CHO

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1930		Rat	
				640	Rat	
			1232	560	Mouse	
			See Note			
Note: Lowest published toxic concentration in air; inhalation - human - 134 ppm irritant effects. 30 min.						

SECTION III PHYSICAL DATA Mol. Wt. 44.05

BOILING POINT 70°C.	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT -123.5°C	° F.	VAPOR DENSITY (Air = 1) 1.52	
SPECIFIC GRAVITY (H ₂ O = 1) 0.7827		EVAPORATION RATE (____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Infinite		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

Colorless, fuming liquid; pungent, fruity odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA % Vol.

FLASH POINT -36°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 60%
METHOD USED Closed Cup		LOWER 4.0%

EXTINGUISHING MEDIA

Dry chemical, "alcohol" foam, or carbon dioxide.

SPECIAL FIRE FIGHTING PROCEDURES

In advanced or large fires, fight from a distance, wear goggles and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

May cause explosion; flash backs.

PRODUCT DESIGNATION
Acetaldehyde

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 100 ppm, 180 mg/C.M.

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation of vapor

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Severe irritation to mucous membranes, reddening of skin, coughing, pulmonary edema, nausea, diarrhea, narcosis, respiratory failure.

EFFECTS OF CHRONIC EXPOSURE Dermatitis, conjunctivitis, anemia, delirium, hallucinations, and loss of intelligence.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure, give oxygen by inhalation; if eye or skin contact--irrigate thoroughly; if ingested - give emetic.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Acid anhydrides, halogens, phenols, alkalies, ketones, alcohols, oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Use water spray

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against physical damage. Separate from alkaline materials, halogens, alcohols, ketones, acid anhydrides, phenols and oxidizing materials.

OTHER PRECAUTIONS

SIGNATURE

DATE

205-2000B

CAS:000060355

AB40250

PRODUCT DESIGNATION

Acetamide
03-205-2500MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Ethanamide

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Acetic Acid Amide

FORMULA

CH₃CONH₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
				10,000	Rat	
				8,300	Mouse	
Note: Lowest published toxic dose, oral - rat 360 mg/kg, 152 weeks, carcinogen						

SECTION III PHYSICAL DATA Mol. Wt. 59.07

BOILING POINT. 222°C	° F.	VAPOR PRESSURE at 65°C		1 mm Hg.
MELTING POINT 81°C	° F.	VAPOR DENSITY (Air = 1)		
SPECIFIC GRAVITY (H ₂ O = 1) 1.159		EVAPORATION RATE (_____ = 1)		
SOLUBILITY IN WATER Pts/100 pts H ₂ O 200		VOLATILE	% Vol.	% Wt.
APPEARANCE AND ODOR White solid, odor, mouse nest				

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Acetamide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Ingestion, inhalation

SKIN AND EYE

IRRITATION No

RELEVANT SYMPTOMS OF EXPOSURE

Drowsiness, fatigue, nausea, acidosis, skin eruptions.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - wash mouth, induce vomiting; if inhaled - rest.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

205-2500B

CAS-000079058

AL77000

PRODUCT DESIGNATION

Acetonitrile
03-205-5000MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Methyl Cyanide, Ethanenitrile

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ethyl Nitrile, Acetonitrile

FORMULA

CH₃CN

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			3800		Rat	
				700 1250	Mouse Rabbit	

SECTION III PHYSICAL DATA Mol. Wt. 41.05

BOILING POINT 179	° F.	VAPOR PRESSURE at 27°C	100	mm Hg.
MELTING POINT -41°C	° F.	VAPOR DENSITY (Air = 1) 1.42		
SPECIFIC GRAVITY (H ₂ O = 1) 0.7868		EVAPORATION RATE (_____ = 1)		
SOLUBILITY IN WATER Pts/100 pts H ₂ O Infinite		VOLATILE	% Vol.	% Wt.

APPEARANCE AND ODOR

Colorless liquid with ethereal odor and burning sweetish taste.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 42°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 16 %
METHOD USED Open Cup		LOWER 4.4 %

EXTINGUISHING MEDIA

Dry chemical, "alcohol" foam, or carbon dioxide
water spray - ineffective.

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Flash backs

PRODUCT DESIGNATION
Acetonitrile

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 40 ppm, 70 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation and skin absorption, ingestion

SKIN AND EYE

IRRITATION Mild to moderate

RELEVANT SYMPTOMS OF EXPOSURE Dizziness, rapid respiration, headache, drowsiness, drop in blood pressure, rapid pulse, unconsciousness.

EFFECTS OF CHRONIC EXPOSURE Dizziness, weakness, hoarseness, congestion of lungs, conjunctivitis, loss of weight and appetite, and mental deterioration.

EMERGENCY AND FIRST AID PROCEDURES Remove from area; give amyl nitrite inhalation every 5 min. (0.2 ml/3 min.); give artificial respiration w/100% O₂; 10 ml of 3% sodium nitrite; skin or eye contact - wash thoroughly; Obtain medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

Cyanide

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Use water spray.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in standard flammable liquids storage room. Protect against physical damage.

OTHER PRECAUTIONS

SIGNATURE

DATE

205-5000B

CAS:000110134

MO31500

PRODUCT DESIGNATION

03-205-6000
AcetorylacetoneMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

2,5 Hexenedione

FORMULA

 $(\text{CH}_2\text{COCH}_3)_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			2700		Rat	

SECTION III PHYSICAL DATA MW-114.16

BOILING POINT 192.4°C.	° F.	VAPOR PRESSURE at 25°C.	1.6 mm Hg.
MELTING POINT -9°C.	° F.	VAPOR DENSITY (Air = 1) 3.9	
SPECIFIC GRAVITY (H ₂ O = 1) 0.97		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very soluble		VOLATILE % Vol.	% Wt.
APPEARANCE AND ODOR Colorless liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
174 ⁰ F.		
METHOD USED		LOWER
Closed cup		
EXTINGUISHING MEDIA		
Alcohol foam, carbon dioxide, dry chemical.		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Acetylacetone

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

MAC-75 PPM

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of eyes and mucous membranes. Narcosis at

higher concentrations.

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - induce vomiting, get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

can react with oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With chemical cartridge filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in well-ventilated area.

OTHER PRECAUTIONS

SIGNATURE

DATE

205-6000B

CAS:000075365

AD63900

PRODUCT DESIGNATION

Acetyl Chloride
03-206-3501MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Ethanoyl Chloride

FORMULA

CH₃COC1

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published toxic concentration in air			Not available			
inhalation - air 2 ppm/1 min. human						

SECTION III PHYSICAL DATA Mol. Wt. 78.5

BOILING POINT 124	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT -112°C	° F.	VAPOR DENSITY (Air = 1) 2.7	
SPECIFIC GRAVITY (H ₂ O = 1) 1.1		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Colorless liquid with pungent odor - fumes in moist air.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 40°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED Closed Cup		LOWER

EXTINGUISHING MEDIA

Do not use water or foam - use carbon dioxide or dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Reacts violently with water - forms explosive mixtures in air. May flash back.

PRODUCT DESIGNATION

Acetyl Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

MAC (5 ppm)

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation

SKIN AND EYE

IRRITATION Moderate to severe

RELEVANT SYMPTOMS OF EXPOSURE

Inhalation - cyanosis, headache, coughing, dizziness, weakness, pulmonary edema; skin contact - severe pain, brownish stains, burns penetrating full thick-

EFFECTS OF CHRONIC EXPOSURE

ness of skin.

Inhalation - erosion of teeth, jaw necrosis, bronchial irritation and chronic cough.

EMERGENCY AND FIRST AID PROCEDURES Skin contact - flood area w/water for 15 min., treat burns; inhalation - remove from area, use respiratory resuscitation, treat shock, pulmonary edema; obtain medical aid.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Water, ethyl alcohol, dimethyl sulfoxide.

HAZARDOUS DECOMPOSITION PRODUCTS

Heated - hydrogen chloride and phosgene evolved.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles (tight fitting)

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Rubber apron, full face shield

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry, well-ventilated, preferably detached location, free of sources of ignition in a standard flammable liquids storage room or cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

206-3501B

See dimethyl acetamide

PRODUCT DESIGNATION

03-206-4501
Acetyl Methyl AmineMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

Methyl Acetamide
CHEMICAL NAME AND SYNONYMS

FORMULA

Acetyl-Methyl amine

CH3CONHCH3

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None available			

SECTION III PHYSICAL DATA MW - 73.1

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
206°C			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
31°C			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
Not available			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Very soluble			
APPEARANCE AND ODOR			
Colorless, needle-like crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER
Not available		
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Acetyl Methyl amine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

moderate

RELEVANT SYMPTOMS OF EXPOSURE

Jaundice, drowsiness, fatigue, nausea

EFFECTS OF CHRONIC EXPOSURE

~~Liver damage~~

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - induce vomiting, get medical aid;
inhalation - rest; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

With chemical filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

206-4501B

PRODUCT DESIGNATION

03-206-6001
Acetyl Methylurea

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Acetyl methylurea	FORMULA <chem>CH3ONHCONHCH3</chem>

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
None available						

SECTION III PHYSICAL DATA MW - 116.12

BOILING POINT decomposes -	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 180°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Crystal			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical.		
SPECIAL FIRE FIGHTING PROCEDURES		

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Acetyl methylurea

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Slight

RELEVANT SYMPTOMS OF EXPOSURE

Dermatitis

EFFECTS OF CHRONIC EXPOSURE

Depression of bone marrow, anemia, allergic
skin eruptions.

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - induce vomiting, get medical aid;
inhalation - rest; wash from eyes & skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with weak calcium hypochlorite solution, neutralize with dilute HCl after
24 hours and wash into drain.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

206-6001B

CAS-000591082

YR77000

PRODUCT DESIGNATION

03-206-6501
Acetyl ThioureaMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS 1,acetyl-2-thiourea	FORMULA <chem>CH3CONHCSNH2</chem>

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			50		Rat	

SECTION III PHYSICAL DATA MW-118.17

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 167°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Powder			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical.		
SPECIAL FIRE FIGHTING PROCEDURES		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

Acetylthiorurea

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Slight

RELEVANT SYMPTOMS OF EXPOSURE

Dermatitis

EFFECTS OF CHRONIC EXPOSURE

Depression of bone marrow, anemia, allergic skin eruptions.

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - induce vomiting, get medical aid;
wash from eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with weak solution calcium hypochlorite. Neutralize with dilute HCl and
wash into drain.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

206-6501B

CAS:000596071

YR53000

PRODUCT DESIGNATION

03-206-7501
Acetyl ureaMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Acetyl urea

FORMULA $\text{CH}_3\text{CONHCONH}_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See	note		
Lowest published lethal dose						
Oral - rat 10 mg/Kg.						
Oral - mouse 40 mg/kg						

SECTION III PHYSICAL DATA MW - 102.09

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
Sublimes at 190°C			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
218°C			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
2			
APPEARANCE AND ODOR			
Needle-like crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
Carbon dioxide, dry chemical		
SPECIAL FIRE FIGHTING PROCEDURES		

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Acetyl Urea

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Slight

RELEVANT SYMPTOMS OF EXPOSURE

Dermatitis

EFFECTS OF CHRONIC EXPOSURE Depression of bone marrow, anemia, allergic skin eruptions.

EMERGENCY AND FIRST AID PROCEDURES If swallowed - induce vomiting, get medical aid; inhalation - rest; wash from eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

With proper filter

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

206-7501B

CAS:000107131

AT52500

PRODUCT DESIGNATION

Acrylonitrile
03-206-8801MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Propenenitrile Vinylcyanide, Cyanoethylene

FORMULA

 $\text{CH}_2=\text{CHCN}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ ppm	
			ORAL	PERCUT.	SPECIES	CONC.
			82	96	Rat	
			93	280	Rabbit	
TCLO inhalation - man 16 ppm/20 min. pulmonary			50	250	Guinea	576
system effects			27		Mouse	

SECTION III PHYSICAL DATA

MW-53.06

BOILING POINT 77.3	° F.	VAPOR PRESSURE 83 mm at 20°C	mm Hg.
MELTING POINT -84°C.	° F.	VAPOR DENSITY (Air = 1) 1.8	
SPECIFIC GRAVITY (H ₂ O = 1) 0.823		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER 9.3 Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Colorless liquid with ethereal odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 30°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 17%
METHOD USED Closed Cup Method		LOWER 3%
EXTINGUISHING MEDIA		

Alcohol foam or carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Acrylonitrile (skin)

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 2 PPM, 2.5 mg/C.M.

Mutagen, teratogen

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Absorption through the skin; inhalation

SKIN AND EYE

IRRITATION

Yes

RELEVANT SYMPTOMS OF EXPOSURE

Headache, nausea, vomiting, abdominal cramps, unconsciousness, convulsions

EFFECTS OF CHRONIC EXPOSURE

Flushing of face, nausea, giddiness and jaundice., tumors of CNS and ear canal.

EMERGENCY AND FIRST AID PROCEDURES

Wash skin with soap and water, wash eye with water; if swallowed - wash mouth with water, give an emetic; inhalation - inhale vapor from amyl nitrite - get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

Polymerizes spontaneously with evolution of heat on exposure to light or caustic alkali.

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Face shield

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep from source of ignition or combustible materials. Outdoor or detached storage preferred. Keep from alkalies.

OTHER PRECAUTIONS

SIGNATURE

DATE

206-8801B

CAS:000107186

BA50750

PRODUCT DESIGNATION

Allyl Alcohol
03-208-0202

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Vinyl Carbinol

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Propenol

FORMULA

 $\text{CH}_2=\text{CHCH}_2\text{OH}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			64		Rat	165 PPM
			96		Mouse	
Lowest published toxic concentration in air; inhalation - human 25 ppm irritant						
Lowest published lethal dose						
Oral - human - 50 mg/kg						

SECTION III PHYSICAL DATA

BOILING POINT 97.1°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -129°C	° F.	VAPOR DENSITY (Air = 1) 2.0
SPECIFIC GRAVITY (H ₂ O = 1) 0.9		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Infinite		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid with pungent odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 70°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 18%
METHOD USED Open Cup		LOWER 2.5%
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide or dry chemical		
SPECIAL FIRE FIGHTING PROCEDURES Water may be ineffective		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION
Allyl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 2 ppm, 5 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Eye irritation, injury to visceral organs, deep pain in eyes, deep bone ache.

EFFECTS OF CHRONIC EXPOSURE

Pulmonary edema

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure; if severe - get medical aid; if swallowed - wash mouth, give emetic get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Avoid sodium hydroxide, Tri-n-Bromomelamine

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

Consult Industrial Hygiene Department

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Tight fitting goggles

MECHANICAL (GENERAL)

Consult Industrial Hygiene Department

GLOVES

Neoprene

SPECIAL

Consult Industrial Hygiene Department

RESPIRATOR

Full face mask with self-contained canister

OTHER PROTECTIVE EQUIPMENT

Impervious clothing made of neoprene

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Outside or detached storage preferred. Inside storage in standard flammable liquids storage cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

208-0202B

CAS:000123513

EL54250

PRODUCT DESIGNATION

Iso-Amyl Alcohol
03-208-0332MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Isobutyl Carbinol

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

3 methyl-1-butanol

FORMULA

CH3CH(CH3)CH2CH2OH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO oral - human 50 mg/kg			1300		Rat	
TCLO inhalation - human 150 ppm irritant				3970	Rabbit	

SECTION III PHYSICAL DATA Mol. Wt. 88.15

BOILING POINT 132°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -117°C	° F.	VAPOR DENSITY (Air = 1) 3.04
SPECIFIC GRAVITY (H ₂ O = 1) 0.813		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Slightly soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid with peculiar odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 109°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 35-40%
METHOD USED Closed Cup		LOWER 1.2%
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical.		

SPECIAL FIRE FIGHTING PROCEDURES

Self-contained gas mask.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Slight explosion hazard when exposed to flame.

PRODUCT DESIGNATION
Iso-Amyl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 100 ppm, 360 mg/kg

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE Eye, nose and throat irritation, narcosis, ingestion, headache, dizziness, nausea, vomiting, diarrhea, delirium, coma.

EFFECTS OF CHRONIC EXPOSURE

Possible liver damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, artificial respiration and oxygen as needed; ingestion - induce vomiting, gastric lavage and cathartics; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper towel; evaporate in hood.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety goggles

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
Cartridge respirator

OTHER PROTECTIVE EQUIPMENT

Face shield, coveralls

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store tightly closed container in flammable liquid storage cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

208-0332B

CAS:000071363

EO-14000

PRODUCT DESIGNATION

n-Butyl Alcohol
03-208-0902MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

N-butanol

FORMULA

C₄H₉OH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			790		Rat	
				1120	Mouse	
				4200	Rabbit	
Note: Lowest published toxic concentration in air, inhalation - human 25 ppm.						
LDLO oral - human 500 mg/kg						

SECTION III PHYSICAL DATA Mol. Wt. 74.14

BOILING POINT 118°C.	° F.	VAPOR PRESSURE at 25°C	6.5	mm Hg.
MELTING POINT -90°C.	° F.	VAPOR DENSITY (Air = 1) 2.6		
SPECIFIC GRAVITY (H ₂ O = 1) 0.8		EVAPORATION RATE (_____ = 1)		
SOLUBILITY IN WATER Pts/100 pts H ₂ O 7.7		VOLATILE	% Vol.	% Wt.

APPEARANCE AND ODOR

Clear liquid, pungent odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
84°F		11.2%
METHOD USED		LOWER
Closed Cup		1.4%
EXTINGUISHING MEDIA		
Alcohol foam, carbon dioxide, dry chemicals		

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Butyl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 50 ppm, 150 mg/kg

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

Headache, dizziness, drowsiness, eye irritation and sensitivity to light.

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, give oxygen as needed; if swallowed - induce vomiting, get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Explosives, oxidizing materials, organic peroxides.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper, evaporate from paper in hood.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

Chemical cartridge mask

OTHER PROTECTIVE EQUIPMENT

Rubber protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, unlighted place away from sources of ignition.

OTHER PRECAUTIONS

SIGNATURE

DATE

208-0902B

CAS:000078922

EO17500

PRODUCT DESIGNATION

03-208-0962
Se butyl alcoholMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Butanol 2

FORMULA

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
#1 intraperitoneal - mouse	LD50 771 mg/lg.		6480		Rat	

SECTION III PHYSICAL DATA

MW-74.14

BOILING POINT	° F.	VAPOR PRESSURE	
99.5°C		at 20°C	10 mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-115°C		2.55	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.808			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
12.5			

APPEARANCE AND ODOR

Colorless liquid, wine odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE)	UPPER
75 C.C.	LIMITS	9.8%
METHOD USED		LOWER
Closed Cup		1.7%

EXTINGUISHING MEDIA

Alcohol foam, water spray, carbon dioxide, dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

INITIAL FIRE AND EXPLOSION HAZARDS

May react with oxidizing materials

PRODUCT DESIGNATION

Sec. Butyl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 150 PPM, 450 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Skin and eye irritation, loss of coordination,
prostration, coma

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

Wash skin & eyes; if swallowed - induce vomiting, get
medical aid; inhalation - rest

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Oxidizing materials, organic peroxides.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper towel, evaporate in hood.

WASTE DISPOSAL METHOD

Burn in hood

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety goggles

MECHANICAL (GENERAL)

GLOVES
Rubber

SPECIAL

RESPIRATOR
With proper filter

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dark place away from sources of ignition.

OTHER PRECAUTIONS

SIGNATURE

DATE

208-0962B

CAS:000078831

NP96250

PRODUCT DESIGNATION

03-208-0942
Isobutyl AlcoholMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Isopropyl carbinol

FORMULA

 $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO oral - human	500 mg/kg		2460		Rat	
				4240	Rabbit	

SECTION III PHYSICAL DATA MW - 74.12

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
108°C		at 21.7°C	10
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-108°C		2.55	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.805			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
10			
APPEARANCE AND ODOR			
Clear liquid, sweet odor.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	82°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 10.9%
METHOD USED	Open Cup		LOWER 1.7%
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical			

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Isobutyl alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 50 PPM, 150 mg/C.M.

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Some

REVELANT SYMPTOMS OF EXPOSURE

Slight liver & kidney damage, eye irritation, narcosis

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

Wash skin & eyes; if swallowed - induce vomiting, get
medical aid; inhalation - rest.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper towels, evaporate in hood.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Coveralls

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in closed container in flammable liquids storage cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

208-0942B

CAS:000075650

E019250

PRODUCT DESIGNATION

Tertiary Butyl Alcohol
03-208-0982MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

2 Methyl-2-Propanol

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Trimethyl Carbinol

FORMULA

 $(\text{CH}_3)_3\text{COH}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			3500		Rat	

SECTION III PHYSICAL DATA

BOILING POINT 181°F	° F.	VAPOR PRESSURE at 25°C	42 mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1) 2.6	
SPECIFIC GRAVITY (H ₂ O = 1) 0.8		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Infinite		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 52°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 8.0%
METHOD USED Closed Cup		LOWER 2.4%
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide or dry chemical.		

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Tertiary Butyl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 100 ppm, 300 mg/kg

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Ingestion, inhalation

SKIN AND EYE

IRRITATION Slight

REVELANT SYMPTOMS OF EXPOSURE

Narcosis, slight skin irritation.

EFFECTS OF CHRONIC EXPOSURE

Possible liver and kidney damage.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, give oxygen as needed; if swallowed - induce vomiting, get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety goggles

MECHANICAL (GENERAL)

GLOVES
Rubber gloves

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

208-0982B

CAS:000123422

SA91000

PRODUCT DESIGNATION

03-208-1602
Diacetone AlcoholMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

4 hydroxy-4 methylpentanone 2

FORMULA

 $\text{CH}_3\text{COCH}_2(\text{CH}_3)_2\text{OH}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			4000		Rat	

SECTION III PHYSICAL DATA MW-116.18

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
328°F		at 20°C	1.1
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
--		4.0	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.9			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
00			
APPEARANCE AND ODOR			
Liquid with faint pleasant odor			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
151°F		6.9%
METHOD USED		LOWER
		1.8%

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide or dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Diacetone Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 50 PPM, 240 mg/C.M.

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation (mainly), ingestion

SKIN AND EYE

IRRITATION

Yes

REVELANT SYMPTOMS OF EXPOSURE

Irritates eyes and mucous membranes, narcotic

EFFECTS OF CHRONIC EXPOSURE

Anemia, liver and kidney damage

EMERGENCY AND FIRST AID PROCEDURES

If inhaled - rest, give oxygen as needed; if swallowed - induce vomiting, get medical aid; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

208-1602B

CAS:000102818

KK38500

PRODUCT DESIGNATION

03-208-2202

2 Di - N - Butylaminoethyl
AlcoholMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

2 Dibutylaminoethanol

FORMULA

 $[\text{CH}_3(\text{CH}_2)_3]_2\text{NCH}_2\text{CH}_2\text{OH}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1070		Rat	
				1680	Rabbit	

SECTION III PHYSICAL DATA MW - 173.3

BOILING POINT 222°C	° F.	VAPOR PRESSURE 91-97°C	mm Hg. 7
MELTING POINT --	° F.	VAPOR DENSITY (Air = 1) 6.0	
SPECIFIC GRAVITY (H ₂ O = 1) 0.85		EVAPORATION RATE (____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol.	% Wt.
APPEARANCE AND ODOR Colorless liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 200°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED Open cup		LOWER
EXTINGUISHING MEDIA Carbon dioxide, dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

2 - Di - N - butylaminoethyl alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 2 PPM, 14 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Skin, ingestion, inhalation

SKIN AND EYE

IRRITATION

moderate

RELEVANT SYMPTOMS OF EXPOSURE

Dermatitis, weight loss, slight increase in clotting time

EFFECTS OF CHRONIC EXPOSURE

Dermatitis

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - drink fruit juice, get medical aid; inhalation - rest. Wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

208-2202B

CAS:000100378

KK50750

PRODUCT DESIGNATION

03-208-2752

B-Di Ethylaminoethyl Alcohol

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

2 diethylaminoethanol.

FORMULA

 $(C_2H_5)_2NCH_2CH_2OH$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
TCLO inhalation - human	100 PPM - CNS		1300	1260	Rat Rabbit	

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
322°F		at 20°C	1.4
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
--		4.0	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.9			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Yes			

APPEARANCE AND ODOR

Colorless liquid

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
140°C		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

B-Di - N - ethyl aminoethyl alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 10 PPM, 50 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Skin, inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Dermatitis, weight loss, slight increase in clotting time

EFFECTS OF CHRONIC EXPOSURE

Dermatitis

EMERGENCY AND FIRST AID PROCEDURES

Wash from skin and eyes; if swallowed - drink fruit juice,
get medical aid; inhalation - rest.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

208-2752B

CAS:000108010

KK61250

PRODUCT DESIGNATION

03-208-3102

B-Dimethylaminoethyl Alcohol

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

Dimethylaminoethanol

(CH₃)₂NCH₂CH₂OH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			2340		Rat	
				1370	Rabbit	

SECTION III PHYSICAL DATA MW - 89.16

BOILING POINT 272°F	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT --	° F.	VAPOR DENSITY (Air = 1) 3.1
SPECIFIC GRAVITY (H ₂ O = 1) 0.9		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Yes		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 105 O.C.	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER LOWER
METHOD USED		

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

B-Dimethylaminoethyl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Skin, inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Dermatitis, weight loss, slight increase in clotting time.

EFFECTS OF CHRONIC EXPOSURE

Dermatitis

EMERGENCY AND FIRST AID PROCEDURES

Wash from skin and eyes; if swallowed - drink fruit juice, get medical aid; inhalation - rest.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

208-3102B

CAS:000098000

LU91000

PRODUCT DESIGNATION

03-208-5002
Furfuryl alcoholMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Furfural Alcohol

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

2-Furyl carbinol

FORMULA

 $C_4H_5OCH_2OH$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ ppm	
			ORAL	PERCUT.	SPECIES	CONC.
			275		Rat	233-4 hrs.
			160		Mouse	

SECTION III PHYSICAL DATA

MW-98.11

BOILING POINT 171°C	° F.	VAPOR PRESSURE at 31.8°C	mm Hg.
MELTING POINT -31°C	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Yes			

APPEARANCE AND ODOR

Clear colorless mobile liquid, weak burning odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 167° F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 16.3%
METHOD USED Open cup		LOWER 1.8%
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Furfuryl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 5 PPM, 20 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Skin, inhalation, ingestion

SKIN AND EYE

IRRITATION severe

RELEVANT SYMPTOMS OF EXPOSURE Severe eye inflammation, central nervous system depressant, nausea, salivation, diarrhea, dizziness.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; give artificial respiration as needed;
if swallowed - induce vomiting, gastric lavage, medical aid, wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

May explode with cyanoacetic acid or formic acid

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper towels, evaporate in hood.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Outside or detached storage preferred,
inside - flammable liquids cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

208-5002B

CAS - 000111706

MK03500

PRODUCT DESIGNATION

n-Heptyl Alcohol
03-208-5202MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

1 Heptanol

FORMULA
 $C_7H_{15}OH$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			3250		rat	
			1500		mouse	
			750		rabbit	

SECTION III PHYSICAL DATA

MW - 116.23

BOILING POINT 175 °F.	VAPOR PRESSURE at 30°C. 1.5 mm Hg.
MELTING POINT 34.6°C. °F.	VAPOR DENSITY (Air = 1) 4.0
SPECIFIC GRAVITY (H ₂ O = 1) 0.913	EVAPORATION RATE (0.2/min/cm ²)
SOLUBILITY IN WATER Pts/100 pts H ₂ O .18	VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR colorless liquid	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 154°F.	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Foam, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
n-Heptyl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

M.A.C. - 100 PPM

CARCINOGENIC no

PRINCIPLE ROUTES OF ABSORPTION

Skin, ingestion, inhalation

SKIN AND EYE

IRRITATION yes

REVELANT SYMPTOMS OF EXPOSURE Twitching, narcosis, weakness, tremors, hypothermia,
convulsions, eye irritation.

EFFECTS OF CHRONIC EXPOSURE

Liver damage.

EMERGENCY AND FIRST AID PROCEDURES Wash from skin and eyes; if swallowed - induce vomiting,
gastric lavage, get medical aid; inhalation - rest.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

208-5202B

CAS:000067561

PC-14000

MATERIAL SAFETY DATA SHEET

PRODUCT DESIGNATION

03-208-6502

03-208-6552

03-208-6002

03-208-6052 Methyl Alcohol

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Wood alcohol

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Methanol

FORMULA

CH₃OH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO - oral - human	340 mg/kg		13,000		Rat	
TCLO - inhalation - human	80 g/c.m.		20,000		Rabbit	

SECTION III PHYSICAL DATA

MW-32.05

BOILING POINT	° F.	VAPOR PRESSURE	100 mm Hg.
65°C		at 21°C	
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-98°C		1.11	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.79			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Infinitely soluble			
APPEARANCE AND ODOR			
Colorless liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	52° F.	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 36 %
METHOD USED	closed cup		LOWER 7.3 %

EXTINGUISHING MEDIA

Alcohol foam, dry chemical, carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
Methyl Alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 200 PPM, 260 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE Disturbs vision, dizziness, stupor, cyanosis, abdominal cramps.

EFFECTS OF CHRONIC EXPOSURE Irritation of mucous membranes, headache, tremors, neuritis, vision failure.

EMERGENCY AND FIRST AID PROCEDURES If swallowed - induce vomiting, get medical aid; inhalation - rest; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Perchloric acid, Sodium hydroxide and chloroform

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper towels, evaporate in hood.

WASTE DISPOSAL METHOD

Burn

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Rubber Apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in flammable liquids cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

208-6002B

CAS:000071238

OH82250

PRODUCT DESIGNATION

03-208-8702

N-Propyl Alcohol

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

1 Propanol

CHEMICAL NAME AND SYNONYMS

FORMULA

N Propyl Alcohol

 C_3H_7OH

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO - oral - human 500	mg/kg		5400		Rat	
LDLO - oral - woman 5700	mg/kg			5040	Rabbit	

SECTION III PHYSICAL DATA MW - 60.11

BOILING POINT 97°C	° F.	VAPOR PRESSURE at 15°C	mm Hg.
MELTING POINT 127°C	° F.	VAPOR DENSITY (Air = 1)	2.1
SPECIFIC GRAVITY (H ₂ O = 1) 0.80		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Infinitely soluble		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Clear colorless liquid, alcohol-like odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 59°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 13.5%
METHOD USED CC		LOWER 2.1%

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide, dry chemical - water may be ineffective.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

N-Propyl alcohol

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 200 PPM, 500 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Low

RELEVANT SYMPTOMS OF EXPOSURE

Mild narcotic effect, slight lowering of blood pressure, feeling of warmth

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - induce vomiting, get medical aid, gastric lavage; inhalation - rest; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper towel, evaporate in hood.

WASTE DISPOSAL METHOD

Burn

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With chemical filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, well-ventilated place away from sources of ignition.

OTHER PRECAUTIONS

SIGNATURE

DATE

208-8702B

CAS:000107117

BA54250

PRODUCT DESIGNATION

03-211-3103
AllylamineMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS	FORMULA
2 Propenylamine, Allylamine	$\text{CH}_2=\text{CH}-\text{CH}_2-\text{NH}_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ PPM/4H	
			ORAL	PERCUT.	SPECIES	CONC.
TCLO - inhalation - man	5 ppm/5 min.				Rat	286
			106		Rat	
				35	Rabbit	
			57		Mouse	

SECTION III PHYSICAL DATA MW - 57.11

BOILING POINT 53.2°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -58°C.	° F.	VAPOR DENSITY (Air = 1) 2.00
SPECIFIC GRAVITY (H ₂ O = 1) 0.716		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O ∞		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid, with strong ammonical odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT -20°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 22% LOWER 2.2%
METHOD USED		
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical, water spray		
SPECIAL FIRE FIGHTING PROCEDURES Water may be ineffective - wear full protective clothing.		
UNUSUAL FIRE AND EXPLOSION HAZARDS When heated to decomposition temperature, emits fumes.		

PRODUCT DESIGNATION

Allylamine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of mucous membranes of eyes, nose and mouth

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage

EMERGENCY AND FIRST AID PROCEDURES Wash from eyes and skin; if swallowed - wash mouth, drink water, get medical aid; inhalation - rest.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts with acids.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Spread sodium bisulfate over area and sprinkle with water.

WASTE DISPOSAL METHOD

Dissolve in combustible solvent such as alcohol and burn in open furnace.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Overalls

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against physical damage outside or detach storage preferred; inside storage in standard liquids storage cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

211-3103B

PRODUCT DESIGNATION

03-211-3203
Allyl bromide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

3 Bromopropene, Allyl Bromide

FORMULA

CH2CHCH2Br

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			30		guinea pig	

SECTION III PHYSICAL DATA MW - 121.0

BOILING POINT 71.3°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -119.4°C	° F.	VAPOR DENSITY (Air = 1) 4.2
SPECIFIC GRAVITY (H ₂ O = 1) 1.8		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O No		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

Colorless liquid, unpleasant odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 300 F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 7.3
METHOD USED		LOWER 4.4

EXTINGUISHING MEDIA

Alcohol foam

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective except as a blanket.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Allyl bromide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

Severe

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of eyes, skin and respiratory tract

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage

EMERGENCY AND FIRST AID PROCEDURES Wash skin & eyes if swallowed - wash mouth, induce vomiting, get medical aid, inhalation - rest; keep warm.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb spills with paper towels. Burn paper towels in hood.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

211-3203B

CAS:000107051

UC-73500

PRODUCT DESIGNATION

Allyl Chloride
03-211-3303

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

3 chloro-1-propene, 3 Chloropropylene

FORMULA

CH2=CHCH2Cl

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			700		Rat	
LCLO inh - human 3000 ppm				2200	Rabbit	
LDLO - oral - rat 64 mg/kg						

SECTION III PHYSICAL DATA MW - 76.53

BOILING POINT 45.1°C	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT -134.5°C	° F.	VAPOR DENSITY (Air = 1)	2.6
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.938			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
<0.1			
APPEARANCE AND ODOR			
Colorless liquid, pungent odor			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT -25°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER 11.1%
METHOD USED		LOWER 3.3%

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide or dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective.

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

PRODUCT DESIGNATION

Allyl Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 1 ppm, 3 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, absorption through skin, ingestion

SKIN AND EYE

IRRITATION

Yes

RELEVANT SYMPTOMS OF EXPOSURE

Eye irritation, deep eye and bone aches

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage

EMERGENCY AND FIRST AID PROCEDURES

Wash from skin or eyes; inhalation exposure (if severe) -
get medical attention; if swallowed - wash mouth with water, induce vomiting with mild
emetic.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Tight fitting goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene

SPECIAL

RESPIRATOR

Full-face mask, self-containing canister

OTHER PROTECTIVE EQUIPMENT

Impervious clothing made of neoprene

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep from sources of ignition.

OTHER PRECAUTIONS

SIGNATURE

DATE

211-3303B

CAS-000060093

BY82250

PRODUCT DESIGNATION

03-211-6503
P-AminoazobenzeneMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS P-Phenylazoaniline	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS P-aminoazobenzene	FORMULA $C_6H_5N_2C_6H_4.NH_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published toxic dose						
Oral - rat 128 g/Kg over 2 years carcinogen						
Skin - rat - 1550 mg/kg/97 weeks						

SECTION III PHYSICAL DATA

MW 197.2

BOILING POINT > 360°C.	° F.	VAPOR PRESSURE 225	mm Hg.
MELTING POINT 124-126°C.	° F.	VAPOR DENSITY (Air = 1)	120
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Slightly soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Brownish-yellow needles			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water spray, foam, carbon dioxide.		
SPECIAL FIRE FIGHTING PROCEDURES		

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapor forms explosive mixture in air.

PRODUCT DESIGNATION

P-Aminoazobenzene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Slight

RELEVANT SYMPTOMS OF EXPOSURE

Cyanosis, headache, blood pressure drop, lethargy, jaundice and anemia.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness, irritability, liver damage, kidney irritation, liver cancer, kidney cancer.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; wash eyes and skin; ingestion - remove by gastric lavage.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Chemical respirator

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

211-6502B

PRODUCT DESIGNATION

03-211-6703
P-Aminoazobenzene Hydrochloride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

P-Aminoazobenzene Hydrochloride

FORMULA

C6H5N=NC6H4NH2HCl

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1250		Rat	
	None available					

SECTION III PHYSICAL DATA MW-233.7

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
228°C.			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Soluble			
APPEARANCE AND ODOR			
Steel blue crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		LOWER
METHOD USED		
EXTINGUISHING MEDIA		
Water spray, foam, carbon dioxide		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapor forms explosive mixture in air.

PRODUCT DESIGNATION

P-Aminoazobenzene Hydrochloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Slight

RELEVANT SYMPTOMS OF EXPOSURE

Cyanosis, headache, blood pressure drop, lethargy,
jaundice and anemia.

EFFECTS OF CHRONIC EXPOSURE

Liver cancer.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - induce vomiting, get
medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety glasses

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

211-6703B

CAS:000095783

ZE91000

PRODUCT DESIGNATION

03-212-0104

2-Amino-1, 4-Dimethylbenzene

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

2,5 dimethyl aniline

CHEMICAL NAME AND SYNONYMS

FORMULA

2,5 xylidine, 2-amino-1, 4-Dimethylbenzene

 $(\text{CH}_3)_2\text{C}_6\text{H}_3\text{NH}_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/Kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1297		Rat	
			841		Mouse	

SECTION III PHYSICAL DATA MW-121.18

BOILING POINT 215°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 16°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 0.98		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very slightly soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Red to dark brown liquid		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	206° F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED	C.C.		LOWER
EXTINGUISHING MEDIA			
Foam, carbon dioxide, dry chemical			

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

2 amino-1,4-Dimethylbenzene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 5 PPM, 25 mg/C.M.

CARCINOGENIC NO

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

slight

REVELANT SYMPTOMS OF EXPOSURE

Headache, drowsiness, cyanosis, mental confusion,

convulsions, central nervous system depression

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage, fatigue, loss of appetite

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - give emetic, get medical aid; inhalation - rest;
wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

212-0104B

CAS:000095681

ZE89250

PRODUCT DESIGNATION

03-212-0134

4 amino - 1,3-Dimethylbenzene

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

2,4 Xylidine

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

2,4 Dimethyl aniline, 4 amino-1, 3 Dimethylbenzene (CH₃)₂C₆H₃NH₂

FORMULA

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			467		Rat	
			250		Mouse	

SECTION III PHYSICAL DATA

MW-121.18

BOILING POINT

° F.

VAPOR PRESSURE

214°C

at 104°C

mm Hg.

12

MELTING POINT

° F.

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

Very slightly soluble

APPEARANCE AND ODOR

Red to dark brown liquid

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

206°F

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

METHOD USED

C.C.

EXTINGUISHING MEDIA

Foam, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

4 amino, - 1,3 Dimethylbenzene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 5 PPM, 25 mg/C.M.

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

slight

REVELANT SYMPTOMS OF EXPOSURE

Headache, drowsiness, cyanosis, mental confusion,
convulsions, central nervous system depression

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage, fatigue, loss of appetite

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - give emetic, get medical aid;
inhalation - rest; wash from skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Forms explosive chloroamines on exposure to hypochlorite.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Full protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against physical damage, store in cool, dry place.

OTHER PRECAUTIONS

SIGNATURE

DATE

212-0134B

PRODUCT DESIGNATION

03-212-0164
5-amino-1,3-Dimethylbenzene

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS 3,5 Dimethylaniline	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS 3,5 Xylidine, 5 amino-1, 3-Dimethylbenzene	FORMULA (CH ₃) ₂ C ₆ H ₃ NH ₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			707		Rat	
			421		Mouse	

SECTION III PHYSICAL DATA MW-121.18

BOILING POINT 220°C	° F.	VAPOR PRESSURE at 105°C	mm Hg. 14
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 0.97		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very slightly soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Pale brown crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 206°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED CC		LOWER
EXTINGUISHING MEDIA Foam, Carbon dioxide, dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

5 amino - 1,3 Dimethylbenzene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 5 PPM, 25 mg/C.M.

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

IRRITATION

Inhalation, ingestion, skinslight

REVELANT SYMPTOMS OF EXPOSURE

Headache, drowsiness, cyanosis, mental confusion,convulsions, central nervous system depression

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage, fatigue, loss of appetite.

EMERGENCY AND FIRST AID PROCEDURES

If swallowed, give emetic, get medical aid;inhalation - rest; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Forms explosive chloroamines on exposure to hypochlorites.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Full protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against physical damage. Store in cool, dry place.

OTHER PRECAUTIONS

SIGNATURE

DATE

212-0164B

CAS:000090415

DU88500

PRODUCT DESIGNATION

03-212-0204
O-aminodiphenylMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

O-aminobiphenyl
CHEMICAL NAME AND SYNONYMS

FORMULA

O-aminodiphenyl

$$\text{NH}_2\text{C}_6\text{H}_4 - \text{C}_6\text{H}_5$$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			2340		Rat	
			1020		Rabbit	

SECTION III PHYSICAL DATA MW - 169.23

BOILING POINT	° F.	VAPOR PRESSURE	mm-Hg.
299°C			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
52°C		5.8	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Insoluble			
APPEARANCE AND ODOR			

Leaf-like crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Carbon-dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

O-aminodiphenyl

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Mucous membrane & skin irritation, cyanosis & jaundice.

EFFECTS OF CHRONIC EXPOSURE

Bladder cancer

EMERGENCY AND FIRST AID PROCEDURES If swallowed - give emetic, get medical aid;
inhalation - oxygen as needed; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATION

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

212-0204B

CAS:000504290

US15750

PRODUCT DESIGNATION

03-212-1704
2-AminopyridineMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS α aminopyridine	FORMULA $C_5H_6N_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
TCLO inhalation - human	5 ppm/5 hrs.		200		Rat	

SECTION III PHYSICAL DATA MW - 94.11

BOILING POINT 210.6°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 58°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O 5		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

White powder or crystals.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical
water may be ineffective.

SPECIAL FIRE FIGHTING PROCEDURES Wear goggles and self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS When heated to decomposition, it emits
highly toxic fumes.

PRODUCT DESIGNATION

2-aminopyridine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 0.5 PPM, 2 mg/C.M.

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Skin, inhalation, ingestion

SKIN AND EYE

IRRITATION

Moderate

REVELANT SYMPTOMS OF EXPOSURE

Headache, increased blood pressure, nausea, convulsions,
respiratory failure.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - remove from exposure, rest, artificial
respiration as needed, get medical aid; ingestion - induce vomiting, get medical
aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover with a 9/1 mixture of sand and soda ash; transfer into paper carton,
burn in furnace.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber (butyl)

SPECIAL

RESPIRATOR

Self-contained respirator

OTHER PROTECTIVE EQUIPMENT

Plastic Coveralls

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

212-1704B

PRODUCT DESIGNATION

03-212-5004
Iso amyl acetate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

Banana oil
CHEMICAL NAME AND SYNONYMS

FORMULA

3 methyl butanol acetate

$$\text{CH}_3\text{COOCH}_2\text{CH}(\text{CH}_3)\text{C}_2\text{H}_5$$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO - oral - human	500 mg/kg		7422		Rabbit	
TCLO inhalation - human	200PPM irritant					

SECTION III PHYSICAL DATA MW - 130.2

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
142°C			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
		4.5	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.9			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Slight			
APPEARANCE AND ODOR			
Liquid - banana-like odor			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
77°F		7.5
METHOD USED		LOWER
		1.0

EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical
water may be ineffective.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Iso Amyl Acetate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 100 PPM, 525 mg/C.M.

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

Inhalation, ingestion

IRRITATION

Severe

REVELANT SYMPTOMS OF EXPOSURE

Irritation of respiratory tract, intoxication,

eye irritation, throat dryness.

EFFECTS OF CHRONIC EXPOSURE

Kidney damage

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - remove from exposure, artificial respiration
as necessary; wash from eyes or skin. Ingestion - gastric lavage.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper towels, evaporate in hood.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Rubber clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Tightly closed, in detached area.

OTHER PRECAUTIONS

SIGNATURE

DATE

212-5004B

CAS:000628637

AJ19250

PRODUCT DESIGNATION

n-Amyl Acetate
03-212-5104MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Banana oil, pear oil

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Amyl Acetic Ester, Pentyl Acetate

FORMULA

 $\text{CH}_3\text{CO}_2\text{C}_5\text{H}_{11}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ ppm	
			ORAL	PERCUT.	SPECIES	CONC.
			7400		Rabbit	
Note: Lowest published lethal concentration in air, inhalation - rat 5400 ppm;						
Lowest published toxic concentration in air, inhalation - human 5000 mg/c.m., 30						
						months.

SECTION III PHYSICAL DATA MW - 130.07

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
148.4°C		4.5 min at 25°C	
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-70.8°C		4.5	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.879			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
0.18			

APPEARANCE AND ODOR

Colorless liquid, banana oil smell

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE)	UPPER
77°F.	LIMITS	7.5%
METHOD USED		LOWER
Closed Cup		1.1%

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION
n-Amyl Acetate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 100 ppm, 525 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, attack on skin and eyes

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of respiratory tract, eye irritation, cough, pain in chest, dizziness, nausea

EFFECTS OF CHRONIC EXPOSURE

Kidney damage

EMERGENCY AND FIRST AID PROCEDURES

Flush skin and eyes with water to remove; inhalation - give artificial respiration if necessary; ingestion - gastric lavage.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb on paper - burn paper in well-ventilated area.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

Use in well ventilated room

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Only in poor ventilation

OTHER PROTECTIVE EQUIPMENT

Rubber protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store large quantities outdoors. Store drums in a cool, well-ventilated area.

OTHER PRECAUTIONS

SIGNATURE

DATE

212-5104B

CAS:000062533

BW66500

(Rev. Dec. 1979)

PRODUCT DESIGNATION

Aniline
03-213-2005MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

Benzenamine

CHEMICAL NAME AND SYNONYMS

FORMULA

Aminobenzene, Phenylamine

 $C_6H_5NH_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO - oral - human 50 mg/kg			440	1400	Rat	
				820	Rabbit	
				1290	Guinea Pig	
			464		Mouse	175 ppm/7H
				254	Cat	

SECTION III PHYSICAL DATA Mol. Wt. 93.61

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
184°		at 34.8°C	
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-6°C.		3.22	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.02 20°/4°C			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Slightly soluble			

APPEARANCE AND ODOR

Colorless oily liquid - characteristic odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
158°F		
METHOD USED		LOWER
Closed Cup		1.3
EXTINGUISHING MEDIA		

Water spray, fog, carbon dioxide, alcohol foam

SPECIAL FIRE FIGHTING PROCEDURES

None

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapor forms explosive mixtures in air.

PRODUCT DESIGNATION

Aniline

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 2 ppm, 10 mg/C.M.

Teratogen

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation and skin contact

SKIN AND EYE

IRRITATION

Slight

REVELANT SYMPTOMS OF EXPOSURE Cyanosis, headache, blood pressure drop, lethargy, jaundice and anemia, pain in joints, fainting.

EFFECTS OF CHRONIC EXPOSURE Weight loss, anemia, weakness, and irritability, possible liver damage, inflammation of kidneys, ringing of ear.

EMERGENCY AND FIRST AID PROCEDURES Remove from exposure; eye and skin contact - irrigate thoroughly with water; if ingested - remove by gastric lavage and catharsis; if respiration is shallow - give oxygen. Obtain medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID) Sodium or potassium peroxide, trichloromelamine, ozone, perchloric acid, formaldehyde, hexachloromelamine, nitric acid

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wear protective clothing during cleanup operations; use water spray.

WASTE DISPOSAL METHOD

Burial - call Safety Department.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

Call Industrial Hygiene Department for advice.

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

Call Industrial Hygiene Department.

GLOVES

Rubber

SPECIAL

Call Industrial Hygiene Department.

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

Full-face shield, apron (rubber)

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Wear full protective clothing, rubber gloves and goggles; when handling - store in outside solvent storage cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

213-2005B

CAS:000142041

CY08750

(Rev. Dec. 1979)

PRODUCT DESIGNATION

03-213-2205
Aniline HydrochlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Aniline Chloride, Benzenamine Hydrochloride

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Aniline Hydrochloride

FORMULA

 $C_6H_5NH_2 \cdot HCl$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1072		Rat	
			841		Mouse	

SECTION III PHYSICAL DATA

MW-129.60

BOILING POINT

245°C.

° F.

VAPOR PRESSURE

mm Hg.

MELTING POINT

198°C.

° F.

VAPOR DENSITY (Air = 1)

4.46

SPECIFIC GRAVITY (H₂O = 1)

1.22

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER 88 Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

at 15°C.

APPEARANCE AND ODOR

Clear crystal, turns brown when exposed to light.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

380°F.

FLAMMABLE
(EXPLOSIVE)

UPPER

METHOD USED

LIMITS

LOWER

O.C.

EXTINGUISHING MEDIA

Alcohol foam, dry chemical, carbon dioxide.

SPECIAL FIRE FIGHTING PROCEDURES

Self-contained gas mask, full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapors of aniline and H Cl.

PRODUCT DESIGNATION

Aniline Hydrochloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

None available (skin)

SKIN AND EYE

IRRITATION

Severe

REVELANT SYMPTOMS OF EXPOSURE

Cyanosis, headache, blood pressure drop, lethargy, jaundice and anemia, pain in joints, fainting.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness & irritability, possible liver damage, inflammation of kidneys, ringing in ear.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure; wash from eyes and skin; if ingested - remove by gastric lavage.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Ozone, perchloric acid, sodium peroxide, potassium peroxide.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wear protective clothing during clean ups.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

Full protective clothing.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Preferred outside storage in solvent storage cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

213-2205B

PRODUCT DESIGNATION

03-213-2405
Aniline Sulfate

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Aniline Sulfate	FORMULA (C ₆ H ₅ NH ₂) ₂ H ₂ SO ₄

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA MW - 284.32

BOILING POINT -	° F.	VAPOR PRESSURE -	mm Hg.
MELTING POINT decomposes	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.38		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER 5 Pts/100 pts H ₂ O at 14°C.		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR White crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Alcohol foam, carbon dioxide, dry chemical.		
SPECIAL FIRE FIGHTING PROCEDURES Self-contained mask, full protective clothing.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Vapors of aniline & SO ₂		

PRODUCT DESIGNATION

Aniline Sulfate

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available (skin)

CARCINOGENIC No.

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Cyanosis, headache, blood pressure drop, lethargy, jaundice and anemia, pain in joints, fainting.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness and irritability, possible liver damage, inflammation of kidneys, ringing in ears.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure; wash from skin & eyes; if swallowed - remove by gastric lavage.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Ozone, perchloric acid, sodium peroxide, potassium peroxide.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wear full, protective clothing during cleanup.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

Wear protective clothing.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Preferred outside storage in solvent storage cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

213-2405B

O-Anisidine
03-213-3205

MATERIAL SAFETY DATA SHEET

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Amino-Anisole, 2 Methoxyaniline	FORMULA $\text{NH}_2\text{C}_6\text{H}_4\text{OCH}_3$

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Note: Lowest published toxic concentration in air, inhalation - human			1.9 mg/C.M.,			
24 weeks; central nervous system effects.						

BOILING POINT 225°C	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 5.2°C	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.098		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Slightly soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Pale yellow to orange liquid			

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Similar to aniline; water spray, alcohol foam, dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Emits toxic fumes, when heated to the decomposition point.

PRODUCT DESIGNATION
O-Anisidine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.1 ppm, 0.5 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, skin absorption

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

Headache, drowsiness, cyanosis, skin irritant

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Wash skin with soap and water, flush eyes with water; if swallowed, wash mouth with water and get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

Use in hood

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber gloves (butyl)

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

Neoprene protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

213-3205B

CAS:000104949

BZ54500

PRODUCT DESIGNATION

P-Anisidine
03-213-3255MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Amino-Anisoles	FORMULA $\text{NH}_2\text{C}_6\text{H}_4\text{OCH}_3$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1400	3200	Rat	
Note: Lowest published toxic concentration in air, inhalation - human 1.9 mg/C.M., 24 weeks; central nervous system effects.						

SECTION III PHYSICAL DATA

BOILING POINT 243	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 57.2	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.089		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Slightly soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Pale yellow to brown solid		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
Not available		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Similar to aniline; water spray, alcohol foam, dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Emits toxic fumes when heated to decomposition point.

PRODUCT DESIGNATION
P-Anisidine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 0.1 ppm, 0.5 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, skin absorption

SKIN AND EYE

IRRITATION Yes

RELEVANT SYMPTOMS OF EXPOSURE

Headache, drowsiness, cyanosis, skin irritant

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Wash skin with soap and water, flush eyes with water, if swallowed, wash mouth with water and get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

Use in hood

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

Neoprene protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

213-3255B

CAS:000120127

CA93500

PRODUCT DESIGNATION

03-213-4005
AnthraceneMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Green Oil

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Anthracene

FORMULA

 $C_{14}H_{10}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED, OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published toxic dose -						
oral - rat 18 g/kg 78 W - carcinogen						

SECTION III PHYSICAL DATA MW - 178.24

BOILING POINT 345°C.	° F.	VAPOR PRESSURE at 145°C.	mm Hg.
MELTING POINT 217°C.	° F.	VAPOR DENSITY (Air - 1) 6.15	
SPECIFIC GRAVITY (H ₂ O = 1) 1.25		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless to yellow crystals.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 250 ⁰ C.	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED Closed cup		LOWER 0.6%
EXTINGUISHING MEDIA Water foam, carbon dioxide, dry chemical.		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Anthracene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION

Yes

REVELANT SYMPTOMS OF EXPOSURE Irritation of eyes and respiratory tract - if ingested -
headache, gastrointestinal symptoms.

EFFECTS OF CHRONIC EXPOSURE

May give cancer

EMERGENCY AND FIRST AID PROCEDURES

Wash eyes and skin; if ingested - gastric lavage, get
medical aid; inhalation - rest.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Chemical Cartridge

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

213-4005B

CAS:000103333

CN14000

PRODUCT DESIGNATION

03-213-9005
AzobenzeneMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Diphenyldiazene

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Azobenzene

FORMULA

 $C_6H_5N_2C_6H_5$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO oral - human	50 mg/kg		1000		Rat	

SECTION III PHYSICAL DATA MW - 182.22

BOILING POINT 293°C.	° F.	VAPOR PRESSURE at 103°C.	mm Hg.
MELTING POINT 68°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.20		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble in water		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Orange-red crystals.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Not specified.		
SPECIAL FIRE FIGHTING PROCEDURES		

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION Azobenzene	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL None available	CARCINOGENIC Yes
PRINCIPLE ROUTES OF ABSORPTION Inhalation, ingestion	SKIN AND EYE IRRITATION Slight
REVELANT SYMPTOMS OF EXPOSURE Slight respiratory irritation.	
EFFECTS OF CHRONIC EXPOSURE Liver and lung cancer.	
EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; if swallowed - emetic, get medical aid; wash skin & eyes.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATABILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE Safety goggles
MECHANICAL (GENERAL)	GLOVES Rubber
SPECIAL	RESPIRATOR With chem. filter
OTHER PROTECTIVE EQUIPMENT	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

213-9005B

CAS - 000495487

PRODUCT DESIGNATION

03-213-9505

Azoxybenzene

CO40250

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

FORMULA

Azoxybenzene $C_{12}H_{10}N_2O$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ Mg/Kg.		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			620		Rat	
				1090	Rabbit	

SECTION III PHYSICAL DATA

MW - 198.24

BOILING POINT

° F.

Decomposes

VAPOR PRESSURE

mm Hg.

MELTING POINT

° F.

36°C

VAPOR DENSITY (Air = 1)

SPECIFIC GRAVITY (H₂O = 1)

EVAPORATION RATE (_____ = 1)

1.16

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt.

Insoluble

APPEARANCE AND ODOR

Pale yellow crystals

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

None available

FLAMMABLE
(EXPLOSIVE)
LIMITS

UPPER

LOWER

METHOD USED

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

On decomposition emits toxic fumes

PRODUCT DESIGNATION

Azoxybenzene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

Slight

RELEVANT SYMPTOMS OF EXPOSURE

Skin irritation, jaundice, cyanosis, dermatitis

EFFECTS OF CHRONIC EXPOSURE

Liver & kidney damage, malignant tumors

EMERGENCY AND FIRST AID PROCEDURES

If swallowed - give emetic; get medical aid;
inhalation - rest; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

213-9505B

PRODUCT DESIGNATION

03-216-3006
BenzalazineMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Dibenzal hydrazine

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Benzalazine

FORMULA

 $(C_6H_5CH=N)_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None available			

SECTION III PHYSICAL DATA MW - 208.25

BOILING POINT --	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 93°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Yellow crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Benzalazine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None established

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

Moderate

RELEVANT SYMPTOMS OF EXPOSURE Irritation of skin, eyes and mucous membranes;
gastroenteric disturbances, anemia

EFFECTS OF CHRONIC EXPOSURE Blood abnormalities & liver damage, loss of appetite.

EMERGENCY AND FIRST AID PROCEDURES If swallowed - induce vomiting, get medical aid;
inhalation - rest; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

Rubber
RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

216-3006B

CAS:000056553

CV92750

PRODUCT DESIGNATION

03-216-6006
1,2-BenzanthraceneMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

Naphthanthracene
CHEMICAL NAME AND SYNONYMS

FORMULA

1,2-Benzanthracene $C_{18}H_{12}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Notes: Lowest published toxic dose						
subcutaneous - mouse 2 mg/Kg.						
Oral - Mouse 4 mg/Kg/5 weeks						
Skin - Mouse 240 mg/Kg. /5 weeks						

SECTION III PHYSICAL DATA MW - 228.29

BOILING POINT Sublimes	° F.	VAPOR PRESSURE mm Hg..
MELTING POINT 160°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water, carbon dioxide, foam or dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES

Wear goggles and self contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

1,2, Benzanthrane

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Slight

RELEVANT SYMPTOMS OF EXPOSURE

Nausea, vomiting

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; if swallowed - remove by gastric lavage or emetic; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

216-6006B

CAS:000071432

CY-14000

PRODUCT DESIGNATION

Benzene (Benzol)
03-216-7106
03-216-7006

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Benzol

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Phenyl Hydride

FORMULA

 C_6H_6

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			3800		Rat	10,000 PPM
TCLO - inhalation - man	2100 mg/kc.m./4 Y		4700		Mouse	9,980 PPM
LCLO - inhalation - human	20,000 PPM-5M					
LDLO oral - human	50 mg/kg					
Note: Lowest published toxic concentration in air, inhalation - human 210 ppm;						
blood effects						

SECTION III PHYSICAL DATA

Mol. Wt. 78.11

BOILING POINT	° F.	VAPOR PRESSURE	100 mm Hg.
80.093°C		26.1°C	
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
5.51°C		2.77	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
0.9			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Insoluble			

APPEARANCE AND ODOR

Colorless liquid - aromatic odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA % Vol.

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
12°F		7.1%
METHOD USED		LOWER
Closed Cup		1.3%
EXTINGUISHING MEDIA		
Dry chemical, foam, or carbon dioxide		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapor forms explosive mixtures with air. Flash back.

PRODUCT DESIGNATION

Benzene (skin)

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 10 ppm, 30 mg/C.M.

Teratogen CARCINOGENIC Yes

PRINCIPLE ROUTES OF ABSORPTION

Inhalation and skin absorption

SKIN AND EYE

IRRITATION

Mild

RELEVANT SYMPTOMS OF EXPOSURE

Dizziness, weakness, euphoria, headache, nausea, vomiting, tightness in chest

EFFECTS OF CHRONIC EXPOSURE

Headache, drowsiness, nervousness, loss of appetite, pallor and severe anemia and petechiae.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure - give artificial respiration if necessary; eye contact - irrigate with water; skin contact - wash thoroughly with soap and water; ingested - give emetic; obtain medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Chlorine, nitryl perchlorate, oxygen, ozone (perchloryl fluoride and aluminum chloride), (permanganates and sulfuric acid), potassium peroxide, silver perchlorate, sodium peroxide.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Use water spray.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Neoprene

SPECIAL

RESPIRATOR

w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Self-contained breathing apparatus, rubber protective clothing.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in standard flammable liquids storage room or cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

216-7006B

CAS:000531851

DDO6000

PRODUCT DESIGNATION

03-216-9146
Benzidine, DihydrochlorideMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Benzidine Dihydrochloride

FORMULA

 $\text{H}_2\text{N}(\text{C}_6\text{H}_4)_2\text{NH}_2 \cdot 2\text{HCl}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
Lowest published lethal dose						
Oral - dog 200 mg/kg						

SECTION III PHYSICAL DATA

MW - 257.17

BOILING POINT —	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT —	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Soluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Carbon dioxide, dry chemical.		
SPECIAL FIRE FIGHTING PROCEDURES		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION	
Benzidine Dihydrochloride	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL	<div style="display: flex; justify-content: space-between;"> None available CARCINOGENIC Yes </div>
PRINCIPLE ROUTES OF ABSORPTION	<div style="display: flex; justify-content: space-between;"> Inhalation, ingestion, skin SKIN AND EYE IRRITATION Severe </div>
RELEVANT SYMPTOMS OF EXPOSURE	Eye irritation
EFFECTS OF CHRONIC EXPOSURE	Bladder tumors.
EMERGENCY AND FIRST AID PROCEDURES	If swallowed - give emetic, get medical aid; inhalation - rest; wash skin & eyes.
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
	Goggles
MECHANICAL (GENERAL)	GLOVES
	Rubber
SPECIAL	RESPIRATOR
	Filter type for dust mist and fumes
OTHER PROTECTIVE EQUIPMENT	
Full protective clothing.	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
Store in sealed container.	
OTHER PRECAUTIONS	
SIGNATURE	DATE

216-9146B

PRODUCT DESIGNATION

03-217-6107
Benzoyl Bromide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME _____ EMERGENCY TELEPHONE NO. _____
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE) _____

TRADE NAME AND SYNONYMS _____ CHEMICAL FAMILY _____

CHEMICAL NAME AND SYNONYMS _____ FORMULA
Benzoyl Bromide C_6H_5COBr

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA

BOILING POINT _____ ° F. VAPOR PRESSURE _____ mm Hg.
218-19°C
MELTING POINT _____ ° F. VAPOR DENSITY (Air = 1)
5.5 - 7.5°C
SPECIFIC GRAVITY (H₂O = 1) _____ EVAPORATION RATE (_____ = 1)
1.57
SOLUBILITY IN WATER Pts/100 pts H₂O _____ VOLATILE _____ % Vol. _____ % Wt.
Decomposes
APPEARANCE AND ODOR
Colorless liquid

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT _____ N/A FLAMMABLE (EXPLOSIVE) LIMITS _____ UPPER _____
METHOD USED _____ LOWER _____

EXTINGUISHING MEDIA Use water spray sparingly, foam, carbon dioxide
or dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES
Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Benzoyl Bromide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC
No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritates respiratory system; burns skin, eyes,
mouth and digestive system.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; get medical aid; if swallowed -
wash mouth, drink water, milk of magnesia; get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Reacts with oxidizing materials

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self contained

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

217-6107B

CAS:000098884

DM66000

PRODUCT DESIGNATION

Benzoyl Chloride
03-217-7107MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Benzyl Carbonyl Chloride

FORMULA

C6H5COCl

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			2460		Rat	
Note: Lowest published lethal concentration in air, inhalation - mouse 700 ppm.						

SECTION III PHYSICAL DATA Mol. Wt. 140.57

BOILING POINT ~387	° F.	VAPOR PRESSURE 32.1°C	1 mm Hg.
MELTING POINT -0.5°C	° F.	VAPOR DENSITY (Air = 1) 4.9	
SPECIFIC GRAVITY (H ₂ O = 1) 1.2187		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Decomposed in water		VOLATILE	% Vol. % Wt
APPEARANCE AND ODOR Colorless, fuming, pungent liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 162°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED Closed Cup		LOWER
EXTINGUISHING MEDIA Water spray sparingly, foam, carbon dioxide or dry chemical.		

SPECIAL FIRE FIGHTING PROCEDURES

Full protective clothing

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Benzoyl Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritates respiratory system, burns skin and eyes; burns mouth and digestive tract, lacrimator

EFFECTS OF CHRONIC EXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure, artificial respiration (if needed); no stimulants, 5% glucose I.V. (for B.P.); if swallowed - water wash mouth, give water to drink, then milk of magnesia, get medical attention.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Dimethyl sulfoxide, water

HAZARDOUS DECOMPOSITION PRODUCTS

When heated - phosgene

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Cover spills with sodium bicarbonate.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

w/appropriate filter

OTHER PROTECTIVE EQUIPMENT

Full protective clothing, body shield.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry, well-ventilated location, away from any area where the fire hazard is acute.

OTHER PRECAUTIONS

SIGNATURE

DATE

217-7107E

PRODUCT DESIGNATION

03-219-0708
Benzyl Bromide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

 α Bromotoluene, Benzyl Bromide

FORMULA

 $C_6H_5CH_2Br$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA MW - 171.04

BOILING POINT 198°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT -4°C	° F.	VAPOR DENSITY (Air = 1) 5.8
SPECIFIC GRAVITY (H ₂ O = 1) 1.438		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol. % Wt.

APPEARANCE AND ODOR

Slightly yellow liquid with pleasant odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water spray, dry chemical, carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Benzyl Bromide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

no

PRINCIPLE ROUTES OF ABSORPTION

SKIN AND EYE

Inhalation, ingestion

IRRITATION

high

RELEVANT SYMPTOMS OF EXPOSURE Irritation of eyes, nose and throat; severe burns to digestive tract if swallowed.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES If inhaled - rest; if swallowed - wash mouth, give emetic; get medical aid; wash skin and eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb spill with paper towels. After material has evaporated, burn in hood.

WASTE DISPOSAL METHOD

Dissolve in combustible solvent and burn.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry place.

OTHER PRECAUTIONS

SIGNATURE

DATE

219-0708B

CAS:000100447

XS89250

PRODUCT DESIGNATION

03-219-1708
03-219-1758
Benzyl Chloride

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

 α chlorotoluene, Benzyl Chloride

FORMULA

 $C_6H_5CH_2Cl$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ PPM/2H.	
			ORAL	PERCUT.	SPECIES	CONC.
#1 lowest published toxic concentration in air			1231		Rat	150
inhalation - human 16 PPM / 1 min.			1624		Mouse	80

SECTION III PHYSICAL DATA MW-126.59

BOILING POINT	° F.	VAPOR PRESSURE	
179°C		at 22°C.	1 mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
-43°C		4.36	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.10			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
.049			

APPEARANCE AND ODOR

Slight yellow liquid with pungent, aromatic, irritating odor. (0.047 ppm odor threshold)

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
153°F		
METHOD USED		LOWER
Closed cup		1.1%

EXTINGUISHING MEDIA

Water spray, dry chemical, carbon dioxide, chemical foam.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

Benzyl Chloride

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV 1 PPM, 5 mg/C.M.

weak mutagen

CARCINOGENIC Neoplastic

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION

high

RELEVANT SYMPTOMS OF EXPOSURE

Irritation of eyes, nose and throat; severe burns to digestive tract if swallowed.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES

If inhaled - rest; if swallowed - wash mouth, give emetic, get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

May undergo exothermic condensation in presence of copper, aluminum, iron, zinc, magnesium, tin and various other metals, as catalysts.

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush spills with large quantities of water and ventilate area to remove vapors.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

MECHANICAL (GENERAL)

Goggles

GLOVES

SPECIAL

Rubber

RESPIRATOR

Self contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

Rubber protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in cool, dry room away from fire hazards.

OTHER PRECAUTIONS

SIGNATURE

DATE

219-1708B

PRODUCT DESIGNATION

03-219-8208
Benzyl-M-Toluidine

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Phenyl-tolyl-methane	FORMULA $C_6H_5CH_2NHC_6H_4CH_3$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA MW - 182.25

BOILING POINT 275°C.	° F.	VAPOR PRESSURE at 193°C.	15 mm Hg.
MELTING POINT 0.997	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Carbon dioxide, dry chemical, foam or water spray.		
SPECIAL FIRE FIGHTING PROCEDURES Wear full protective clothing.		
UNUSUAL FIRE AND EXPLOSION HAZARDS When heated emits highly toxic fumes.		

PRODUCT DESIGNATION

Benzyl-M-Toluidine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Moderate

REVELANT SYMPTOMS OF EXPOSURE Cyanosis, air hunger, nausea, vomiting, low blood pressure, convulsions.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; if swallowed - give emetic, get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

219-8208B

PRODUCT DESIGNATION

03-219-8238
Benzyl-O-Toluidine

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Benzyl-O-Toluidine	FORMULA <chem>C6H5CH2NHC6H4CH3</chem>

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA

MW - 182.25

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
60°C			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR			
Crystalline solid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER
EXTINGUISHING MEDIA		
Carbon dioxide, dry chemical, foam or water spray.		
SPECIAL FIRE FIGHTING PROCEDURES		
--		
UNUSUAL FIRE AND EXPLOSION HAZARDS		
--		

PRODUCT DESIGNATION

Benzyl-O-Toluidine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Moderate

RELEVANT SYMPTOMS OF EXPOSURE Cyanosis, air hunger, nausea, vomiting, low blood pressure, convulsions.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness.

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; if swallowed, give emetic, get medical aid; wash from skin & hands.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Safety goggles

MECHANICAL (GENERAL)

GLOVES
Rubber gloves

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

219-8238B

PRODUCT DESIGNATION

03-219-8268
Benzyl-P-Toluidine

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Benzyl-P-Toluidine	FORMULA <chem>C6H5CH2NHC6H4CH3</chem>

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA MW - 182.25

BOILING POINT 286 ⁰ C.	⁰ F.	VAPOR PRESSURE at 180 ⁰ C.	10 mm Hg.
MELTING POINT -30 ⁰ C.	⁰ F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 0.994		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Very soluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Carbon dioxide, dry chemical, foam or water spray.		
SPECIAL FIRE FIGHTING PROCEDURES Wear full protective clothing.		
UNUSUAL FIRE AND EXPLOSION HAZARDS When heated emits highly toxic fumes.		

PRODUCT DESIGNATION

Benzyl-P-Toluidine

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

Moderate

RELEVANT SYMPTOMS OF EXPOSURE

Cyanosis, air hunger, nausea, vomiting, low blood pressure, convulsions.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed - give emetic, get medical aid; wash from skin & hands.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber gloves

SPECIAL

RESPIRATOR

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

219-8268B

CAS-000507426^e

AB33250

PRODUCT DESIGNATION

03-220-0809
BromalMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Tribromoacetaldehyde

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Bromal

FORMULA

 CBr_3CH_2O

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
For Bromal Hydrate						
Lowest published lethal dose oral - rat 40 mg/kg.						

SECTION III PHYSICAL DATA MW - 280.76

BOILING POINT 174°C-	° F.	VAPOR PRESSURE at 73°C.	18 mm Hg.
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 2.67		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Decomposes		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

Yellow liquid, irritating odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Alcohol foam, carbon dioxide, dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated to decomposition emits toxic fumes.

PRODUCT DESIGNATION

Bromal

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

REVELANT SYMPTOMS OF EXPOSURE Ingestion - nausea, vomiting, coldness of extremities,
unconsciousness, skin & eye irritation, hypnotic effects.

EFFECTS OF CHRONIC EXPOSURE

Dermatitis, eye irritation.

EMERGENCY AND FIRST AID PROCEDURES

Ingestion - give emetic, get medical aid, inhalation - rest; wash skin and eyes
with water.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR
Self-contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Protect against physical damage, detached storage preferred. Inside storage
in flammable liquids cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

220-0809B

PRODUCT DESIGNATION

03-220-1803
 α -Bromo-acetophenone

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Phenacyl Bromide, α -Bromo-acetophenone	FORMULA $\text{BrCH}_2\text{COC}_6\text{H}_5$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None available			

SECTION III PHYSICAL DATA MW - 199.05

BOILING POINT 119°C	° F.	VAPOR PRESSURE at 140°C	12 mm Hg.
MELTING POINT 50°C	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.647		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR White to greenish crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Not available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED Carbon dioxide, dry chemical		LOWER
EXTINGUISHING MEDIA		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

 α -bromo-acetophenone

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Eye irritation, corneal haziness and pain; burning of throat and eyes; irritation of skin and eyes.

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Inhalation - remove from exposure, rest. If swallowed - wash mouth, give emetic, get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-1803B

PRODUCT DESIGNATION

03-220-2309
Bromoacetyl Bromide

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS Bromoacetyl Bromide	FORMULA BrCH_2COBr

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None available			

SECTION III PHYSICAL DATA

MW-201.87

BOILING POINT <u>150°C</u>	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT <u>--</u>	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) <u>2.32</u>		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O <u>Decomposes</u>		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR <u>Fuming liquid</u>			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT <u>Not available</u>	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER LOWER
METHOD USED		
EXTINGUISHING MEDIA Do not use water or foam, use carbon dioxide or dry chemical.		
SPECIAL FIRE FIGHTING PROCEDURES		

UNUSUAL FIRE AND EXPLOSION HAZARDS When heated to decomposition point gives off toxic HBr.

PRODUCT DESIGNATION

Bromoacetyl Bromide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritation of eyes & respiratory system; severe internal damage if swallowed; eye & skin burns.

EFFECTS OF CHRONIC EXPOSURE

Bronchial irritation, erosion of teeth.

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; get medical aid; if swallowed - drink water, milk of magnesia, get medical aid, wash eyes & skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts violently with water or alcohol.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self contained

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-2309P

CAS:007745917

XU43750

PRODUCT DESIGNATION

03-220-2809
3 Bromo-4-AminotolueneMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

3 Bromo P Toluidine

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

2 Bromo-4 Methyl Aniline

FORMULA

 $\text{CH}_3\text{C}_6\text{H}_3\text{BrNH}_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/Kg.		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			1.9		Bird	

SECTION III PHYSICAL DATA MW-186.07

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
240			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
16-18			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.5			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt
Insoluble			
APPEARANCE AND ODOR			

Liquid

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		
METHOD USED		LOWER

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical, foam or water spray

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated emits highly toxic fumes.

PRODUCT DESIGNATION

3-Bromo-4 Aminotoluene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC
No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Yes

REVELANT SYMPTOMS OF EXPOSURE Cyanosis, air hunger, nausea, vomiting, low blood pressure, convulsions

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest. If swallowed - wash mouth, give emetic, get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-2809B

03-220-3309
5-Bromo-2-Aminotoluene

MATERIAL SAFETY DATA SHEET

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

4 Bromo-2-toluidine

FORMULA

CHEMICAL NAME AND SYNONYMS

4 Bromo 2 Methyl Analine

$$\text{CH}_3\text{C}_6\text{H}_3\text{BrNH}_2$$

SECTION II HAZARDOUS INGREDIENTS

[illegible]

SECTION III PHYSICAL DATA MW-686.07

BOILING POINT 240°C	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT 58-59°C	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.

APPEARANCE AND ODOR

Crystalline

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
N/A		LOWER
METHOD USED		

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical, foam or water spray

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing

UNUSUAL FIRE AND EXPLOSION HAZARDS

When heated emits highly toxic fumes.

PRODUCT DESIGNATION

5 Bromo-2-Aminotoluene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Eyes

RELEVANT SYMPTOMS OF EXPOSURE Cyanosis, air hunger, nausea, vomiting, low blood pressure, convulsions.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest. If swallowed - wash mouth, give emetic, get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-3309B

PRODUCT DESIGNATION

03-220-3809
M-Bromoaniline

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS M-Bromoaniline	FORMULA $\text{Br}(\text{C}_6\text{H}_4)\text{NH}_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
		None available				

SECTION III PHYSICAL DATA MW - 172.03

BOILING POINT 251°C.	° F.	VAPOR PRESSURE at 16°C.	mm Hg.
MELTING POINT 19°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1) 1.58		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water spray, carbon dioxide, alcohol foam.		

SPECIAL FIRE FIGHTING PROCEDURES

Self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapor may form explosive mixture in air.

PRODUCT DESIGNATION

M-Bromoaniline

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, skin, ingestion

SKIN AND EYE

IRRITATION Low

RELEVANT SYMPTOMS OF EXPOSURE

Cyanosis, headache, blood pressure drop, lethargy, jaundice
and anemia, pain in joints, fainting.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness and irritability, possible liver
damage, inflammation of kidney, ringing in ear.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure; wash from skin & eyes. If swallowed -
remove by gastric lavage and cartharsis; give oxygen as needed.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Sodium and potassium peroxide ozone, perchloric acid.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wear protective clothing during clean up.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPE) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in flammable liquids cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

220-3809B

PRODUCT DESIGNATION

03-220-3839
O-Bromoaniline

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

O-Bromoaniline

FORMULA

Br (C₆H₄) NH₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None available			

SECTION III PHYSICAL DATA MW - 172.03

BOILING POINT 229°C.	° F.	VAPOR PRESSURE Low	mm Hg.
MELTING POINT 32°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Crystals			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT None available	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water spray, carbon dioxide, alcohol foam.

SPECIAL FIRE FIGHTING PROCEDURES

Self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapor may form explosive mixture in air.

PRODUCT DESIGNATION

O-Bromoaniline

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, skin, ingestion

SKIN AND EYE

IRRITATION Low

REVELANT SYMPTOMS OF EXPOSURE

Headache, nausea, vomiting; jaundice, convulsions.

EFFECTS OF CHRONIC EXPOSURE

Severe kidney damage, some liver damage, dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure; wash skin & eyes; if swallowed -
remove by gastric lavage and cathartics, oxygen as needed.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

Sodium & potassium peroxide, ozone, perchloric acid.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wear protective clothing during cleanup.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

Protective clothing.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in flammable liquids cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

220-3839B

PRODUCT DESIGNATION

03-220-3869
P-Bromoaniline

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

P-Bromoaniline

FORMULA

BrC6H4NH2

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None Available			

SECTION III PHYSICAL DATA MW - 172.03

BOILING POINT	° F.	VAPOR PRESSURE LOW	mm Hg.
MELTING POINT 62-64°C.	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
1.80			
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Insoluble			
APPEARANCE AND ODOR			
Crystalline, sweet odor.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
None available		
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water spray, carbon dioxide, alcohol foam.

SPECIAL FIRE FIGHTING PROCEDURES

Self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Vapor may form explosive mixtures in air.

PRODUCT DESIGNATION

P-Bromoaniline

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

None available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, skin, ingestion

SKIN AND EYE

IRRITATION Low

REVELANT SYMPTOMS OF EXPOSURE

Cyanosis, headache, blood pressure drop, lethargy, jaundice and anemia, pain in joints, fainting.

EFFECTS OF CHRONIC EXPOSURE

Weight loss, anemia, weakness and irritability, possible liver damage, inflammation of kidneys, ringing in ear.

EMERGENCY AND FIRST AID PROCEDURES

Remove from exposure; wash from eyes and skin; if ingested - remove by gastric lavage and catharsis; give oxygen as needed.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

Sodium or potassium peroxide, ozone, perchloric acid.

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wear protective clothing during clean up.

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Safety goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in flammable liquids cabinet.

OTHER PRECAUTIONS

SIGNATURE

DATE

220-3869B

CAS:000108861

CY90000

PRODUCT DESIGNATION

03-220-4859
BromobenzeneMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

Bromobenzol

CHEMICAL NAME AND SYNONYMS

FORMULA

Phenyl bromideC₆H₅BrSECTION II HAZARDOUS INGREDIENTS ^{6 5}

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA MW - 157.02

BOILING POINT 156.2°C	° F.	VAPOR PRESSURE at 40°C	mm Hg. 10
MELTING POINT -30.7°C	° F.	VAPOR DENSITY (Air = 1) 5.41	
SPECIFIC GRAVITY (H ₂ O = 1) 1.497		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol.	% Wt.

APPEARANCE AND ODOR

Clear, colorless liquid, aromatic odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 124°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Water, foam, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES Wear goggles and self contained breathing apparatus.

INITIAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION	
Bromobenzene	
SECTION V HEALTH HAZARD DATA	
TOXIC LEVEL	
Not available	CARCINOGENIC No
PRINCIPLE ROUTES OF ABSORPTION	
Inhalation, ingestion, skin	SKIN AND EYE IRRITATION Yes
RELEVANT SYMPTOMS OF EXPOSURE	
Cyanosis, deep & rapid respiration, irregular pulse, drowsiness, unconsciousness.	
EFFECTS OF CHRONIC EXPOSURE	
Lung, liver and kidney damage	
EMERGENCY AND FIRST AID PROCEDURES	
Inhalation - remove from exposure, rest. If swallowed - wash mouth, give emetic, get medical aid; wash skin & eyes.	
SECTION VI REACTIVITY DATA	
CONDITIONS CONTRIBUTING TO INSTABILITY	
CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (MATERIALS TO AVOID)	
HAZARDOUS DECOMPOSITION PRODUCTS	
SECTION VII SPILL OR LEAK PROCEDURES	
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	
WASTE DISPOSAL METHOD	
SECTION VIII SPECIAL PROTECTION INFORMATION	
VENTILATION REQUIREMENTS LOCAL EXHAUST	PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE
	Goggles
MECHANICAL (GENERAL)	GLOVES
	Polyvinyl alcohol
SPECIAL	RESPIRATOR
	Self contained breathing apparatus
OTHER PROTECTIVE EQUIPMENT	
Overalls	
SECTION IX SPECIAL PRECAUTIONS	
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	
SIGNATURE	DATE

220-4859B

Similar to benzoyl chloride

PRODUCT DESIGNATION

03-220-5809

M-Bromobenzoyl Bromide

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

M-Bromobenzoyl Bromide

FORMULA

 $\text{BrC}_6\text{H}_4\text{COBr}$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
				Not available		

SECTION III PHYSICAL DATA

BOILING POINT 124-126°C	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT N/A	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA

Use water spray sparingly, foam, carbon dioxide or dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES

Wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

M-bromobenzoyl bromide

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritation of respiratory system, burns skin, eyes,
mouth and digestive tract

EFFECTS OF CHRONIC EXPOSURE

--

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest; if swallowed - wash mouth, drink water,
milk of magnesia, get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Reacts with oxidizing materials

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self-contained

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-5809B

CAS:000074975

PA52500

PRODUCT DESIGNATION

03-220-6809
BromochloromethaneMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

Methylene chlorobromide

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

Bromochloromethane

FORMULA

 ClCH_2Br

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀ mg/kg		LC ₅₀ PPM	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO - oral - human	50 mg/kg		5000		Rat	465-15 M.
			4300		Mouse	2300-72H.
Lowest published lethal dose in air						
inhalation - mouse	1500 PPM					

SECTION III PHYSICAL DATA

MW 129.4

BOILING POINT

68°C

° F.

VAPOR PRESSURE

mm Hg.

MELTING POINT

-55°C

° F.

VAPOR DENSITY (Air = 1)

4.46

SPECIFIC GRAVITY (H₂O = 1)

1.99

EVAPORATION RATE (_____ = 1)

SOLUBILITY IN WATER Pts/100 pts H₂O

VOLATILE

% Vol.

% Wt

APPEARANCE AND ODOR
~~Sparingly soluble in water~~

Colorless liquid, sweet chloroform like odor

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT

None

FLAMMABLE
(EXPLOSIVE)

UPPER

METHOD USED

LIMITS

LOWER

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

May emit toxic fumes when heated.

PRODUCT DESIGNATION

Bromochloromethane

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

TLV - 200 PPM, 1050 mg/C.M.

CARCINOGENIC No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE

Inhalation - pulmonary edema; irritation of eyes or skin;
central nervous system depression

EFFECTS OF CHRONIC EXPOSURE

Liver and kidney damage

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest; if swallowed, wash mouth, give
emetic, get medical aid; wash from eyes & skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb spill with paper towels. Let liquid evaporate in hood.

WASTE DISPOSAL METHOD

Dissolve in combustible solvent and burn.

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

Rubber coveralls

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-6809B

PRODUCT DESIGNATION

03-220-7809
P-BromoDiethylaniline

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS P-Bromo diethylaniline	FORMULA $\text{BrC}_6\text{H}_4\text{N}(\text{C}_2\text{H}_5)_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			Not available			

SECTION III PHYSICAL DATA

BOILING POINT 270 °C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 33 °C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Yellow crystal		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Probably above 200 °F estimated	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Alcohol foam, water spray, carbon dioxide, dry chemical		

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

P-Bromodiethylaniline

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

yes

REVELANT SYMPTOMS OF EXPOSURE Weakness, tremors, cyanosis, drowsiness, central

nervous system depressant

EFFECTS OF CHRONIC EXPOSURE

Fatigue, loss of appetite, headache, dizziness

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical aid; if swallowed -
wash mouth, give emetic; get medical aid; wash from skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Gloves

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-7809B

PRODUCT DESIGNATION

03-220-8309

P-Bromodimethylaniline

MATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

P-bromo, N,N'dimethylaniline

CHEMICAL NAME AND SYNONYMS

FORMULA

P-bromodimethylanilineBrC₆H₄N(CH₃)₂

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
LDLO oral - rat 500 mg/kg			None	available		

SECTION III PHYSICAL DATA

BOILING POINT	° F.	VAPOR PRESSURE	mm Hg.
264 ° C			
MELTING POINT	° F.	VAPOR DENSITY (Air = 1)	
55 ° C			
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE	% Vol. % Wt.
Insoluble			
APPEARANCE AND ODOR			

Crystalline

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	Probably above 200 ⁰ F estimated	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED			LOWER
EXTINGUISHING MEDIA			
Alcohol foam, water spray, carbon dioxide, dry chemical			

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

P-bromodimethylaniline

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion, skin

SKIN AND EYE

IRRITATION

Yes

REVELANT SYMPTOMS OF EXPOSURE

Weakness, tremors, cyanosis, drowsiness, central nervous

system depressant

EFFECTS OF CHRONIC EXPOSURE

Fatigue, loss of appetite, headache, dizziness

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical aid; if swallowed - wash mouth, give emetic, get medical aid; wash from eyes & skin.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-8309B

PRODUCT DESIGNATION

03-220-8809
2 Bromo-1,4-dimethybenzene

MATERIAL SAFETY DATA SHEET

Similar to xylene

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	
TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
CHEMICAL NAME AND SYNONYMS 2-Bromo-P-Xylene	FORMULA $\text{BrC}_6\text{H}_3(\text{CH}_3)_2$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			See Note			
Note:						
Lowest published toxic concentration in air						
inhalation - human 75 PPM 110 months						

SECTION III PHYSICAL DATA

BOILING POINT 205°C at 755 mm	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 9-10°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1) 1.356		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR Colorless liquid		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT Flash point estimated 100-200°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER LOWER
METHOD USED		
EXTINGUISHING MEDIA Foam, carbon dioxide, dry chemical water spray may be used to reduce rate of burning		
SPECIAL FIRE FIGHTING PROCEDURES Wear self contained breathing apparatus		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

2 bromo-1,4-dimethyl benzene

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion

SKIN AND EYE

IRRITATION Severe

RELEVANT SYMPTOMS OF EXPOSURE Irritation of respiratory tract, disturbance of vision, dizziness, nausea, collapse, coma; burning of skin or eyes.

EFFECTS OF CHRONIC EXPOSURE

Dermatitis, blood & liver damage

EMERGENCY AND FIRST AID PROCEDURES Inhalation - rest, get medical aid; if swallowed - give saline cathartics and demulcents, get medical aid; wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-8809B

Similar to chlorodiphenyl

PRODUCT DESIGNATION

03-220-9309
O-BromodiphenylMATERIAL SAFETY
DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME

EMERGENCY TELEPHONE NO.

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS

CHEMICAL FAMILY

CHEMICAL NAME AND SYNONYMS

O-bromodiphenyl

FORMULA

 $\text{BrC}_6\text{H}_4\text{C}_6\text{H}_5$

SECTION II HAZARDOUS INGREDIENTS

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA MW-233.11

BOILING POINT 296-8°C	° F.	VAPOR PRESSURE	mm Hg.
MELTING POINT <-20°C	° F.	VAPOR DENSITY (Air = 1)	
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)	
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE	% Vol. % Wt.
APPEARANCE AND ODOR Liquid			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT N/A	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER
EXTINGUISHING MEDIA Water, foam, carbon dioxide, dry chemical		
SPECIAL FIRE FIGHTING PROCEDURES		
UNUSUAL FIRE AND EXPLOSION HAZARDS		

PRODUCT DESIGNATION

O-Bromodiphenyl

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion skin

SKIN AND EYE

IRRITATION

Yes

REVELANT SYMPTOMS OF EXPOSURE

Acne, irritation of respiratory passages

EFFECTS OF CHRONIC EXPOSURE

Liver damage

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical aid; if swallowed, wash mouth, give emetic, get medical aid, wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

Rubber

SPECIAL

RESPIRATOR

Self contained breathing apparatus

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-9309B

PRODUCT DESIGNATION

03-220-9359
P-Bromodiphenyl

MATERIAL SAFETY DATA SHEET

SECTION I SOURCE AND NOMENCLATURE

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
---------------------	-------------------------

ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)

TRADE NAME AND SYNONYMS	CHEMICAL FAMILY
-------------------------	-----------------

CHEMICAL NAME AND SYNONYMS	FORMULA
----------------------------	---------

P-Bromodiphenyl

BrC1=CC=C(C=C1)C2=CC=CC=C2

SECTION II HAZARDOUS INGREDIENTS

6 4 6 5

BASIC MATERIAL	APPROXIMATE OR MAXIMUM % WT. OR VOL.	ESTABLISHED OSHA STANDARD	LD ₅₀		LC ₅₀	
			ORAL	PERCUT.	SPECIES	CONC.
			None	available		

SECTION III PHYSICAL DATA

MW-233.11

BOILING POINT 310.8°C	° F.	VAPOR PRESSURE mm Hg.
MELTING POINT 89.8-90.3°C	° F.	VAPOR DENSITY (Air = 1)
SPECIFIC GRAVITY (H ₂ O = 1)		EVAPORATION RATE (_____ = 1)
SOLUBILITY IN WATER Pts/100 pts H ₂ O Insoluble		VOLATILE % Vol. % Wt.
APPEARANCE AND ODOR White crystals		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 290°F	FLAMMABLE (EXPLOSIVE) LIMITS	UPPER
METHOD USED		LOWER

EXTINGUISHING MEDIA
Water, foam, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PRODUCT DESIGNATION

P-Bromodiphenyl

SECTION V HEALTH HAZARD DATA

TOXIC LEVEL

Not available

CARCINOGENIC

No

PRINCIPLE ROUTES OF ABSORPTION

Inhalation, ingestion skin

SKIN AND EYE

IRRITATION

Yes

RELEVANT SYMPTOMS OF EXPOSURE

Acne, irritation of respiratory passages

EFFECTS OF CHRONIC EXPOSURE

Liver damage

EMERGENCY AND FIRST AID PROCEDURES

Inhalation - rest, get medical aid; if swallowed - wash mouth, give emetic, get medical aid, wash skin & eyes.

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

INCOMPATIBILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS LOCAL EXHAUST

PROTECTIVE EQUIPMENT (SPECIFY TYPES) EYE

Goggles

MECHANICAL (GENERAL)

GLOVES

SPECIAL

RESPIRATOR

With proper filter

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

OTHER PRECAUTIONS

SIGNATURE

DATE

220-9359B

CHEMICAL ABSTRACT SERVICE REGISTRY NUMBER

<u>Inorganic</u>	<u>CAS. NO.</u>	<u>PAGE NO.</u>
Chromic Acid	007738945	1-0721
Hydriodic Acid	010034852	1-0922
Hydrobromic Acid	010035106	1-1113
Hydrochloric Acid	007647010	1-1324
Hydrofluoric Acid	007664393	1-1500
Hydrofluosilicic Acid	016961834	1-1716
Hypophosphorous Acid (30%)	006303215	1-1917
Iodic Acid	007782685	1-2128
Nitric Acid	007697372	1-2933
Perchloric Acid	007601903	1-3703
Periodic Acid	013444718	1-3904
Phosphoric Anhydride	001314563	1-4506
Phosphoric Acid	007664382	1-4516
Phosphotungstic Acid	012067991	1-4807
Sulfuric Acid	007664939	1-7212
Sulfurous Acid	007782992	1-7262
Aluminum Chloride	007446700	6-1310
Ammonium Bichromate	007789095	8-1102
Ammonium Bifluoride	001341497	8-1503
Ammonium Fluoride	012125018	8-4401
Ammonium Hydroxide	001336216	8-5123
Ammonium Oxalate	014258492	8-6527
Ammonium Sulfide Solution	012124991	8-7851
Ammonium Vanadate	007803556	8-9336
Antimony	007440360	10-0360
Antimony Trichloride	010025919	10-0600
Arsenic Metal	007440382	13-0401
Barium Acetate	000543806	15-0102
Barium Carbonate	000513779	15-0903

A-1-2

Barium Chloride	010361372	15-1904
Barium Hydroxide	017194002	15-3706
Barium Metal	007740393	15-4607
Barium Nitrate	010022318	15-5538
Beryllium Nitrate	007787555	17-6661
Bromine	007726956	24-5204
Cadmium Chloride	010108642	26-2805
Cadmium (Metal)	007440439	26-4805
Calcium Fluoride	007789755	28-3516
Calcium Oxide	001305788	28-5926
Chromium Metal	007440473	40-3400
Chromic Nitrate	007789028	40-4550
Chromium Potassium Sulfate	007788990	40-5600
Cobalt Metal	007440484	42-4001
Cupric Carbonate	012069691	46-2903
Cupric Chloride	001344678	46-3433
Cupric Nitrate	010031433	46-4403
Cupric Oxide	001317380	46-4953
Cupric Sulfate	007758987	46-6403
Cuprous Chloride	007758896	46-8423
Cuprous Cyanide	000544923	46-8721
Cuprous Oxide	001317391	46-9303
Ferric Chloride	010025771	53-2624
Ferric Nitrate	007782618	53-3804
Iodine	007553562	74-1009
Lead Acetate	000301042	82-0102
Lead Chloride	007758954	82-1802
Lead Dioxide	001309600	82-3002
Lead Metal	007439921	82-4802
Lead Nitrate	010099748	82-5402
Lead Oxide	001317368	82-6002
Lead Sulfate	007446142	82-7202
Lithium Aluminum Hydride	016853853	84-1003
Lithium Metal	007439932	84-8003

A-1-3

Lithium Fluoride	007789244	84-5003
Lithium Hydroxide	001310652	84-6003
Mercuric Chloride	007487947	91-2006
Mercuric Iodide	007774290	91-3006
Mercuric Nitrate	010045940	91-4006
Mercurous Nitrate	010415755	91-8006
Mercury Metal	007439976	91-9026
Nickel Carbonyl	013463393	97-0001
Nickel Metal	007440020	97-2848
Nickelous Ammonium Sulfate	007785208	97-3508
Nickelous Chloride	007791200	97-4908
Nickelous Nitrate	013478007	97-7008
Nickelous Sulfate	010101970	97-8508
Phosphorous Pentachloride	010026138	106-5001
Potassium Arsenate	007784410	110-0452
Potassium Bichromate	007778509	110-0802
Potassium Bifluoride	007789299	110-1032
Potassium Chromate	007789006	110-2902
Potassium Cyanide	000151508	110-3502
Potassium Fluoride	007789233	110-4522
Potassium Hydroxide	001310583	110-5042
Potassium Metal	007440097	110-5602
Potassium Oxalate	000583528	110-6402
Potassium Periodate	007790218	110-6802
Ruthenium Chloride	013465526	121-2905
Selenium Metal	007782492	125-4006
Sodium Arsenite	007784465	131-1068
Sodium Azide	026628228	131-1108
Sodium Calcium Hydrate		131-3158
Sodium Chromate	007775113	131-3608
Sodium Cyanide	000143339	131-4008
Sodium Dichromate	010588019	131-4108
Sodium Fluoride	007681494	131-4808
Sodium Hydroxide	001310732	131-5323

A-1-4

Sodium Hypochlorite	007681529	131-5508
Sodium Metal	007440235	131-6028
Sodium Oxalate	000062760	131-6908
Sodium Peroxide	001313606	131-7338
Sodium Silicate	006834920	131-8148
Sodium Tellurite	010102202	131-8758
Stannic Chloride	007646788	133-3008
Stannous Chloride	007772998	133-6008
Tellurium Metal	013494809	141-5902
Titanium Chloride	007550450	150-4003
Vanadium Pentoxide	001314621	154-6035
Yttrium Metal	007440655	159-5006
Yttrium Oxide	001314369	159-8006
Zinc Chloride	007646857	161-2007

Gases

Ammonia (anhydrous)	007664417	910-4030
Carbon Monoxide	000630080	927-5550
Chlorine, liquid, compressed	007782505	934-4000
Hydrogen Sulfide	007783064	950-9425
Sulfur Dioxide	007446095	988-2020

Other

Asbestos Fiber		609-2050
----------------	--	----------

Precious Metals

Gold Cyanide	000506650	5201-1400
Sel-Rex Bright Gold B1		5201-4000
Sel-Rex Bright Gold M ²		5201-4050
Gold(ous) Potassium Cyanide		5201-6200
Osmic Acid Anhydride	020816120	5401-0401
Chloroplatinic Acid	017083704	5601-0801
Platinum Chloride	013454961	5601-1120

A-1-5

Diamino Platinum Nitrite		5601-1510
Rhodium Trichloride	010049077	5801-1105
Silver Carbonate	012537767	5901-1101
Silver Cyanide	000506649	5901-1251
Silver Nitrate	007761888	5901-5621

Organic Acids

Acetic Anhydride	000108247	201-0100
Acetic Acid	000064197	201-0200
P-Arsanilic Acid	000098500	201-2102
Bromoacetic Acid	000079083	201-4004
B-Bromopropionic Acid	000590921	201-4454
Chloroacetic Acid	000079118	201-5905
Chloromaleic Anhydride	000096026	201-6186
Chlorosulfonic Acid	007790945	201-6706
Formic Acid	000064186	202-1400
8 Hydroxy-5-Quinoline Sulfonic Acid	000084888	202-2903
Maleic Acid	000110167	202-4405
Maleic Anhydride	000108316	202-4505
Malonic Acid	000141822	202-4805
Methoxyacetic Acid	000625456	202-5206
Nitrophthalic Anhydride	000641703	202-9610
Oxalic Acid	000144627	203-0302
Phenylarsonic Acid	000098055	203-1303
Phthalic Anhydride	000085449	203-2024
Picramic Acid	000096913	203-2504
Picric Acid	000088891	203-2704
Pyrogalllic Acid	000087661	203-3455
Tannic Acid	001401554	203-7309
Thioglycolic Acid	000068111	203-8310
Trichloro Acetic Acid	000076039	203-9202

Organic

Acetal	000105577	205-1550
Acetaldehyde	000075070	205-2000
Acetamide	000060355	205-2500
Acetonitrile	000075058	205-5000
Acetonylacetone	000110134	205-6000
Acetyl Chloride	000075365	206-3501
Acetyl Methyl Amine	000079163	206-4501
Acetyl Methylurea	000623596	206 6001
Acetyl Thiourea	000591082	206-6501
Acetyl Urea	000591071	206-7501
Acrylonitrile	000107131	206-8801

Alcohols

Allyl Alcohol	000107186	208-0202
Iso-Amyl Alcohol	000123513	208-0332
n-Butyl Alcohol	000071363	208-0902
Isobutyl Alcohol	000078831	208-0942
Sec Butyl Alcohol	000078922	208-0962
Tertiary Butyl Alcohol	000075650	208-0982
Diacetone Alcohol	000123422	208-1602
2 Di-N-Butylaminoethyl Alcohol	000102818	208-2202
B-Di Ethylaminoethyl Alcohol	000100378	208-2752
B-Dimethylaminoethyl Alcohol	000108010	208-3102
Furfuryl Alcohol	000098000	208-5002
n-Heptyl Alcohol	000111706	208-5202
Methyl Alcohol	000067561	208-6002
N-Propyl Alcohol	000071238	208-8702

Organic

Allylamine	000107119	211-3103
Allyl Bromide	000106956	211-3203
Allyl Chloride	000107051	211-3303
P-Aminoazobenzene	000060093	211-6503
P-Aminoazobenzene Hydrochloride	003457985	211-6703
2-Amino-1, 4-Dimethylbenzene	000095783	212-0104
4 amino-1, 3-Dimethylbenzene	000095681	212-0134
5-amino-1, 3-Dimethylbenzene	000108690	212-0164
O-aminodiphenyl	000090415	212-0204
2-Aminopyridine	000504290	212-1704
Iso amyl acetate	000123922	212-5004
n-Amyl Acetate	000628637	212-5104
Aniline	000062533	213-2005
Aniline Hydrochloride	000142041	213-2205
Aniline Sulfate	020305504	213-2405
O-Anisidine	000090040	213-3205
P-Anisidine	000104949	213-3255
Anthracene	000120127	213-4005
Azobenzene	000103333	213-9005
Azoxybenzene	000495487	213-9505
Benzalazine	000588681	216-3006
1,2-Benzanthracene	000056553	216-6006
Benzene (Benzol)	000071432	216-7006
Benzidine, Dihydrochloride	000531851	216-9146
Benzoyl Bromide	000618326	217-6107
Benzoyl Chloride	000098884	217-7107
Benzyl Bromide	000100390	219-0708
Benzyl Chloride	000100447	219-1708
Benzyl-M-Toluidine	005405174	219-8208
Benzyl-O-Toluidine	005405130	219-8238
Benzyl-P-Toluidine	005405152	219-8268
Bromal	000115173	220-0809

A-1-8

α -Bromo-acetophenone	000070111	220-1803
Bromoacetyl Bromide	000598210	220-2309
3 Bromo-4-Aminotoluene	000583686	220-2809
5-Bromo-2-Aminotoluene	000583755	220-3309
M-Bromoaniline	000591195	220-3809
O-Bromoaniline	000615361	220-3839
P-Bromoaniline	000106401	220-3869
Bromobenzene	000108861	220-4859
M-Bromobenzoyl Bromide		220-5809
Bromochloromethane	000074975	220-6809
P-BromoDiethylaniline	002052064	220-7809
P-Bromodimethylaniline	000586776	220-8309
2 Bromo-1, 4-dimethylbenzne	000553946	220-8809
O-Bromodiphenyl	002052075	220-9309
P-Bromodiphenyl	000092660	220-9359

INTERNAL DISTRIBUTION

1. Arakawa, E. T.
2. Atchley, R. L.
3. Auble, R. L.
4. Baes, C. F.
5. Baker, M. A.
6. Bandy, C. W.
7. Barclay, D. D.
8. Bell, J. T.
9. Betz, N.
10. Beweley, W. D.
11. Binford, F. T.
12. Blevins, W. A.
13. Boarner, L. A.
14. Bolinsky, J.
15. Baunstein, J.
16. Breeding, S. W.
17. Brogan, D.
18. Brooksbank, R. E.
19. Brown, J. M.
20. Bryant, E. H.
21. Burch, W. D.
22. Busby, W.
23. Busing, W. R.
24. Cagle, C. D.
25. Cain, G. C.
26. Case, F. N.
27. Chandler, J. M.
28. Chapman, G. T.
29. Clark, B. R.
30. Clark, R. L.
31. Cleland, J. W.
32. Clinton, S. D.
33. Coleman, C. F.
34. Collins, W. M.
35. Coltharp, H. G.
36. Colwell, B.
37. Conrad, M. C.
38. Corbett, B. L.
39. Corbin, L. T.
40. Cottrell, W. B.
41. Cox, J. A.
42. Cox, T. T.
43. Creswick, F. A.
44. Crowell, R. A.
45. Crump, B. F.
46. Datz, S.
47. DeBakker, R. J.
48. Demonbrun, J. R.
49. Dismuke, S. E.
50. Dixon, G. J.
51. Dobbs, N. A.
52. Doherty, D. G.
53. Dunning, D. E.
54. Ealy, J. A.
55. Edwards, R. S.
56. Ehrlich, R. D.
57. Elrod, J. C.
58. Emerson, E. E.
59. Everett, W. S.
60. Fair, W. C.
61. Farnham, R. M.
62. Fields, J. A.
63. Fields, J. W.
64. Fontana, M. H.
65. Fortney, T. G.
66. Fox, C. I.
67. Garrett, A. S.
68. Garrett, W. R.
69. Gary, D. C.
70. Gilley, L. W.
71. Gilmore, R. D.
72. Glass, J.
73. Glass, R. W.
74. Graves, W. D.
75. Griest, W. H.
76. Groenier, W. S.
77. Guerin, M. R.
78. Hamrick, T. P.
79. Hartman, H. F.
80. Haymond, H. H.
81. Haynes, C. E.
82. Hicks, G. R.
83. Hightower, J. R.
84. Hoffman, H. W.
85. Holbrook, J. L.
86. Holland, L. B.

87. Hood, W. B.
88. Hull, G. T.
89. Hurt, S. S.
90. Hutchins, J. D.
91. Ind. Hyg. Library (K-25)
- 92-102. Ind. Hyg. Dept. (ORNL)
103. Jackson, J. W.
104. Jamison, K. E.
105. Jenkins, L. H.
106. Jenkins, R. A.
107. Jenness, R. G.
108. Jennings, R. M.
109. Johnson, C. E.
110. Johnston, R. L.
111. Jones, J. E., Jr.
112. Jones, J. R.
113. Jones, R. S.
114. Judish, T. P.
115. Kappelmann, F. A.
116. Keesee, H. F.
- 117-118. Ketchen, E. E.
119. King, E. M.
120. King, L. J.
121. Klaus, H. V.
122. Kobisk, E. H.
123. Kowhler, W. C.
124. Lake, M. M.
125. Lampton, R. E.
126. Lance, E. D.
127. Langford, L.
128. Lasher, L. C.
129. Lees, E. M.
130. Leinart, R. L.
131. Leuze, R. E.
132. Library (Paducah)
133. Lieberman, B.
134. Lines, R. L.
135. Livingston, R.
136. Lloyd, M. H.
137. Love, G.
138. Lovelace, H. G.
139. Lyon, W. S.
140. MacPherson, R. E.
141. Macres, J.
142. Mailen, J. C.
143. Malinauskas, A. P.
144. Martin, J. R.
145. Massengill, J.
146. McCord, R. V.
147. McDougal, B. E.
148. McDowell, J. W.
149. McNabb, J. G.
150. Mesmer, R. E.
151. Michel, J. W.
152. Milan, D.
153. Millican, R.
154. Miller, J. M.
155. Miller, P. D.
156. Miller, W. H.
157. Mitchell, M. E.
158. Murray, J. A.
159. Nicol, R. G.
160. Noggle, T. S.
161. Oakes, T. W.
162. Odell, T. T.
163. Oliphant, G. W.
164. Ottinger, C. L.
165. Parrott, J. R.
166. Parzyck, O. C.
167. Perry, T. P. A.
168. Peterson, C. H.
169. Pickel, T. W.
170. Pierce, E. E.
171. Pope, R. G.
172. Porter, W. E.
173. Posey, F. A.
174. Poteet, K. H.
175. Poutsma, M. L.
176. Pugh, L. P.
177. Pulley, H.
178. Ragland, W. R.
179. Rickard, C. R.
180. Rickard, R. R.
181. Robbins, D.
182. Rohwer, P. S.
183. Ross, R. G.
184. Ruch, J. B.
185. Ryon, A. D.
186. Schaich, R. W.
187. Schmitt, C.
188. Scott, C. B.
189. Senkan, S. M.
190. Setaro, J. A.
191. Shanks, M. H.
192. Sherrod, J.
193. Shults, W. D.
194. Skidmore, M. R.
195. Smith, G. P.

- 196. Snider, J. W.
- 197. Spiewak, I.
- 198. Stinton, L. H.
- 199. Stokely, J. R.
- 200. Swanks, J. H.
- 201. Taylor, W. C.
- 202. Testerman, G. E.
- 203. Thomas, I. L.
- 204. Thompson, W. E.
- 205. Tidwell, B. L.
- 206. Tidwell, K. W.
- 207. Todd, W. D.
- 208. Tuck, H. H.
- 209. Tuholsky, A. M.
- 210. Turok, C. W.
- 211. Vaughen, V.
- 212. Viar, C. L.
- 213. Vollman, C. L.
- 214. Walden, J. M.
- 215. Walls, A. A.
- 216. Ward, R. H.
- 217. Weeren, W. H.
- 218. White, J. E.
- 219. Whitman, G. D.
- 220. Whitson, W. R.
- 221. Wicker, C. D.
- 222. Wilson, G. R.
- 223. Wilson, M. A.
- 224. Winget, R. H.
- 225. Wolfenbarger, J. D.
- 226. Wood, R. F.
- 227. Wright, J. A.
- 228. Wright, J. R.
- 229. Young, F. W.
- 230. Young, G. B.
- 231. Youngblood, E. L.
- 232-233. Central Research Library
- 234. Document Reference Section
- 235. ORNL Patent Office
- 236-237. Laboratory Records
- 238. Laboratory Records (RC)
- 239-270. Industrial Hygiene Department (ORNL)

EXTERNAL DISTRIBUTION

- 271-297. Technical Information Center
- 298. Office of Asst. Mgr. Energy Research &
Development, Department of Energy, Oak Ridge
Operations Office, Oak Ridge, TN
- 299. N. E. Bolton, Union Carbide Corporation - NYO
- 300. John Janous, 222 Rainbow Blvd. N. - Box 728,
Niagara Falls, Ny 14302