X. APPENDIX II

METHODS FOR BIOCHEMICAL DETERMINATION OF CHOLINESTERASE ACTIVITY IN BLOOD

The method of Wolfsie and Winter [340], a micromodification of the Michel method [341], is recommended for the measurement of cholinesterase (ChE) activity in workers exposed to organophosphorus (OP) insecticides, but not carbamate insecticides.

Reagents

All reagents should be at least American Chemical Society reagent grade.

(a) Buffer Solution I (for erythrocytes)

For 1 liter of buffer, dissolve 4.1236 g sodium barbital (0.02 M), 0.5446 g potassium orthophosphate, di-H (0.004 M), and 44.730 g potassium chloride (0.60 M) in 900 ml of distilled water; 28.0 ml of 0.1 N hydrochloric acid is added while shaking the solution, and the flask is brought to volume with distilled water. The pH of Buffer I should be 8.10 at 25 C.

(b) Buffer Solution II (for plasma)

For 1 liter of buffer, dissolve 1.2371 g sodium barbital

(0.006 M), 0.1361 g potassium orthophosphate, di-H (0.001 M), and 17.535 g sodium chloride (0.30 M) in 900 ml of distilled water and add 11.6 ml of 0.1 N hydrochloric acid before bringing to volume. The pH of Buffer II should be 8.00 at 25 C.

The pH of the buffer solutions will decrease over a period of several weeks. The pH should be checked before using and, if it has dropped more than 0.03 pH units, it should be discarded and a fresh solution made.

(c) Acetylcholine Substrate (for erythrocytes)

This is 0.11 M acetylcholine chloride (2.000 g in 100 ml of distilled water).

(d) Acetylcholine Substrate (for plasma)

This is 0.165 M acetylcholine chloride (3.000 g in 100 ml of distilled water).

A few drops of toluene are added to each acetylcholine substrate solution as a preservative, and the solutions are refrigerated when not in use. The acetylcholine solutions should not be retained for more than 1 week.

(e) Saponin Solution

This is 0.010% saponin (100 mg in 1,000 ml of distilled water). This solution should be made fresh as needed.

Apparatus

(a) Centrifuge capable of 3,500 rpm and holding capillary sample tubes.

(b) A pH meter, calibrated to 0.01 pH units.

(c) 0.02 ml Sahli-type hemoglobin pipet.

(d) Constant-temperature bath, 25 C.

(e) 100- and 1,000-ml volumetric flasks.

(f) Heparinized capillary tubes.

(g) A Bunsen burner.

Sampling, Handling, and Preparation

Blood is collected from a clean, dry fingertip in a heparinized glass capillary tube. The blood is allowed to flow into the capillary tube until the tube is approximately 3/4 full, leaving one end free by 1-1.25 inches, to permit flame-sealing of the tip of the tube without overheating the blood sample.

The finger should be pricked deeply and care should be taken to collect only free-flowing drops of blood in order tc guard against the initiation of the clotting process before the blood contacts the heparin lining in the wall of the capillary.

One end of the capillary is plugged with solid (room temperature) paraffin and the other (free) end is sealed in the flame of a Bunsen burner. The capillary may now be labeled with an adhesive tape tag bearing a serial number or name and date. The sample should then be centrifuged at 3,000-3,500 rpm for 50-60 minutes. When the sample has been so treated, it may be shipped to a laboratory, if necessary, or stored for several days (preferably in a refrigerator) without appreciable change.

Analysis

For analysis, the capillary is cut cleanly with a sharp ampule file. From the packed-cells section of the capillary,

draw 0.02 ml directly into a Sahli-type hemoglobin pipet. The ends of the capillary must be cut evenly to provide satisfactory juxtaposition with the tip of the pipet. Discharge the contents of the pipet directly into 1.0 ml of 0.01% saponin solution in a microbeaker, and rinse the pipet well (3 times) into the solution. Glass vials, 1 inch (2.5 cm) deep by 3/4 inch (19 mm) in diameter, are convenient for electrometric testing. They will fit in the carrier of a standard pH meter, and, when used with a clean rubber stopper, will eliminate transfer of the sample from a test tube for each pH measurement. Plasma is taken from the appropriate section of the capillary in the same manner as the packed erythrocytes and discharged into 1.0 ml of distilled water, the Sahli pipet being rinsed into the solution (3 times) as with the erythrocytes.

Erythrocyte Cholinesterase Assay

(a) One milliliter of hemolyzed erythrocyte solution is added to 1 ml of buffer solution I and placed in a 25 C water bath.

(b) After a 10-minute equilibrium period, the initial pH(i) is determined to the nearest 0.01 pH unit with the pH meter.

(c) Two-tenths milliliter of 0.11 M acetylcholine chloride solution is added with rapid mixing and the time is recorded.

(d) The reaction proceeds for 1-1.5 hours before the final pH(f) is noted.

The beaker containing the solution should be shaken when the glass electrode is introduced to speed the establishment of equilibrium.

Note: The buffer solution I is designed to yield a pH of 8.00 after the addition of hemolyzed human erythrocytes.

Plasma Cholinesterase Assay

(a) One milliliter of diluted plasma is mixed with 1 ml of buffer solution II.

(b) The solution is allowed to equilibrate in a 25 C water bath for 10 minutes.

(c) At the end of 10 minutes, the initial pH(i) is noted to the nearest 0.01 pH unit.

(d) Two-tenths milliliter of 0.165 M acetylcholine chloride solution is added with rapid mixing.

(e) The reaction mixture is incubated for 1-1.5 hours before the final pH(f) is noted.

Calculations

The final units derived from this assay are Δ pH/hour:

$$\text{Delta pH/hour} = \frac{pH(i) - ph(f) - bc}{t(f) - t(i)}$$

where:

pH(i) = initial pH

pH(f) = final pH

rt(f) - t(i) = time elapsed in hours between reading pH(i) and reading pH(f)

b = nonenzymatic hydrolysis corresponding to pH(f)

c = correction for variations in ΔpH/hour with pH, corresponding to pH(f)

The b and c correction factors are given in Table X-1. Average baseline values of erythrocyte and plasma ChE activity determined by this method for healthy nonexposed men and women are given in Table X-2. The value for average red blood cell (RBC) ChE activity for men is drawn from Wolfsie and Winter. The value for women is obtained by multiplying the average RBC ChE activity figure for men by the ratio of mean Δ pH/hr for women to mean Δ pH/hr for men derived from the data of Rider et al [342]. The use of the data of Wolfsie and Winter [340] allows for the increased packing and possible contamination of RBC's by plasma ChE. Plasma ChE values were selected from Rider et al, since their larger data base probably provides a closer approximation of the true population mean of normal values for plasma ChE activity. For the same reason, their data provide the most reliable women/men ratio for RBC ChE activities. The data of Wolfsie and Winter [340] and Rider et al [342] are presented in Table X-3.

TABLE X-1
CORRECTION FACTORS
FOR USE IN EQUATION FOR Δ pH/HR

pH(f)	Erythrocyte/ Cholinesterase Corrections b	c	Plasma/ Cholinesterase Corrections b	c
7.9	0.03	0.94	0.09	0.98
7.8	0.02	0.95	0.07	1.00
7.7	0.01	0.96	0.06	1.01
7.6	0.00	0.97	0.05	1.02
7.5	0.00	0.98	0.04	1.02
7.4	0.00	0.99	0.03	1.01
7.3	0.00	1.00	0.02	1.01
7.2	0.00	1.00	0.02	1.00
7.1	0.00	1.00	0.02	1.00
7.0	0.00	1.00	0.01	1.00
6.8	0.00	0.99	0.01	1.00
6.6	0.00	0.97	0.01	1.01
6.4	0.00	0.97	0.01	1.02
6.2	0.00	0.97	0.01	1.04
6.0	0.00	0.99	0.01	1.09

Adapted from reference 341

TABLE X-2
MEANS BASELINE VALUES
OF ERYTHROCYTE AND
PLASMA CHOLINESTERASE IN MEN
AND WOMEN (Δ pH/HR)

	Men	Women
	Erythrocyte Cholinesterase	
Mean	0.861	0.843
	Plasma Cholinesterase	
Mean	0.953	0.817

Adapted from Wolfsie and Winter [340] and Rider et al [342]

TABLE X-3
NORMAL VALUES FOR CIRCULATING CHOLINESTERASES
IN HEALTHY NONEXPOSED PERSONS*

Subjects	Erythrocyte Cholinesterase Activity (Δ pH/hr) Range	Mean	SD	Plasma Cholinesterase Activity (Δ pH/hr) Range	Mean	SD	Reference
400 men	0.58-0.95	0.766	0.081	0.52-1.39	0.953	0.187	342**
400 women	0.56-0.94	0.750	0.082	0.38-1.25	0.817	0.187	342**
255 men	0.554-1.252	0.861	0.091	0.408-1.652	0.912	0.112	340***

* All analyses performed by method of Michel [339]
** Ranges, means, and standard deviations in this study are estimates based on data extrapolated to age 40; ranges reflect elimination of highest 1% and lowest 1% of values
*** Analytic method modified for smaller blood sample

XI. APPENDIX III

OSHA EXPOSURE LIMITS FOR CERTAIN PESTICIDES

	ppm	mg/m3
Acrolein	0.1	0.25
Acrylonitrile-Skin* (ETS)	1	
Aldrin-Skin		0.25
Allyl alcohol-Skin	2	5
Ammonia	25	18
ANTU (alpha naphthyl thiourea)		0.3
Azinphos-methyl (Guthion)-Skin		0.2
Barium (soluble compounds)		0.5
Benzene-Skin	2	
Biphenyl	0.2	1
Cadmium		0.2
Calcium arsenate (as As)		1
Camphor, synthetic	2	12
Carbaryl (Sevin)		5
Carbon dioxide	5,000	9,000
Carbon disulfide	20	
Carbon tetrachloride-Skin	10	65
Chlordane-Skin		0.5
Chlorinated camphene (toxaphene)-Skin		0.5
Chlorine	1	3
1-Chloro,2,3-epoxy-propane (epichlorhydrin)	5	20
Chloroform (trichloromethane)	25	120
Chloropicrin	0.1	0.7
Coal tar pitch volatiles		0.2
Copper (dusts and mists)		1
Crag herbicide		10
Chromic acid		0.05
2,4-D (2,4 dichlorophenoxyacetic acid)		10
DBCP (dibromochloropropane)	0.001	
DDT-Skin		1
DDVP (dichlorovos)	0.1	1
Demeton (Systox)-Skin	0.01	0.1
1,2-Dibromoethane (ethylene) dibromide)-Skin	20	145
Dibrom		3
o-Dichlorobenzene	50	300
p-Dichlorobenzene	75	450
1,2-Dichloroethane	50	200

Dichloroethyl ether-Skin	5	30
1,1 Dichloro-1-nitroethane	10	60
1,2 Dichloropropane	75	350
Dieldrin-Skin		0.25
Dimethylphthalate		5
Dinitro-o-cresol-Skin		0.2
Endrin-Skin		0.1
EPN-Skin		0.5
1,2-Epoxypropane (propylene oxide)	100	240
Ethyl acetate	400	1,400
Ethyl formate	100	300
Ferbam		10
Formaldehyde	2	3
Furfural-Skin	5	20
Heptachlor-Skin		0.5
Hydrogen cyanide-Skin	10	11
Hydrogen fluoride	3	
Isopropyl alcohol	400	980
Lead arsenate (as PB)		0.15
Lindane-Skin		0.5
Malathion-Skin		15
Mercury		0.1
Methoxychlor		10
Methyl alcohol	200	260
Methyl bromide-Skin	15	60
Methyl chloride	100	210
Methyl chloroform	350	1,900
Methylene chloride	200	720
Napathalene	10	50
Nickel, soluble compounds (as Ni)		0.1
Nicotine-Skin		0.5
Nitrobenzene-Skin	1	5
Paraquat-Skin		0.5
Parathion-Skin		0.1
Pentachlorophenol-Skin		0.5
Pentane	600	1,800
Perchloroethylene-Skin	100	670
Petroleum distillates (naphtha)	500	2,000
Phenol-Skin	5	19
Phosdrin (mevinphos)-Skin	0.01	0.1
Phosphine	0.3	0.4
Pival (2-pivalyl-1, 3-indandione)		0.1
Propargyl alcohol-Skin	1	2
Propylene dichloride (1,2 dichloropropane)	75	350
Pyrethrum		5
Pyridine	5	15
Ronnel		10
Rotenone (commercial)		5
Silica, crystalline (respirable free silica)		0.05

	ppm	mg/m3
Sodium fluoroacetate (1080)-Skin	100	575
Stoddard solvent	500	2,950
Strychnine		0.15
Sulfuric acid		1
2,4,5-T		10
TEDP-Skin		0.2
TEPP-Skin	0.004	0.05
1,1,2,2-Tetrachloroethane-Skin	5	35
Thiram		5
Tin (organic)		0.1
Trichloroethylene	100	535
Warfarin		0.1
Xylene	100	435
Zinc chloride fume		1

Adapted from 29 CFR 1910.1000
*Standards denoted "Skin" apply to both dermal and respiratory exposure

XII. APPENDIX IV

NIOSH RECOMMENDED EXPOSURE LIMITS FOR CERTAIN PESTICIDES

Substance	NIOSH Recommendations For Workplace Air Exposure Limits
Acrylonitrile	4 ppm ceiling (4 hrs)
Arsenic, Inorganic	2 μg(As)/m3 ceiling[a] (15-minute)
Benzene	1 ppm ceiling (120-minute)
Cadmium	40 μg(Cd)/m3 TWA; 200 μg(Cd)/m3 ceiling(15-minute)
Carbaryl	5 mg/m3 TWA
Carbon dioxide	10,000 ppm TWA; 30,000 ppm ceiling (10-minute)
Carbon disulfide	3 mg/m3 TWA 30 mg/m3 ceiling (15-minute)
Carbon tetrachloride	2 ppm, ceiling (60-minute)
Chlorine	0.5 ppm ceiling (15 minute)
Chloroform	2 ppm ceiling (60-minute)
Chromic acid	0.05 mg(CrO3)/m3 TWA 0.1 mg (CrO3)/m3 ceiling (15-minute)
Creosote[b]	0.1 mg/m3 TWA

Cyanide Salts and Hydrogen Cyanide	5 mg(CN)/m3 ceiling (10-minute)
1,2-Dibromo-3-Chloropropane	10 ppb TWA
Epichlorohydrin	2 mg/m3 TWA 19 mg/m3 ceiling (15-minute)
Ethylene dichloride	5 ppm TWA; 15 ppm ceiling (15-minute)
Formaldehyde	1.2 mg/m3 ceiling (30-minute)
Hydrogen fluoride	2.5 mg (F)/m3 TWA; 5.0 mg/m3 ceiling (15-minute,fluoride ion)
Kepone	1 μg/m3 ceiling (15-minute)
Lead, Inorganic[c]	<100 μg/m3
Malathion	15 mg/m3 TWA
Mercury, Inorganic	0.05 mg/m3 TWA
Methyl alcohol	200 ppm TWA; 800 ppm ceiling (15-minute)
Methyl parathion	0.2 mg/m3 TWA
Methylene chloride	75 ppm TWA; 500 ppm ceiling, (15-minute). TWA to be lowered in presence of carbon monoxide
Nickel, Inorganic	15 μg/m3 TWA
Organotin compounds	0.1 mg(tin)/m3 TWA
Parathion	0.05 mg/m3 TWA
Pentane[d]	350 mg/m3 TWA 1,800 mg/m3 ceiling

	(15-minute)
Phenol	20 mg/m3 TWA 60 mg/m3 ceiling (15-minute)
Mineral spirits,[e] Kerosene, Stoddard solvent[e]	350 mg/m3 TWA 1,800 mg/m3 ceiling (15-minute)
Silica, Crystalline	50 μg/m3 TWA respirable free silica
Sulfur dioxide	2 ppm TWA
Sulfuric acid	1 mg/m3 TWA
1,1,2,2-Tetrachloroethane	1 ppm TWA
Toluene	100 ppm TWA; 200 ppm ceiling (10-minute)
Trichloroethylene[f]	< 25 ppm TWA
Xylene	100 ppm TWA; 200 ppm ceiling (10-minute)
Zinc oxide	5 mg/m3 TWA; 15 mg/m3 ceiling (15-minute)

Adapted from reference 153

a NIOSH TWA recommendations based on up to a 10-hr/d, 40-hr/wk exposure unless otherwise noted

b Recommended in the Coal Tar Products Criteria Document

c Revised, March 1977 in NIOSH testimony at OSHA hearings

d Recommended in the Alkanes Criteria Document

e Recommended in the Refined Petroleum Solvents Criteria Document

f Revised, January 1978 in Special Occupational Hazard Review on Trichloroethylene

XIII. APPENDIX V

MATERIAL SAFETY DATA SHEET

General instructions for preparing a Material Safety Data Sheet (MSDS) are presented in this chapter. The examples used in this text are for illustrative purposes and are not intended to apply to any specific compound or product. Applicable information about a specific product or material shall be supplied in the appropriate block of the MSDS.

The product designation is inserted in the block in the upper left corner of the first page to facilitate filing and retrieval. Print in upper case letters as large as possible. It should be printed to read upright with the sheet turned sideways. The product designation is that name or code designation which appears on the label, or by which the product is sold or known to employees. The relative numerical hazard ratings and key statements are those determined by the guidelines in Chapter V, Part B, of the NIOSH publication, An Identification System for Occupationally Hazardous Materials. The company identification may be printed in the upper right corner if desired.

(a) Section I. Product Identification

The manufacturer's name, address, and regular and emergency telephone numbers (including area code) are inserted in the appropriate blocks of Section I. The company listed should be a source of detailed backup information on the hazards of the

material(s) covered by the MSDS. The listing of suppliers or wholesale distributors is discouraged. The trade name should be the product designation or common name associated with the material. The synonyms are those commonly used for the product, especially formal chemical nomenclature. Every known chemical designation or competitor's trade name need not be listed.

(b) Section II. Hazardous Ingredients

The "materials" listed in Section II should be those substances which are part of the hazardous product covered by the MSDS and which individually meet any of the criteria defining a hazardous material. Thus, one component of a mulitcomponent product might be listed because of its toxicity, another component because of its flammability, while a third component could be included both for its toxicity and its reactivity. Note that a MSDS for a single component product must have the name of the material repeated in this section to avoid giving the impression that there are no hazardous ingredients.

Chemical substances should be listed according to their complete name derived from a recognized system of nomenclature. Where possible, avoid using common names and general class names such as "aromatic amine," "safety solvent," or "aliphatic hydrocarbon" when the specific name is known.

The "%" may be the approximate percentage by weight or volume (indicate basis) which each hazardous ingredient of the mixture bears to the whole mixture. This may be indicated as a range or maximum amount, ie, "10-40% vol" or "10% max wt," to avoid disclosure of trade secrets.

Toxic hazard data should be stated in terms of concentration, mode of exposure or test, and animal used, eg, "100 ppm LC50-rat," "25 mg/kg LD50-skin-rabbit," "75 ppm LC man," or "permissible exposure from 29 CFR 1910.1000" or, if not available, from other sources or publications such as the American Conference of Governmental Industrial Hygienists or the American National Standards Institute, Inc. Flashpoint, shock sensitivity, or similar descriptive data may be used to indicate flammability, reactivity, or similar hazardous properties of the material.

(c) Section III. Physical Data

The data in Section III should be for the total mixture and should include the boiling and melting points in degrees Fahrenheit (Celsius in parentheses); vapor pressure, in conventional millimeters of mercury (mm Hg); vapor density of gas or vapor (air=1); solubility in water, in parts/hundred parts of water by weight; specific gravity (water=1); percent volatiles (indicate if by weight or volume) at 70 F (21.1 C); evaporation rate for liquids or sublimable solids, relative to butyl acetate; and appearance and odor. These data are useful for the control of toxic substances. Boiling point, vapor density, percent volatiles, vapor pressure, and evaporation are useful for designing proper ventilation equipment. This information is also useful for design and deployment of adequate fire and spill containment equipment. The appearance and odor may facilitate identification of substances stored in improperly marked containers, or when substances are spilled.

(d) Section IV. Fire and Explosion Data

Section IV should contain complete fire and explosion data for the product, including flashpoint and autoignition temperature in degrees Fahrenheit (Celsius in parentheses); flammable limits, in percent by volume in air; suitable extinguishing media or materials; special firefighting procedures; and unusual fire and explosion hazard information. If the product presents no fire hazard, insert "NO FIRE HAZARD" on the line labeled "Extinguishing Media."

(e) Section V. Health Hazard Information

The "Health Hazard Data" should be a combined estimate of the hazard of the total product. This can be expressed as a TWA concentration, as a permissible exposure, or by some other indication of an acceptable limit. Other data are acceptable, such as lowest LD50, if multiple components are involved.

Under "Routes of Exposure," comments in each category should reflect the potential hazard from absorption by the route in question. Comments should indicate the severity of the effect and the basis for the statement, if possible. The basis might be animal studies, analogy with similar products, or human experiences. Comments such as "yes" or "possible" are not helpful. Typical comments might be:

Skin Contact--single short contact, no adverse effects likely; prolonged or repeated contact, irritation, and cracking. Readily absorbed through the skin with severe systemic effects.

Eye Contact--some pain and mild transient irritation;

no corneal scarring.

"Emergency and First Aid Procedures" should be written in lay language and should primarily represent first-aid treatment that should be provided by paramedical personnel or individuals trained in first aid.

Information in the "Notes to Physician" section should include any special medical information which would be of assistance to an attending physician including required or recommended preplacement and periodic medical examinations, diagnostic procedures, and medical management of overexposed employees.

(f) Section VI. Reactivity Data

The comments in Section VI relate to safe storage and handling of hazardous, unstable substances. It is particularly important to highlight instability or incompatibility to common substances or circumstances such as water, direct sunlight, steel or copper piping, acids, alkalies, etc. "Hazardous Decomposition Products" should include those products released under fire conditions. It must also include dangerous products produced by aging, such as peroxides in the case of some ethers. Where applicable, shelf life should also be indicated.

(g) Section VII. Spill or Leak Procedures

Detailed procedures for cleanup and disposal should be listed with emphasis on precautions to be taken to protect workers assigned to cleanup detail. Specific neutralizing chemicals or procedures should be described in detail. Disposal methods should be explicit and should include proper labeling of

containers holding residues and ultimate disposal methods such as "sanitary landfill" or "incineration." Warnings such as "comply with local, state, and Federal anti-pollution ordinances" are proper but not sufficient. Specific procedures should be identified.

(h) Section VIII. Special Protection Information

Section VIII requires specific information. Statements such as "Yes," "No," or "If Necessary" are not informative. Ventilation requirements should be specific as to type and preferred methods. Specify respirators as to type and NIOSH or US Bureau of Mines approval class, ie, "Supplied air," "Organic vapor canister," "Suitable for dusts not more toxic than lead," etc. Protective equipment must be specified as to type and materials of construction.

(i) Section IX. Special Precautions

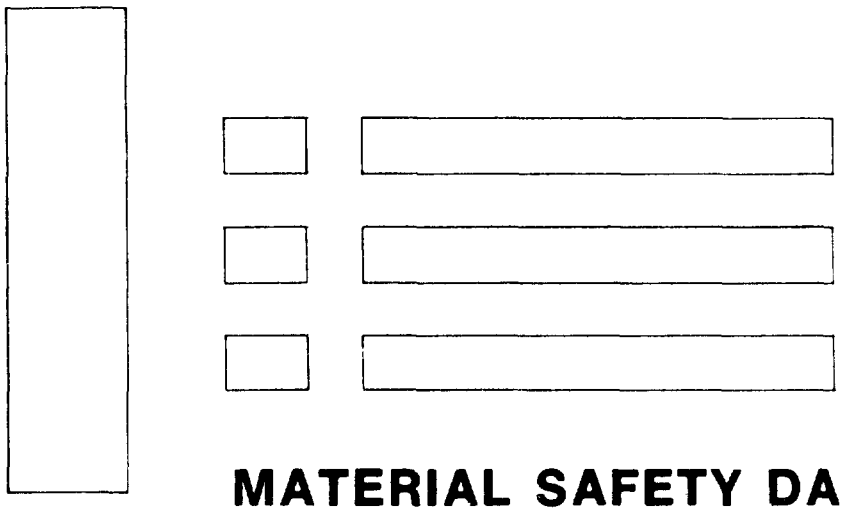
"Precautionary Statements" should consist of the label statements selected for use on the container or placard. Additional information on any aspect of safety or health not covered in other sections should be inserted in Section IX. The lower block can contain references to published guides or in-house procedures for handling and storage. Department of Transportation markings and classifications, other freight, handling, or storage requirements, and environmental controls can be noted.

(j) Signature and Filing

Finally, the name and address of the responsible person who completed the MSDS and the date of completion are entered. This

will facilitate correction of errors and identify a source of additional information.

The MSDS shall be filed in a location readily accessible to workers potentially exposed to the hazardous material. The MSDS can be used as a training aid and as a basis for discussion during safety meetings and training of new employees. It should assist management by directing attention to the need for specific control engineering, work practices, and protective measures to ensure safe handling and use of the material. It will aid the safety and health staff in planning a safe and healthful work environment and in suggesting appropriate emergency procedures and sources of help in the event of harmful exposure of employees.



MATERIAL SAFETY DATA SHEET

I PRODUCT IDENTIFICATION	
MANUFACTURER'S NAME	REGULAR TELEPHONE NO EMERGENCY TELEPHONE NO
ADDRESS	
TRADE NAME	
SYNONYMS	

II HAZARDOUS INGREDIENTS		
MATERIAL OR COMPONENT	%	HAZARD DATA

III PHYSICAL DATA		
BOILING POINT, 760 MM HG		MELTING POINT
SPECIFIC GRAVITY (H_2O=1)		VAPOR PRESSURE
VAPOR DENSITY (AIR=1)		SOLUBILITY IN H_2O, % BY WT
% VOLATILES BY VOL		EVAPORATION RATE (BUTYL ACETATE=1)
APPEARANCE AND ODOR		

IV FIRE AND EXPLOSION DATA

FLASH POINT (TEST METHOD)		AUTOIGNITION TEMPERATURE	
FLAMMABLE LIMITS IN AIR, % BY VOL.	LOWER		UPPER	
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARD			

V HEALTH HAZARD INFORMATION

HEALTH HAZARD DATA

ROUTES OF EXPOSURE

INHALATION

SKIN CONTACT

SKIN ABSORPTION

EYE CONTACT

INGESTION

EFFECTS OF OVEREXPOSURE

ACUTE OVEREXPOSURE

CHRONIC OVEREXPOSURE

EMERGENCY AND FIRST AID PROCEDURES

EYES

SKIN

INHALATION

INGESTION

NOTES TO PHYSICIAN

VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

INCOMPATIBILITY

HAZARDOUS DECOMPOSITION PRODUCTS

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

NEUTRALIZING CHEMICALS

WASTE DISPOSAL METHOD

VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY (SPECIFY IN DETAIL)

EYE

GLOVES

OTHER CLOTHING AND EQUIPMENT

IX SPECIAL PRECAUTIONS

PRECAUTIONARY
STATEMENTS

OTHER HANDLING AND
STORAGE REQUIREMENTS

PREPARED BY _____

ADDRESS _____

DATE _____