HAZARD COMMUNICATION PROGRAM

CALIFORNIA STATE UNIVERSITY, FRESNO

OFFICE OF

ENVIRONMENTAL HEALTH AND SAFETY

June 2002

HAZARD COMMUNICATION PROGRAM

BY THE

ENVIRONMENTAL HEALTH AND SAFETY OFFICE
CALIFORNIA STATE UNIVERSITY, FRESNO

POLICY

It is the policy of California State University, Fresno insofar as is reasonable and practical, to ensure that employees know what properties and potential safety and health hazards are in the materials which they use or to which they are exposed.

Employees who use or may be exposed to potentially hazardous substances or harmful physical agents shall be informed about the hazards of those substances or agents and shall be trained in the precautions to take to prevent exposure and what to do if they are accidentally exposed. No employee shall engage in, or be required to perform, any task that is determined to be unsafe or unreasonably hazardous.

John D. Welty, President

Benjamin F. Quillian, Vice President for Administration

TABLE OF CONTENTS

Page

POLICY iii

HAZARD COMMUNICATION LAW vi

IMPLEMENTATION OF HAZARD COMMUNICATION PROGRAM vii

1.0 GENERAL INFORMATION 1

1.1 Access To Written Hazard Communication Program 1
1.2 List Of Hazardous Chemicals 1
1.3 Non-Routine Task Evaluation 1

2.0 CALIFORNIA STATE LAW: RIGHT TO KNOW 2

2.1 Right To Know Law 2
2.2 Responsible Agency 2
2.3 Implementation Dates 2
2.4 Applicability 2
2.5 Exemptions 2
2.6 Substance Lists 3
2.7 Material Safety Data Sheets (MSDS's) 3
2.8 Trade Secrets 3
2.9 Coordination With Local Authorization/Emergency Response 3
2.10 Employee Rights 4

3.0 HAZARD COMMUNICATION - TITLE 8 CCR SECTION 5194 6

3.1 Purpose 6
3.2 Scope and Application 6
3.3 Definitions 10
3.4 Hazard Determination 16
3.5 Written Hazard Communication Program 18
3.6 Labels and Other Forms of Warning 18
3.7 Material Safety Data Sheets 20
3.8 Employee Information and Training 24
3.9 Trade Secrets 25
3.10 Appendices 30

TABLE OF CONTENTS

Page

4.0 MATERIAL SAFETY DATA SHEETS 31

4.1 Procedure If MSDS Is Not Received At The Time Of First Shipment 31
4.2 Updating MSDS Information 31
4.3 Glossary Of Common MSDS Terms 34
4.4 Guide To Understanding MSDS's 50

5.0 LABELING OF HAZARDOUS SUBSTANCES 55

5.1 Labeling Requirements 55
5.2 Language 58
5.3 Designs 59
5.4 Hazard Class Definitions 60
5.5 Hazardous Materials Warning Labels 66

6.0 RESOURCES 68

HAZARD COMMUNICATION LAW

The Hazard Communication Law is one of the most far reaching Federal and State Safety Regulations ever passed. It will affect all levels in the work place, from top management to the line worker.

A regulation of this size and complexity will take a lot of work and cooperation from all parties involved, if it is to be initiated properly. This standard carries a lot of liability and accountability, if it is not adhered to. Therefore, the Hazard Communication Manual has been developed to aid you with developing your program.

Please pay special attention to the Implementation Chapter of this manual. This chapter reviews the various responsibilities and accountability that these regulations place upon us.

IMPLEMENTATION OF HAZARD COMMUNICATION

I. UNIVERSITY PRESIDENT

The University President has the ultimate responsibility for all activities at the University that may impact the safety and well being of all employees. Along with this responsibility, comes the authority to delegate responsibility to ensure that all environmental and occupational laws and regulations are followed to ensure a safe work environment.

II. VICE PRESIDENTS FOR ACADEMIC, ADMINISTRATION AND AUXILIARY AFFAIRS

These individuals are responsible to the University President for carrying out the dictates of the Hazard Communication Program as it applies to their respective areas. They are to ensure that proper attention and funding is available, and to delegate responsibility to those personnel who will be responsible for the Hazard Communication Program.

III. SCHOOL DEANS, DEPARTMENT DIRECTORS AND AUXILIARIES

The various heads of each department will be responsible for setting up the Hazard Communication Program within their area. They will be responsible for appointment of the Hazard Communication Coordinator; funding if necessary; and enforcement of all precepts of the Hazard Communication Program.

IV. HAZARD COMMUNICATION COORDINATORS

The Hazard Communication Coordinator will be responsible for the day to day activities of the Hazard Communication Program. The responsibility will include:

1. Inventory of all chemicals in their areas.
2. Updating this inventory.
3. Gathering and processing MSDS's.
4. Training of employees.
5. Labeling.
6. Disposal and emergency procedures.
7. Documentation.

V. ENVIRONMENTAL HEALTH AND SAFETY OFFICE

The Environmental Health and Safety Office will act as a consulting office. Its responsibility is as follows:

1. Develop and maintain Hazard Communication Manual.
2. Assist in training by providing materials, films, lectures, etc.
3. Develop and maintain a master file of MSDS's to aid Hazard Communication Coordinators.
4. Inspect various departments to ensure compliance with Hazard Communication Program.
5. Issue deficiency notices for non-compliance.

HAZARD COMMUNICATION PROGRAM

1.0 GENERAL INFORMATION

The information presented in this section addresses several matters that are general in nature and also explain ways and means adopted by the University to assure both efficient and effective compliance with Title 8, Chapter 4, Section 5194, Hazard Communication.

1.1 Access To Written Hazard Communication Program

The written master and department Hazard Communication Program will be made available, upon request, to employees; their designated representatives; the Chief of the Division of Occupational Safety and Health; and the director, National Institute for Occupational Safety and Health (NIOSH). The term, "Designated Representative" means any individual or organization to exercise such employee rights under Section 5194.

Any employee desiring access to the written Hazard Communication Program should make the request to his/her immediate supervisor.

Designated representatives of employees should request the written program through the individual with whom he/she normally conducts work for, on behalf of the represented employees.

Access to the department's written program will be permitted during the shift in which the request was made, unless more than one request was made during the shift. In such cases, the employee will be given access to the department written program as soon as is practicable.

Each department superintendent will maintain in the work area a written Hazard Communication Program that will include applicable MSDS to allow ready access during every work shift by the employees.

1.2 List Of Hazardous Chemicals

Each department superintendent (manager) is responsible for the maintenance of a list of hazardous chemical products used within his area of responsibility. These listings shall include an identity that is referenced on the appropriate Material Safety Data Sheet (MSDS).

1.3 Non-Routine Task Evaluation

Prior to undertaking a non-routine task (such as cleaning of spilled chemicals, a student bath tank, or a sump area), the supervisor in charge will be responsible for reviewing the operation to be performed. This includes reviewing the appropriate MSDS of the hazardous chemicals associated with the performance of the task to determine the potential problems that may arise and how best to perform the non-routine task.

2.0 CALIFORNIA STATE LAW: RIGHT TO KNOW

2.1 Right To Know Law

California's Hazardous Substance Information and Training Act is found in West's Annotated Labor Code Sec. 6306 et seq.

California has a Hazard Communication Standard in the California Code of Regulations, Title 8, Chapter 4, Sec. 5194. Laws regarding reporting of releases and threatened releases of hazardous substances are found in Chapter 5.94, Section 25500 et seq. of the Health and Safety Code.

2.2 Responsible Agency

The Department of Industrial Relations is responsible for administering the act.

The Office of Emergency Services administers the section regarding reporting of releases and treated releases.

2.3 Implementation Dates

The law took effect in March, 1983. The law regarding reporting of releases and threatened releases was adopted in September, 1985. Regulations were promulgated by the Office of Emergency Services early in 1986. The law was expanded to include all work places, including Universities as of May, 1988.

2.4 Applicability

The law applies to all employers who use hazardous substances in the State, to any person who sells a hazardous substance to any employer in the State. The law applies to hazardous substances present in the State. The law applies to hazardous substances present in the workplace that may cause employee exposure under normal conditions of work, or in reasonably foreseeable emergencies.

2.5 Exemptions

The law does not apply to products intended for personal consumption by employees in the workplace; consumer products packaged for distribution to and use by the general public; and retail food establishments, and exclusive of processing and work areas.

There are also exemptions from the requirements to provide purchasers of hazardous substances with material safety data sheets discussed below. Manufacturers or persons other than a manufacturer will be relieved of the obligation to provide MSDS's if they have a record of having provided the specific purchaser with the most current version of the MSDS's; if the product is labeled by the purchaser with the Federal Insecticide, Fungicide and Rodenticide Act; or if the product is sold at retail

and incidentally sold to an employer or the employer's employees in the same form as it is sold to consumers, and employee exposure is not significantly greater than the consumers. Except for producers so labeled, manufacturers must still provide direct purchasers information on the MSDS's.

2.6 Substance Lists

The Director of Industrial Relations must establish a list of hazardous substances and make the list available to manufacturers, employees and the public. Substances on the list must be designated by chemical and common names. The law provides a procedure for preparing and amending the list, as well as establishing a concentration requirement for a hazardous substance. The list, and any additions to it, are subject to the approval of the Occupational and Safety Health Standards Board. When the Board approves the list, the Director must adopt it as a regulation.

2.7 Material Safety Data Sheets (MSDS's)

The manufacturer of any substance on the list of hazardous substances must prepare and provide its direct purchaser with an MSDS containing specified information. Substances that are present in a state that will not cause a chronic risk to health are not included. The manufacturer must revise MSDS's on a timely basis.

Provision of a Federal OSHA Form 20, material safety data sheet or equivalent is prima facia proof of compliance. The preparer of an MSDS must provide the department with a copy of the MSDS on each hazardous substance it manufactures. MSDS's may have to be provided for product mixtures under certain conditions.

Any person other than a manufacturer who sells a mixture of hazardous substances must provide direct purchasers with a copy of the most recent MSDS, or equivalent information at the time of the sale.

2.8 Trade Secrets

The Director of Industrial Relations must protect from disclosure all trade secrets coming into his or her possession, when requested in writing. This may include appropriate stamping or marking of documents by the manufacturer or producer of mixtures. The law provides a procedure for review of a trade secret claim by the Director. Before final notice that a claim has been disallowed, the manufacturer or producer may institute an action for a declaratory judgment as to whether the data is a protected trade secret.

2.9 Coordination With Local Authorization/Emergency Response

The law requires that all releases or threatened releases of hazardous materials that could significantly impact human health and safety, property, or the environment be reported to the OES and local administering agency. Counties are designated as local

administering agencies, but may by ordinance, assume responsibility for implementation of plans.

Administering agencies must establish area plans for emergency response to a release or threatened release of a hazardous material within its jurisdiction. In addition, any business which handles a hazardous material must establish a business plan for emergency response to a release or threatened release. Plans must include, in addition to information on the type, location, and amount of material, the following:

1. Emergency response plans and procedures in the event of a reportable release or threatened release of a hazardous material.

2. Immediate notification to appropriate local emergency rescue personnel and the Office.

3. Procedures for mitigation of a release or threatened release to minimize any potential harm or damage to persons, property, or the environment.

4. Evacuation plans and procedures, including immediate notice, for the business site and for the affected public.

5. Training for all employees in safety procedures.

Business plans must be established by September 1, 1986. Reporting to the Office of Emergency Services may be made by calling, (800) 852-7550 or (916) 427-4341. Unless otherwise designated, reporting to the local response agency may be made by calling 911.

2.10 Employee Rights

The law requires the Occupational Safety and Health Standards Board to adopt a standard providing employees, their representatives and their physicians access to information regarding substances in the workplace. This information may be delivered in written form or through training programs. In addition, employees must be informed of their rights.

The manufacturer of a hazardous substance or producer of a mixture must make an MSDS available upon request to an employer whose employees may be exposed to its product in the workplace. If the employer does not have an MSDS and has not:

1. Made written inquiry with 6 months as to whether a substance is subject to the requirements of the law; or

2. Requested within 6 months as whether any information has been issued on a substance, the employer must request one within 7 working days of an employee's request.

The manufacturer must reply within 15 days, furnishing an MSDS or a statement why the law does not apply. If the employer does not get a reply within 25 days, the employer must send the director a copy of the employer's request to the manufacturer with a notation that no response has been received.

No employer may discharge, discipline or discriminate against an employee for exercising rights under the law.

3.0 HAZARD COMMUNICATION - TITLE 8 CCR SECTION 5194

3.1 Purpose

The purpose of this section is to ensure that the hazards of all substances produced or imported by manufacturers or importers are evaluated, and that information concerning their hazards is transmitted to all affected employers and employees. This transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets and employee training.

3.2 Scope and Application

1. This section requires manufacturers or importers to assess the hazards of substances which they produce or import. It also requires all employers to provide information to employees about the hazards to which they are exposed, by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training. In addition, this section requires distributors to transmit the required information to employers.

2. This section applies to any hazardous substance which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions to use or in a reasonably foreseeable emergency.

3. This section applies to laboratories that primarily provide quality control analyses for manufacturing processes or that produce hazardous substances for commercial purposes, and to all other laboratories except those under the direct supervision and regular observation of an individual who has knowledge of the physical hazards, health hazards, and emergency procedures associated with the use of the particular hazardous substances involved, and who conveys this knowledge to employees in terms of safe work practices. Such excepted laboratories must also ensure that labels of incoming containers of hazardous substances are not removed or defaced pursuant to section 5194(f)(4), and must maintain any material safety data sheets that are received with incoming shipments of hazardous substances and ensure that they are readily available to laboratory employees pursuant to section 5194(g).

4. This section does not require labeling of the following substances:

    a. Any pesticide as such term is defined in the Federal Insecticide, Fungicide and Rodenticide Act (7 U.S.C. 136 et seq.), when subject to labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency;

b. Any food, food additive, color additive, drug or cosmetic including material intended for use as ingredients in such products (e.g. flavor and fragrances), as such terms are defined in the Federal Food, Drug and Cosmetic Act (21 U.S.C. 310 et seq.), and regulations issued under that Act and labeling regulations issued under that Act by the Food and Drug Administration;

c. Any distilled spirits (beverage alcohols), wine or malt beverage intended for non-industrial use, as such terms are defined in the Federal Alcohol Administration Act (27 U.S.C. 201 et seq.), and regulations issued under that Act and labeling regulations issued under that Act by the Bureau of Alcohol, Tobacco, and Firearms; and

d. Any consumer product or hazardous substance as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 et seq.), and the Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.), respectively, when subject to a consumer product safety standard or labeling requirement of those Acts, or regulations issued under those Acts by the Consumer Product Safety Commission.

5. This section does not apply to:

a. Any hazardous waste as such term is defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901 et seq.), when subject to regulations issued under the Act by the Environmental Protection Agency;

b. Tobacco or tobacco products;

c. Wood or wood products (non-excluded hazardous substances which are used in conjunction with wood or wood products, or are known to be present as impurities in those materials, are covered by this section);

d. Articles (hazardous substances used in the manufacture or use of an article are covered by this section unless otherwise excluded);

e. Foods, drugs, or cosmetics intended for personal consumption by employees while in the workplace;

f. Retail food sale establishments and all other trade establishments, exclusive of processing and repair work areas;

g. Consumer products packaged for distribution to and use by, the general public;

h. The use of a substance in compliance with regulations of the Director of Food and Agriculture issued pursuant to Section 12981 of the Food and Agriculture Code.

i. Work operations where employees only handle substances in sealed containers which are not opened under normal conditions of use (such as are found in marine cargo handling, warehousing, or transportation); however, this section does apply to these operations as follows:

1. Employers shall ensure that labels on incoming containers of hazardous substances are not removed or defaced;

2. Employers shall maintain copies of any material safety data sheets that are received with incoming shipments of the sealed containers of hazardous substances, shall obtain a material safety data sheet for sealed containers of hazardous substances received without a material safety data sheet if an employee requests the material safety data sheet, and shall ensure that the material safety data sheets are readily accessible during each work shift to employees when they are in their work area(s); and,

3. Employers shall ensure that employees are provided with information and training in accordance with subsection (h) except for the location and availability of the written hazard communication program under subsection (h)(2)(C), to the extent necessary to protect them in the event of a spill or leak of a hazardous substance from a sealed container.

6. Proposition 65 Warnings.

A. Notwithstanding any other provision of law including the preceding subsections, an employer which is a person in the course of doing business within the meaning of Health and Safety Code Section 25249.11(a) and (b), is subject to the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65 or the "Act") (Health and Safety Code Sec. 25249.5 et seq.), and shall comply with the Act in the manner set forth in subsections (B) and (C) below. The following employers are not subject to the Act:

1. an employer employing fewer than ten employees;

2. any city, county, or district or any department or agency thereof or the state or any department or agency thereof or the federal government or any department or agency thereof;

3. any entity in its operation of a public water system as defined in Health and Safety Code Section 4010.1.

B. Exposures Subject to Proposition 65 and Hazard Communication. Before exposing any employee to any hazardous substance that otherwise falls within the scope of this section and which requires a warning under this Act (see 22 CCR Section 12000, Chemicals Known to the State to Cause Cancer or Reproductive Toxicity) except as provided in subsection (D) below, any employer subject to the Act shall comply with the requirements set forth in subsections (d) through (k). Such compliance shall be deemed compliance with the Act.

C. Exposures Subject to Proposition 65 Only. Before knowingly and intentionally exposing any employee to any hazardous substance that does not otherwise fall within the scope of the section, but which requires a warning under the Act (see 22 CCR Section 12000, Chemicals Known to the State to Cause Cancer or Reproductive Toxicity) except as provided in subsection (D) below, any employer subject to the Act shall either provide a warning to employees in compliance with California Code of Regulations Title 22 (22 CCR) Section 12601(c) in effect on May 9, 1991 or shall comply with the requirements set forth in subsections (d) through (k).

D. Exposures Not Subject to Proposition 65. A warning required by subsection (B) and (C) above shall not apply to any of the following:

1. An exposure for which federal law governs warning in a manner that preempts state authority.

2. An exposure that takes place less than twelve months subsequent to the listing of the chemical in 22 CCR Section 12000.

3. An exposure for which the employer responsible can show that the exposure poses no significant risk assuming lifetime exposure at the level in question for the chemicals known to the State to cause cancer, and that the exposure will have no observable effect assuming exposure at one thousand (1,000) times the level in question for chemicals known to the State to cause reproductive toxicity, based on evidence and standards of comparable scientific validity to the evidence and standards which form the scientific basis for the listing of such chemical in 22 CCR Section 12000. In any enforcement action the burden of showing that an exposure meets the criteria of this subsection shall be on the employer.

E. Additional Enforcement of Proposition 65. In addition to any other applicable enforcement provision, violations or threatened violations of the Act may be enforced in the manner set forth in Health and Safety Code Section 25249.7 for violations and threatened violations of Health and Safety Code Section 25249.6. Compliance with 22 CCR Section 12601(c) in effect on May 9, 1991 shall be deemed a defense to an enforcement action under Health and Safety Code Section 25249.7.

F. All terms and provisions of subsection (b)(6) shall have the same meaning as the following 22 CCR Sections in effect on May 9, 1991: 12201(a), 12201(b), 12201(c), 12201(d), 12201(f), 12201(k), 12502, 12601, 12701(a), 12701(b), 12701(d), 12703, 12705, 12707, 12709, 12711, 12721, 12801, 12803, 12805, 12821 and 12901. The above listed 22 CCR Sections in effect on May 9, 1991 are printed in Appendix E to this section. Additionally, all terms and provisions of subsection (b)(6) shall have the same meaning as in the Act and in 22 CCR Section 12000.

3.3. Definitions

Article: A manufactured item; (1) Which is formed to a specific shape or design during manufacture; (2) which has end use function(s) dependent in whole or in part; and (3) which does not release, or otherwise result in exposure to, a hazardous substance under normal conditions of use or in a reasonably foreseeable emergency resulting from workplace operations.

CAS Number: The unique identification number assigned by the Chemical Abstracts Service to specific chemical substances.

Chemical Name: The scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name which will clearly identify the substance for the purpose of conducting a hazard evaluation.

Chief: The Chief of the Division of Occupational Safety and Health, P.O. Box 420603, San Francisco, CA 94142 or designee.

Combustible Liquid: Any liquid having a flashpoint at or above 100°F (37.8°C), but below 200°F (93.3°C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

Common Name: Any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a substance other than its chemical name.

Compressed Gas:

a. A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70°F (21.1°C); or

b. A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130°F (54.4°C) regardless of the pressure at 70°F (21.1°C); or

c. A liquid having a vapor pressure exceeding 40 psi at 100°F (37.8°C) as determined by ASTM D 323-72.

Container: Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like, that contains a hazardous substance. For purposes of this section, pipes or piping systems are not considered to be containers.

Department: The Department of Industrial Relations, P.O. Box 420603, San Francisco, CA 94142, or designee.

Designated Representative: Any individual or organization to whom an employee gives written authorization to exercise such employee's rights under this section. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.

Director: The Director of Industrial Relations, P.O. Box 503, San Francisco, CA 94101, or designee.

Distributor: A business, other than a manufacturer or importer, which supplies hazardous substances to other distributors or to employers.

Division: The Division of Occupational Safety and Health (CAL/OSHA) California Department of Industrial Relations, or designee.

Emergency: Any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment, which may or does result in a release of a hazardous substance into the workplace.

Employee: Every person who is required or directed by an employer, to engage in any employment, or to go to work or be at any time, in any place or employment.

Employer:

a. The State and every State Agency.

b. Each county, city, district, and all public and quasi-public corporations and public agencies therein.

c. Every person including any public service corporation which has any natural person in service.

d. The legal representative of any deceased employer.

Explosive: A substance that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure or high temperature.

Exposure or Exposed: Any situation arising from work operation where any employee may ingest, inhale, absorb through the skin or eyes, or otherwise come into contact with a hazardous substance.

Flammable: A substance that falls into one of the following categories:

a. Aerosol, flammable: An aerosol that, when tested by the method described in 16 C.F.R. 1500.45, yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;

b. Gas, Flammable:

1. A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of thirteen (13) percent of volume or less; or

2. A gas that, at ambient temperature and pressure, forms a range of flammable mixture with air wider than twelve (12) percent of volume, regardless of the lower limit;

c. Liquid, flammable: Any liquid having a flashpoint below 100°F (37.8°C), except any mixture having components with flashpoints 100°F (37.8°C) or higher, the total volume of which make up 99 percent or more of the total volume of the mixture;

d. Solid, flammable: A solid, other than a blasting agent or explosive as defined in Section 5237(a), that is liable to cause fire through friction, absorption of moisture, spontaneous

chemical change or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if when tested by the method described in 15 C.F.R. 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

Flashpoint: The minimum at which a liquid gives off vapor in such sufficient concentration to ignite when tested as follows:

a. Tagliabue Closed Tester (See American National Standard Method of Test for Flash Point by Tagliabue Closed Tester, Z11.24-1979 ASTM D 56-79) for liquids with a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100°F (37.8°C), or that have a tendency to form a surface film under test;

b. Pensky-Martins Closed Tester (See American National Standard Method of Test for Flash Point by Pensky-Martins Closed Tester, Z11.7-1979 ASTM D 93-79) for liquids with a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100°F (37.8°C), or that have a tendency to form a surface film under test; or

c. Setaflash Closed Tester (See American National Standard Method of Test for Flash Point by Setaflash Closed Tester, ASTM D 3278-78).

Organic peroxides, which undergo auto accelerating thermal decomposition are excluded from any of the flashpoint determination methods specified above.

Hazard Warning: Any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the health hazards and physical hazards of the substance(s) in the container(s).

Hazardous Substance: Any substance which is a physical hazard or a health hazard or is included in the list of Hazardous Substances prepared by the Director pursuant to Labor Code Section 6382.

Health Hazard: A substance for which there is statistically significant evidence based on at least one study conducted in accordance with health effects which may occur in exposed employees. The term "health hazard" includes substances which are carcinogens, toxic or highly

toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendix A provides further definitions and explanations of the scope of health hazards covered by this section, and Appendix B describes the criteria to be used to determine whether or not a substance is to be considered hazardous for purposes of this standard.

Identity: Any chemical or common name which is identified on the material safety data sheet (MSDS) for the substance. The identity used shall permit cross references to be made among the required list of hazardous substances, the label and the MSDS.

Immediate Use: The hazardous substance will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

Importer: The first business with employees within the Customs territory of the United States which received hazardous substances produced in other countries for the purpose of supplying them to distributors or purchasers within the United States.

Label: Any written, printed, or graphic material displayed on or affixed to containers of hazardous substances.

Manufacturer: A person who produces, synthesizes, extracts, or otherwise makes a hazardous substance.

Material Safety Data Sheet (MSDS): Written or printed material concerning a hazardous substance which is prepared in accordance with Section 5194(g).

Mixture: Any solution or intimate admixture of two or more substances, at least one of which is present as a hazardous substance, which do not react chemically with each other.

NIOSH: The National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services.

Organic Peroxide: An organic compound that contains the bivalent -0-0 structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical.

Oxidizer: A substance other than a blasting agent or explosive as defined in Section 5237(a), that initiates or promotes combustion in other

materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Physical Hazard: A substance for which there is scientifically valid evidence that it is a combustible liquid, compressed gas, explosive, flammable, or organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water reactive.

Produce: To manufacture, process, formulate, repackage, or relabel.

Pyrophoric: A substance that will ignite spontaneously in air at a temperature of 130°F (54.4°C) or below.

Responsible Party: Someone who can provide additional information on the hazardous substances and appropriate emergency procedures, if necessary.

Special Chemical Identity: The chemical name, Chemical Abstracts Service (CAS) Registry number, or any other information that reveals the precise chemical designation of the substance.

Substance: Any amount, chemical compound or mixture of elements and/or compounds.

Trade Secret: Any confidential formula, pattern, process, device, information, or compilation of information which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it.

Unstable (reactive): A substance which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure or temperature.

Use: To package, handle, react, or transfer.

Water-reactive: A substance that reacts with water to release a gas that is either flammable or presents a health hazard.

Work Area: A room or defined space in a workplace where hazardous substances are produced or used, and where employees are present.

Workplace: Any place, and the premises appurtenant thereto, where employment is carried on, except a place the health and safety jurisdiction over which is vested by law in, and actively exercised by, any state or federal agency other than the Division.

3.4 Hazard Determination

1. Manufacturers and importers shall evaluate substances produced in their workplaces or imported by them to determine if they are hazardous. Employers are not required to evaluate substances unless they choose not to rely on the evaluation performed by the manufacturer or importer for the substance to satisfy this requirement.

2. Manufacturers, importers or employers evaluating substances shall identify and consider the available scientific evidence concerning such hazards. For health hazards, evidence which is statistically significant and which is based on at least one positive study conducted in accordance with established scientific principles is considered to be sufficient to establish a hazardous effect if the results of the study meet the definitions of health hazards in this section. Appendix A shall be consulted for the scope of health hazards covered, and Appendix B shall be consulted for the criteria to be followed with respect to the completeness of the evaluation, and the data to be reported.

3. The manufacturers, importers or employers evaluating substances shall treat any of the following sources as establishing that the substances listed in them are hazardous:

   a. The list of hazardous substances prepared by the Director pursuant to Labor Code Section 6382. The concentrations and footnotes which are applicable to the list shall be understood to modify the same substance on all other source lists or hazard determinations set forth in Section 5194(d)(3)(B) - 5194(d)(5)(D).

   b. 29 C.F.R. Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

   c. 1991-1992 Threshold Limit Values for Chemical Substances in the Work Environment, American Conference of Governmental Industrial Hygienists (ACGIH).

   The manufacturer, importer or employer is still responsible for evaluating the hazards associated with the substances in these source lists in accordance with the requirements of the standard.

4. Manufacturers, importers or employers evaluating substances shall treat any of the following sources as establishing that a substance is a carcinogen or potential carcinogen for hazard communication purposes:

   a. National Toxicology Program (NTP), Sixth Annual Report on Carcinogens, 1991.

b. International Agency for Research on Cancer (IARC) Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Vols 1-53.

c. 29 C.F.R. Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

NOTE: The Registry of Toxic Effects of Chemical Substances published by the National Institute for Occupational Safety and Health indicates whether a substance has been found by NTP or IARC to be a potential carcinogen.

5. The manufacturer, importer or employer shall determine the hazards of mixtures of substances as follows:

   a. If a mixture has been tested as a whole to determine its hazards, the results of such testing shall be used to determine whether the mixture is hazardous;

   b. If a mixture has not been tested as a whole to determine whether the mixture is a health hazard, the mixture shall be assumed to present the same health hazards as do the components which comprise one percent (by weight or volume) or greater of the mixture, except that the mixture shall be assumed to present a carcinogenic hazard if it contains a component in concentration of 0.1 percent or greater which is considered to be a carcinogen under Section 5194(d)(4);

   c. If a mixture has not been tested as a whole to determine whether the mixture is a physical hazard, the manufacturer, importer or employer may use whatever scientifically valid data is available to evaluate the physical hazard potential of the mixture; and

   d. If the manufacturer, importer or employer has evidence to indicate that a component present in the mixture in concentrations of less than one percent (or in the case of carcinogens less than 0.1 percent) could be released in concentrations which would exceed an established permissible exposure limit or ACGIH Threshold Limit Value, or could present a health hazard to employees in those concentrations, the mixture shall be assumed to present the same hazard.

6. Manufacturers, importers or employers evaluating hazardous substances shall describe in writing the procedures they use to determine the hazards of the substance they evaluate. The written procedures are to be made available, upon request, to employees, their designated representatives, the Director, and NIOSH. The written description may be incorporated into the written hazard communication program required under Section 5194(e).

3.5 Written Hazard Communication Program

1. Employers shall develop and implement a written hazard communication program for their workplaces which at least describes how the criteria specified in Section 5194(f), (g), and (h) for labels and other forms of warning, material safety data sheets and employee information training will be met, and which also includes the following:

    a. A list of the hazardous substances known to be present using an industry that is referenced on the appropriate material safety data sheet (the list may be compiled for the workplace as a whole or for individual work areas);

    b. The methods the employer will use to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), and the hazards associated with substances contained in unlabeled pipes in their work areas; and

2. In multi-employer workplaces, the written hazard communication program shall include the methods employers will use to inform any employers sharing the same work area of the hazardous substances to which their employees may be exposed while performing their work, and any suggestions for appropriate protective measures, including the following:

    a. The methods the employer will use to provide the other employer(s) with access to the material safety data sheet, or to make it available at a central location in the workplace, for each hazardous substance the other employer(s)' employees may be exposed to while working;

    b. The methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and,

    c. The methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.

3. The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives, the Chief, and NIOSH, in accordance with the requirements of Section 3204(e).

3.6 Labels and Other Forms of Warning

1. The manufacturer, importer, or distributor shall ensure that each container of hazardous substances leaving the workplace is labeled, tagged, or marked with the following information:

a. Identity of the hazardous substance(s);

b. Appropriate hazard warning; and

c. Name and address of the manufacturer, importer, or other responsible party.

EXCEPTION: For solid metal (such as a steel beam or a metal casting) that is not exempted as an article due to its downstream use, the required label may be transmitted to the customer at the time of the initial shipment, and need not be included with subsequent shipments to the same employer unless the information on the label changes. The label may be transmitted with the initial shipment itself, or with the material safety data sheet that is to be provided prior to or at the time of the first shipment. This exception to requiring labels on every container of hazardous substances is only for the solid metal itself and does not apply to hazardous substances used in conjunction with, or known to be present with, the metal and to which the employees handling the metal may be exposed (for example, cutting fluids or lubricants).

2. Manufacturers, importers, or distributors shall ensure that each container of hazardous substances leaving the workplace is labeled, tagged, or marked in accordance with this section in a manner which does not conflict with the requirements of the Hazardous Materials Transportation Act (18 U.S.C. 1801 et seq.) and regulations issued under that Act by the Department of Transportation.

3. If the hazardous substance is regulated by these orders in a substance specific health standard, the manufacturer, importer, distributor, or employer shall ensure that the labels or other forms of warning used are in accordance with the requirements of the standard.

4. Except as provided in Sections 5194(f)(5) and (f)(6) employers shall ensure that each container of hazardous substances in the workplace is labeled, tagged, or marked with the following information:

   a. Identity of the hazardous substance(s) contained therein; and

   b. Appropriate hazard warning.

5. The employer may use signs, placards, process sheets, batch tickets, operating procedures or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the container to which it is applicable and conveys the information required by Section 5194(f)(4) to be on a label. The written materials shall be readily accessible to the employees in their work area throughout each work shift.

6. The employer is not required to label portable containers into which hazardous substances are transferred from labeled containers, and which

are intended only for the immediate use of the employee who performs the transfer.

7. The employer shall not remove or deface existing labels on incoming containers of hazardous substances, unless the container is immediately marked with the required information.

8. The employer shall ensure that labels or other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift. Employers having employees who speak other languages may add the information in their language to the material presented, as long as the information is presented in English as well.

9. The manufacturer, importer, distributor, or employer need not affix new labels to comply with this section if existing labels already convey the required information.

3.7 Material Safety Data Sheets

1. Manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous substance they produce or import. Employers shall have a material safety data sheet for each hazardous substance they use.

   NOTE: Employers should also refer to Section 3204 concerning information to be retained after a particular substance is no longer in use.

2. Each material safety data sheet shall be in English and shall contain at least the following information:

   a. The identity used on the label, and except as provided for in Section 5194(i) on trade secrets:

      1. If the hazardous substance is a single substance, its chemical and common names(s) and CAS number(s);

      2. If the hazardous substance is a mixture which has been tested as a whole to determine its hazards, the chemical and common names(s) and CAS number(s) of the ingredients which contribute to these known hazards, and the common name(s) of the mixture itself;

      3. If the hazardous substance is a mixture which has not been tested as a whole:

A. The chemical, common names(s) and CAS number(s) of all ingredients which have been determined to be health hazards, and which comprise 1% or greater of the composition, except that substances identified as carcinogens under subsection 5194(d)(4) shall be listed if the concentrations are 0.1% or greater; and

B. The chemical and common name(s), and CAS number(s) of all ingredients which comprise less than 1% (0.1% for carcinogens) of the mixture, if there is evidence that the ingredient(s) could be released from the mixture in concentrations which would exceed an established OSHA permissible exposure limit or ACGIH Threshold Limit Value, or could present a health hazard to employees; and,

C. The chemical, common names(s) and CAS number(s) of all ingredients which have been determined to present a physical hazard when present in the mixture.

b. Physical and chemical properties of the hazardous substance (such as vapor pressure, flash point, etc.);

c. The physical hazards of the hazardous substance, including the potential for fire, explosion and reactivity;

d. The health hazards of the hazardous substance, including signs and symptoms of exposure and any medical condition which are generally recognized as being aggravated by exposure to the substance;

e. The potential route(s) of entry;

f. The OSHA permissible exposure limit, ACGIH Threshold Limit Value and any other exposure limit used or recommended by the manufacturer, importer, or employer preparing the material safety data sheet, where available;

g. Whether the hazardous substance is listed in the National Toxicology Program (NTP) Sixth Annual Report on Carcinogens or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs, Vols 1-58, or by OSHA;

h. Any generally applicable precautions for safe handling and use which are known to the manufacturer, importer, or employer preparing the material safety data sheets, including the appropriate hygienic practices, protective measurements during repair and

maintenance of contaminated equipment and procedures for cleanup of spills and leaks;

i. Any generally applicable control measures which are known to the manufacturer, importer, or employer preparing the material safety data sheets, such as appropriate engineering controls, work practices or personal protective equipment;

j. Emergency and first-aid procedures;

k. The date of preparation of the material safety data sheet or the last change to it;

l. The name, address and telephone number of the manufacturer, importer, or employer or other responsible party preparing or distributing the material safety data sheet, who can provide additional information on the hazardous substance and appropriate emergency procedures, if necessary; and

m. A description in lay terms, if not otherwise provided, on either a separate sheet or with the body of the information specified in this section, of the specific potential health risks posed by a hazardous substance, intended to alert any person reading the information.

3. If no relevant information is found for any given category on the material safety data sheet, the manufacturer, importer, or employer preparing the material safety data sheet shall mark it to indicate that no information was found. If the category is not applicable to the hazardous substance involved, the space shall be marked to indicate that.

4. Where complex mixtures have similar hazards and contents (i.e., the chemical ingredients are essentially the same, but the specific composition varies from mixture to mixture) the manufacturer, importer, or employer may prepare one material safety data sheet to apply to all of these similar mixtures.

5. The manufacturer, importer, or employer preparing the material safety data sheet shall ensure that the information recorded accurately reflects the scientific evidence used in making the hazard determination. If the manufacturer, importer, or employer becomes aware of any significant information regarding the hazards of a substance, or ways to protect against the hazards, this new information shall be added to the material safety data sheet within three months. If the substance is not currently being produced or imported, the manufacturer or importer shall add the information to the material safety data sheet before the substance is introduced into the workplace again.

6. Manufacturers or importers shall ensure that distributors and purchasers of hazardous substances are provided an appropriate material safety data sheet with their initial shipment, and with the first shipment after a material safety data sheet is updated. The manufacturer or importer shall either provide material safety data sheets with the shipped containers or send them to the purchaser prior to or at the time of the shipment, the purchaser shall obtain one from the manufacturer, importer or distributor as soon as possible.

7. Distributors shall ensure that material safety data sheets, and updated information, are provided to other distributors and purchasers of hazardous substances.

8. The employer shall maintain copies of the required material safety data sheets for each hazardous substance in the workplace and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s).

9. Where employees must travel between workplaces during a workshift, i.e., their work is carried out at more than one geographical location, the material safety data sheets may be kept at a central location at the primary workplace facility. In this situation, the employer shall ensure that employees can immediately obtain the required information in an emergency.

10. Material safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous substances in a work area where it may be more appropriate to address the hazardous substances. However, the employer shall ensure that in all cases the required information is provided for each hazardous substance, and is readily accessible during each work shift to employees when they are in their work area(s).

11. Material safety data sheets shall also be made readily available upon request, to designated representatives, and to the Chief, in accordance with the requirements of Section 3204(e). NIOSH and the employee's physician shall also be given access to material safety data sheets in the same manner.

12. If the material safety data sheet, or any item of information required by Section 5194(g)(2), is not provided by the manufacturer or importer, the employer shall:

    a. Within seven working days of a request make a written inquiry to the manufacturer, producer, or seller of a hazardous substance responsible for the material safety data sheet, asking that the complete material safety data sheet be sent to the employer. If the

employer has made written inquiry in the preceding 12 months as to whether the substance or product is subject to the requirements of the Act or the employer has made written inquiry within the last six months requesting new, revised or later information on the material safety data sheet for the hazardous substance, the employer need not make additional written inquiry.

b. Notify the requester in writing of the date that the inquiry was made, to whom it was made, and the response, if any, received. Providing the requester with a copy of the inquiry sent to the manufacturer, producer, or seller and a copy of the response will satisfy this requirement.

c. Notify the requester of the availability of the material safety data sheet within 15 days of the receipt of the material safety data sheet from the manufacturer, producer, or seller or provide a copy of the material safety data sheet to the requester within 15 days of the receipt of the material safety data sheet from the manufacturer, producer, or seller.

d. Send the Director a copy of the written inquiry if a response has not been received within 25 working days.

13. The preparer of a material safety data sheet shall provide the Director with a copy of the material safety data sheet. Where a trade secret claim is made, the preparer shall submit the information specified in Section 5194(i)(15).

3.8 Employee Information and Training

1. Employers shall provide employees with information and training on hazardous substances in their work area at the time of their initial assignment and whenever a new hazard is introduced into their work area. Information and training may relate to general classes of hazardous substances to the extent appropriate and related to reasonably foreseeable exposures of the job.

2. Information and training shall consist of at least the following topics:

a. Employees shall be informed of the requirements of this section;

b. Employees shall be informed of any operations in their work area where hazardous substances are present;

c. Employees shall be informed of the location and availability of the written hazard communication program;

d. Employees shall be trained in the methods and observations that may be used to detect the presence or release of a hazardous substance in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous substances when released, etc.);

e. Employees shall be trained in the physical and health hazards of the substances in the work area and the measures they can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous substances, such as appropriate work practices, emergency procedures, and personal protective equipment to be used;

f. Employees shall be trained in the details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

g. Employers shall inform employees of the right:

1. To personally receive information regarding hazardous substances to which they may be exposed, according to the provisions of this section.

2. For their physician or collective bargaining agent to receive information regarding hazardous substances to which the employee may be exposed, according to the provisions of this section.

3. Against discharge or other discrimination due to the employee's exercise of the rights afforded pursuant to the provisions of the Hazardous Substances Information and Training Act.

3. Whenever any employer receives a new or revised material safety data sheet, such information shall be provided to employees on a timely basis not to exceed 30 days after receipt, if the new information indicates significantly increased risks to, or measures necessary to protect employee health as compared to those stated on a material safety data sheet previously provided.

3.9 Trade Secrets

1. The manufacturer, importer or employer may withhold the specific chemical identity of a hazardous substance from the material safety data sheet, provided that:

a. The claim that the information withheld is a trade secret can be supported;

b. Information contained in the material safety data sheet concerning the properties and effects of the hazardous substance is disclosed;

c. The material safety data sheet indicates that the specific chemical identity is being withheld as a trade secret; and

d. The specific chemical identity is made available to health or safety professionals, in accordance with the applicable provisions of this subsection.

2. Where a physician or nurse determines that a medical emergency exists and the specific chemical identity of a hazardous substance is necessary for emergency or first-aid treatment, the manufacturer, importer or employer shall immediately disclose the specific chemical identity of a trade secret substance to that physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement. The manufacturer, importer or employer may require a written statement of need and confidentiality agreement, in accordance with the provisions of Section 5194(i)(3) and (4), as soon as circumstances permit.

3. In non-emergency situations, a manufacturer, importer or employer shall, upon request, disclose a specific chemical identity, otherwise permitted to be withheld under Section 5194(i)(1), to a health or safety professional (i.e. physician, nurse, industrial hygienist, safety professional, toxicologist or epidemiologist) providing medical or other occupational health services to exposed employees if:

a. The request is in writing;

b. The request describes with reasonable detail one or more of the following occupational health needs for the information:

1. To assess the hazards of the substances to which employees will be exposed;

2. To conduct or assess sampling of the workplace atmosphere to determine employee exposure levels;

3. To conduct pre-assignment or periodic medical surveillance of exposed employees;

4. To provide medical treatment to exposed employees;

5. To select or assess appropriate personal protective equipment for exposed employees;

6. To design or assess engineering controls or other protective measures for exposed employees; and

7. To conduct studies to determine the health effect of exposure.

c. The request explains in detail why the disclosure of the specific chemical identity is essential and that, in lieu thereof, the disclosure of the following information would not enable the health or safety professional to provide the occupational health services described in Section 5194(i)(3)(B);

1. The properties and effects of the substance;

2. Measures for controlling worker's exposure to the substance;

3. Methods of monitoring and analyzing worker exposure to the substance; and

4. Methods of diagnosing and treating harmful exposures to the substance.

d. The request includes a description of the procedures to be used to maintain the confidentiality of the disclosed information; and

e. The health or safety professional, or designated representative and the employer or contractor of the health or safety professional's services (i.e., downstream employer, labor organization, or individual employer), agree in a written confidentiality agreement that the health or safety professional will not use the trade secret information for any purpose other than the health need(s) asserted and agree not to release the information under any circumstances other than to the Director, as provided in Section 5194(i)(6) except as authorized by the terms of the agreement or by the manufacturer, importer or employer.

4. The confidentiality agreement authorized by Section 5194(i)(3)(D) shall not include requirements for the posting of a penalty bond.

5. Nothing in this standard is meant to preclude the parties from pursuing non-contractual remedies of the extent permitted by law.

6. If the health or safety professional or designated representative receiving the trade secret information decides that there is a need to disclose it to the Director, the manufacturer, importer or employer who provided the

information shall be informed by the health or safety professional prior to, or at the same time as, such disclosure.

7. If the manufacturer, importer or employer denies a written request for disclosure of a specific chemical identity, the denial must:

    a. Be provided to the health or safety professional or designated representative within thirty days of the request;

    b. Be in writing;

    c. Include evidence to support the claim that the specific chemical identity is a trade secret;

    d. State the specific reasons why the request is being denied; and

    e. Explain in detail how alternative information may satisfy the specific medical or occupational health need without revealing the specific chemical identity.

8. The health or safety professional or designated representative whose request for information is denied under Section 5194(i)(3) may refer the request and the written denial of the request to the Director for consideration.

9. When a health or safety professional or designated representative refers the denial to the Director under Section 5194(i)(8) or upon the Director's own initiative when receiving information pursuant to Section 5194(g)(13) which is claimed to be a trade secret, the Director shall consider the evidence to determine if:

    a. The manufacturer, importer or employer has supported the claim that the specific chemical identity is a trade secret;

    b. The health or safety professional or designated representative has supported the claim that there is a medical or occupational health need for the information; and

    c. The health or safety professional or designated representative has demonstrated adequate means to protect the confidentiality.

10. If the Director determines that the specific chemical identity requested under Section 5194(i)(3) is not a bona fide trade secret, or that it is a trade secret but the requesting health or safety professional or designated representative has a legitimate medical or occupational health need for the information, has executed a written confidentiality agreement, and has shown adequate means to protect the confidentiality of the information,

the manufacturer, importer or employer, will be subject to citation by the Director. The Director shall so notify the manufacturer, importer or employer by certified mail.

11. The manufacturer, importer or employer shall have 15 days after receipt of notification under Section 5194(i)(10) to provide the Director with a complete justification and statement of the grounds on which the trade secret privilege is claimed. This justification and statement shall be submitted by certified mail.

12. The Director shall determine whether such information is protected as a trade secret within 15 days after receipt of the justification and statement required by Section 5194(i)(11), or if no justification and statement is filed within 30 days of the original notice, and shall notify the employer or manufacturer and any party who has requested the information pursuant to the California Public Records Act of that determination by certified mail. If the Director determines that the information is not protected as a trade secret, the final notice shall also specify a date, not sooner that 15 days after the date of mailing of the final notice, when the information shall be available to the public.

13. Prior to the date specified in the final notice provided pursuant to Section 5194(i)(12), a manufacturer, importer or employer may institute an action in an appropriate superior court for a declaratory judgment as to whether such information is subject to protection from disclosure.

14. If the manufacturer, importer or employer demonstrates to the Director that the execution of a confidentiality agreement as provided for by Section 5194(i)(10) would not provide sufficient protection against potential harm from the unauthorized disclosure of a trade secret specific chemical identity, the Director may issue such orders to impose such additional limitations or conditions upon the disclosure of the requested information as may be appropriate to assure that the occupational health services are provided without an undue risk of harm to the manufacturer, importer or employer.

15. Notwithstanding the existence of a trade secret claim, a manufacturer, importer or employer shall disclose to the Director, the specific chemical identity of any hazardous substance in a product for which trade secrecy is claimed. Where there is a trade secret claim, such claim shall be made no later than at the time the information is provided to the Director so that suitable determinations of trade secret status can be made and the necessary protections can be implemented.

16. Nothing in Section 5194(i) shall be construed as requiring the disclosure under any circumstances of process or percentage of mixture information which is a trade secret.

3.10 Appendices

1. Appendices A, B and D to this section are incorporated as part of this section and the provisions are mandatory.

2. Appendix C contains information which is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

4.0 MATERIAL SAFETY DATA SHEETS

A Material Safety Data Sheet (MSDS) is a concise presentation of safety and health information that can help the reader minimize the possibility of suffering an occupational disease or physical injury due to the inappropriate handling and use of a specific product.

The Administration of California State University, Fresno, recognizes its regulatory need to inform its employees of the potentially harmful properties of chemical products with which they work. More specifically, the Administration has assigned the following responsibilities and established the following procedures to assure MSDS's are accurate and technically feasible, obtained and maintained in a reasonable manner and each employee has ready access to the MSDS's during each working shift.

4.1 Procedure If MSDS Is Not Received At The Time Of First Shipment

If the MSDS, or any item of information required by Section 5194(g)(2), is not provided by the manufacturer or importer, the receiving individual shall immediately contact the campus Environmental Quality Manager, Lisa. Kao, at 278-7422. The following will then take place:

A. Within seven (7) working days of a request, a written inquiry to the manufacturer, producer or seller of a hazardous substance responsible for the MSDS, asking that the complete MSDS be sent to California State University, Fresno. If the Administration has made a written inquiry within the preceding twelve (12) months as to whether the substance or product is subject to requirements of the Act or the purchasing agent has made written inquiry within the last six (6) months requesting new, revised or later information on the MSDS for the hazardous substance, California State University, Fresno will not make additional written inquiry.

B. Notify the manufacturer, producer or seller in writing of the date that the inquiry was made, to whom it was made, and the response, if any received. Providing the manufacturer, producer or seller within twenty-five (25) working days of the date the request was made, the Environmental Quality Manager shall send the Director of Industrial Relations a copy of the request with a notation that no response has been received.

4.2 Updating MSDS Information

The Environmental Health and Safety Office will distribute to all known suppliers of hazardous substances a letter (copies on the next two pages) stating that updated MSDS's be forwarded to his attention anytime a significant change to the information occurred. A similar letter will be sent to known chemical suppliers at least annually. If in the interim, the Administration of California State University, Fresno, has reason to believe that significant change has occurred, an inquiry will be made with the manufacturer, producer or seller of the product.

January 1, 2001

Dear Sir:

As part of an industrial hygiene investigation of potential work place health hazards and to comply with 29 C.F.R. 1910.1200 (Hazard Communication Act), I am in need of a completed material safety data sheet (OSHA Form 20) on the product(s) listed below. In order to perform the required air sampling, information on the specific toxic chemical/material in the MSDS is critical.

The information you provide will be used solely for industrial hygiene evaluation and will be treated as proprietary data.

Please provide material safety data sheets with a copy of this letter for the following products:

If you have any questions, I can be contacted by telephone at (559) 278-7422. Please forward written information to: California State University, Fresno, Environmental Health and Safety Office, Fresno, CA 93740-0014.

Sincerely,

Lisa Kao
Environmental Quality Manager

LK:pm

January 1, 2001

Dear Sir:

I recently received the MSDS you forwarded to me. As you are aware, both the Federal OSHA and the State of California have specific requirements with regard to the data contained on the MSDS. Those requirements are set forth in 29 C.F.R. Part 1910, Subpart 1200, paragraph (g). Further, the State of California requires employers who receive an MSDS with incomplete or inaccurate information from a chemical manufacturer or importer to make a second request for a completed and accurate MSDS. Further, if an employer making a second request for such data, does not receive the completed and accurate data requested within 25 days of that request, the employer is required by Title 8, Chapter 4, Section 5194, paragraph (g), subparagraph (11) to notify he Director of Industrial Relations (CAL/OSHA) of the request with a notation that no response has been received.

Attached you will find a copy of my original request for MSDS information. Listed below is(are) the specific problem(s) noted with the information you recently provided. I am hopeful that you will correct this matter so that California State University, Fresno, may meet the requirements of the CAL/OSHA "Hazard Communication" standard.

This letter should be considered a SECOND REQUEST for completed and accurate MSDS information in accordance with the requirement set forth in CAL/OSHA Title 8, Chapter 4, Section 5194, paragraph (g).

I sincerely appreciate your efforts in regard to this matter, and I look forward to a continuance of business with your company.

Sincerely,

Lisa Kao
Environmental Quality Manager

LK:pm

4.3 Glossary Of Common MSDS Terms

Acute Effect - An adverse effect on a human or animal body, with severe symptoms developing rapidly and coming quickly to a crisis. Also see "chronic."

Acute Toxicity - The adverse (acute) effects resulting from a single dose of, or exposure to, a substance. Ordinarily used to denote effects in experimental animals.

ACGIH - American Conference of Governmental Industrial Hygienists: An organization of professional personnel in governmental agencies or educational institutions engaged in occupational safety and health programs. ACGIH develops and publishes recommended occupational exposure limits (see TLV) for hundreds of chemical substances and physical agents.

ANSI - American National Standards Institute: A privately funded, voluntary membership organization that identifies industrial and public needs for national consensus standards and coordinates development of such standards. Many ANSI standards relate to safe design/performance of equipment -- such as safety shoes, eyeglasses, smoke detectors, fire water pumps, household appliances -- and safe practices or procedures -- such as noise measurement, testing of the extinguishing and flame arresters, industrial lighting practices and use of abrasive wheels.

API - American Petroleum Institute: A voluntary membership organization of the petroleum industry. Among its services, API assists member committees in developing -- by the consensus process -- and publishing recommended practices for drilling and well servicing, storage tank installation, tank cleaning, piping and fitting, and other industry-related design, installation and operating practices. API also funds and publishes basic reference books and manuals (e.g., "Industrial Hygiene Monitoring Manual for Petroleum Refineries and Selected Petrochemical Operations").

Asphyxiant - A vapor or gas which can cause unconsciousness or death by suffocation (lack of oxygen). Most simple asphyxiants are harmful to the body only when they become so concentrated that they reduce oxygen in the air (normally about 21 percent) to dangerous levels (18 percent or lower). Asphyxiation is one of the principal potential hazards of working in confined and enclosed spaces.

ASTM - American Society for Testing and Materials: A voluntary membership organization with members from a broad spectrum of individuals, agencies and industries concerned with materials. The world's largest source of voluntary consensus standards for materials, products, systems and services. The ASTM is a resource for sampling and testing methods, health and safety aspects of materials, safe performance guidelines, and effects of physical and biological agents and chemicals.

Boiling Point - The temperature at which a liquid changes to a vapor state, at a given pressure; usually expressed in degrees Fahrenheit at sea level pressure (760 mm Hg, or one atmosphere). For mixtures, the initial boiling point or the boiling range may be given. Flammable materials with low boiling points generally present special fire hazards. Some approximate boiling points:

Propane	-44°F	Gasoline	100°F
Anhydrous Ammonia	-28°F	Alkyl Chloride	113°F
Butane	31°F	Ethylene Glycol	387°F

BOM or BuMines - Bureau of Mines of the U.S. Department of Interior: The Bureau began approving air breathing apparatus in 1918, later added all types of respirators. The BOM's respirator testing/approval activities have been discontinued; NIOSH now has this responsibility. Most BOM approvals have expired or been replaced by NIOSH approvals.

C - Celsius: A temperature scale, also known as centigrade.

CAA - Clean Air Act: A federal law enacted to regulate/reduce air pollution. Administered by EPA.

Carcinogen - A substance or agent capable of causing or producing cancer in mammals. The OSHA Hazard Communication Standard (see "Hazard Communication Standard") defines a carcinogen as a substance evaluated by the International Agency for Research on Cancer or by the National Toxicology Program in the Annual Report on Carcinogens and found to be a carcinogen or potential carcinogen, or is regulated by OSHA as a carcinogen.

CAS - Chemical Abstracts Service: A Columbus, Ohio organization affiliated with the American Chemical Society. The CAS abstracts and indexes chemical literature from all over the world in "Chemical Abstracts." Information about particular substances may be located in the "Abstracts" when needed. "CAS Numbers" identify specific chemicals or mixtures.

cc - Cubic Centimeter: A volume measurement in the metric system, equal in capacity to one milliliter (ml). One quart is about 946 cubic centimeters.

Ceiling - The maximum allowable human exposure limit for an airborne substance; not to be exceeded even monetarily. Also see "PEL" and "TLV."

CERCLA - Comprehensive Environmental Response, Compensation and Liability Act of 1980 (Superfund): Federal environmental legislation, administered by EPA, for regulating cleanup and liability for hazardous waste sites. Also establishes reporting requirements for releases of designated substances into the environment.

Chemical Family - A group of single elements of compounds with a common general name. Example: acetone, methyl ethyl ketone (MEK) and methyl isobutyl ketone (MIBK) are of the "ketone" family; acrolein, furfural and acetaldehyde are of the "aldehyde" family.

CHEMTREC - Chemical Transportation Emergency Center: A national center established by the Chemical Manufacturers Association (CMA) in Washington, D.C. in 1970, to relay pertinent emergency information concerning specific chemicals on request. CHEMTREC has a 24-hour toll-free telephone number (800-424-9300), intended primarily for use by those who respond to chemical transportation emergencies.

Chronic Effect - An adverse effect on a human or animal body, with symptoms which develop slowly over a long period of time or which recur frequently. Also see "acute ."

Chronic Toxicity - Adverse (chronic) effects resulting from repeated doses of, or exposures to, a substance over a relatively prolonged period of time. Ordinarily used to denote effects in experimental animals.

CNS - Central Nervous System. Early to moderate CNS depression may be evidenced by giddiness, headache and nausea.

CWA - Clean Water Act: A federal law enacted to regulate/reduce water pollution. Administered by EPA.

CO - Carbon monoxide. A colorless, odorless, flammable and very toxic gas produced by the incomplete combustion of carbon; also a byproduct of many chemical processes.

CO_2 - Carbon dioxide. A heavy, colorless, gas produced by the combustion and decomposition of organic substances and as a byproduct of many chemical processes. CO_2 will not burn and is relatively non-toxic (although high concentrations, especially in confined spaces, can create hazardous oxygen deficient environments).

COC - Cleveland Open Cut: A flashpoint test method.

Combustible - A term used by NFPA, DOT, OSHA and others to classify certain liquids that will burn, on the basis of flashpoints. NFPA, DOT and OSHA generally define "combustible liquids" as having a flashpoint of 100°F (37.8°C) or higher. Also see "flammable." Non-liquid substances such as wood and paper are classified as "ordinary combustibles" by NFPA.

Concentration - The relative amount of a substance when combined or mixed with other substances. Examples: 2 ppm hydrogen sulfide in air, or a 50 percent caustic solution.

Corrosive - As defined by DOT, a corrosive material is a liquid or solid that causes visible destruction of, or irreversible alterations in, human skin tissue at the site of contact -- in the case of leakage from its packaging -- a liquid that has a severe corrosion rate on steel. A solid or liquid waste which exhibits a "characteristic of corrosivity," as defined by RCRA, may be regulated (by EPA) as a hazardous waste. As defined by OSHA, corrosive does not refer to action on inanimate surfaces (e.g., steel).

CPSC - Consumer Products Safety Commission: A federal agency with responsibility for regulating hazardous materials when they appear in consumer goods. For CPSC purposes, hazards are defined in the Hazardous Substances Act and the Poison Prevention Packaging Act of 1970.

Cutaneous Toxicity - See "Dermal Toxicity."

Decomposition - Breakdown of a material or substance (by heat, chemical reaction, electrolysis, decay or other processes) into parts or elements or simpler compounds.

Dermal - Used or applied to the skin.

Dermal Toxicity - Adverse effects resulting from skin exposure to a substance. Ordinarily used to denote effects in experimental animals.

DHHS - U.S. Department of Health and Human Services: A federal department created in 1980 to replace the department of Health, Education and Welfare as "parent" for NIOSH, the Public Health Service and other agencies related to health and safety.

DOL - U.S. Department of Labor: A federal department that includes OSHA (Occupational Safety and Health Administration) and MSHA (Mine Safety and Health Administration).

DOT - U.S. Department of Transportation: A federal department that regulates transportation of chemicals and other substances, to aid in the protection of the public as well as well fire, law enforcement and other emergency response personnel, particularly when transportation incidents occur involving hazardous materials. Detailed DOT classification lists specify appropriate warnings -- such as Oxidizing Agent or Flammable Liquid -- which must be used for various substances. The DOT requires labeling of hazardous materials in transit.

EPA - U.S. Environmental Protection Agency: A federal agency with environmental protection regulatory and enforcement authority. Administers the CWA, CAA, FIFRA, RCRA, TSCA, CERCLA and other federal environmental laws.

Epidemiology - The science that deals with the study of disease in a general population. Determination of the incidence (rate of occurrence) and distribution of a particular disease (as by age, sex or occupation) may provide information about the cause of the disease.

Evaporation Rate - The rate at which a material vaporizes (evaporates) compared to the rate of vaporization of a known material, usually normal-butyl acetate (NBUAC or n-BuAc) with a rate designated as 1.0. Evaporation rate can be useful in evaluating health and fire hazards of a material. Vaporization rates of other materials are classified as:

- FAST evaporating if greater than 3.0; e.g., Methyl Ethyl Ketone (MEK) - 3.8, Acetone - 5.6, Hexane - 8.3.
- MEDIUM evaporating if 0.8 to 3.0; e.g., 190 proof (95%) Ethyl Alcohol - 1.4, VM&P Naphtha - 1.4, MIBK - 1.6.
- SLOW evaporating if less than 0.8; e.g., Xylene - 0.6, iso-Butyl Alcohol - 0.6, Butyl Alcohol - 0.4, Water - 0.3, Mineral Spirits - 0.1.

F - Fahrenheit: A temperature scale.

FDA - The U.S. Food and Drug Administration: Under the provisions of the Federal Food, Drug and Cosmetic Act, the FDA establishes requirements for the labeling of foods and drugs. The FDA also regulates materials for food contact service and the conditions under which such materials are approved.

FIFRA - Federal Insecticide, Fungicide and Rodenticide Act: Regulations administered by EPA under this Act require that certain useful poisons, such as chemical pesticides sold to the public, contain labels that carry health hazard warnings to protect users.

Flashpoint - The temperature at which a liquid will give off enough flammable vapor to ignite. There are several flashpoint test methods, so flashpoints may very for the same material depending on the method used. The test method is indicated when the flashpoint is given (150°F PMCC, 2000°F TCC, etc.).

Flammable - A "flammable liquid" is defined by NFPA, OSHA and DOT as a liquid with a flashpoint below 100°F (37.8°C). Solids that will ignite readily or are liable to cause fires under ordinary conditions of transportation through friction or retained heat from manufacturing or processing, and which burn so vigorously and persistently as to create a serious transportation hazard, are classified by DOT and OSHA as "flammable solids." Also see "combustible."

Formula - The conventional scientific designation for a material (water is H_2O, sulfuric acid is H_2SO_4, sulfur dioxide is SO_2, etc.).

General exhaust - A system for exhausting air which contains contaminants from a general work area. Also see "local exhaust."

g - Gram: A metric unit of mass. One ounce U.S. (avoirdupois) is approximately 28.4 grams.

g/kg - Grams per kilogram: An expression of dose used in oral and dermal toxicology testing to indicate the grams of substance dosed per kilogram of animal body weight. Also see "kg" (kilogram).

Hazard Communication Standard - Federal standard administered by OSHA regulating transmittal to employees of information on substance hazards. The transmittal is to be by container labeling and other forms of warning, MSDS and employee training. (Also, 29 C.F.R. 1910.1200).

Hazardous Chemical - As defined in the OSHA Hazard Communication Standard, any chemical which is a physical hazard or a health hazard. Hazardous chemicals require certain specific action under the OSHA standard.

Hazardous Material - In a broad sense, a hazardous material is any substance or mixture of substances having properties capable of producing adverse effects on the health or safety of a human being. In 1971 OSHA adopted the following definition in regulations affecting employers in operations subject to the federal Longshoremen's and Harbor Worker's Compensation Act:

"The term hazardous material means a material which has one or more of the following characteristics:

(1) Has a flashpoint below 140°F, closed cup, or is subject to spontaneous heating;

(2) Has a threshold limit value below 500 ppm for gases and vapors, below 500 mg/m^3 for fumes and below 24 mppcf for dusts;

(3) A single-dose oral LD_{50} below 500 mg/kg;

(4) Is subject to polymerization with the release of large amounts of energy;

(5) Is a strong oxidizing or reducing agent;

(6) Causes first degree burns to skin in short time exposure, or is systemically toxic by skin contact; or

(7) In the course of normal operations, may produce dusts, gases, fumes, vapors, mists or smokes which have one or more of the above characteristics."

Ignitable - As defined by RCRA, solid, liquid or compressed gas waste which exhibits a "characteristic of ignitability" (having a flashpoint less than 140°F). It may be regulated (by EPA) as a hazardous waste.

Incompatible - Materials which could cause dangerous reactions from direct contact with one another are described as incompatible.

Ingestion - The taking in of a substance through the mouth.

Inhalation - The breathing in of a substance in the form of a dust, gas, fume, vapor, mist or smoke.

Inhibitor - A chemical which is added to another substance to prevent an unwanted chemical change from occurring.

Internal Standard - A Shell term for an exposure standard established by the company. See the explanation for Section IV of the MSDS.

Irritant - A substance which, by contact in sufficient concentration for a sufficient period of time, will cause an inflammatory response or reaction of the eye, skin or respiratory system. The contact may be a single exposure or multiple exposures. Some primary irritants: chromic acid, nitric acid, sodium hydroxide, calcium chloride, amines, metallic salts, chlorinated hydrocarbons, ketones and alcohols. The OSHA defines an irritant as a chemical which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact.

Irritating Material - As defined by DOT, is a liquid or solid substance which upon contact with fire or when exposed to air gives off dangerous or intensely irritating fumes (not including poisonous materials; see Poison, Class A and Poison, Class B).

kg - Kilogram: A metric unit of mass, about 2.2 U.S. pounds. Also see "g/kg," "g," and "mg."

l - Liter: A metric unit of capacity. A U.S. quart is about 9/10 of a liter.

LC - Lethal Concentration: A concentration of a substance being tested that will kill a test animal. See the explanation of Section 11B of the MSDS.

LC_{50} - Lethal $Concentration_{50}$: The concentration of a material in air which, on the basis of laboratory tests, is expected to kill 50% of a group of test animals when administered as a single exposure (usually 1 or 4 hours). The LC_{50} is expressed as parts of material per million parts of air, by volume (ppm) for gasses and vapors, or as micrograms of material per liter of air (µg/l) or milligrams of material per cubic meter of air (mg/m^3) for dusts and mists as well as for gasses and vapors.

LD - Lethal Dose: A single dose of a substance being tested that will kill a test animal. See the explanation of Section 11B of the MSDS.

LD_{50} - Lethal $Dose_{50}$: A single dose of a material in air which, on the basis of laboratory tests, is expected to kill 50% of a group of test animals. The LD_{50} is usually expressed as milligrams or grams of material per kilogram of animal body weight (mg/kg or g/kg). The material may be administered by mouth (oral) or applied to the skin (dermal or cutaneous).

LEL or LFL - Lower Explosive Limit or Lower Flammable Limit of a vapor or gas; the lowest concentration (lowest percentage of the substance in air) that will provide a flash of fire when an ignition source (heat, arc or flame) is present. At concentrations lower than the LEL, the mixture is too "lean" to burn. Also see "UEL."

Local exhaust - A system for capturing and exhausting contaminated air at the point where the contaminants are produced (welding, grinding, sanding or other processes or operations). Also see "general exhaust."

m^3 - Cubic meter (or stere): A metric unit of volume, about 35.3 cubic feet or 1.3 cubic yards.

Melting point - The temperature at which a solid substance changes to a liquid state. For mixtures the melting range may be given. Some approximate melting points:

Water	32°F	Benzene	60°F
Vinyl Chloride	-247°F	Phenol	118°F

Mechanical exhaust - A powered device, such as a motor-driven fan or air/stream venturi tube, for exhausting contaminants from a workplace, vessel or enclosure.

mg - Milligram: A metric unit of mass. There are 1,000 milligrams in one gram (g) of a substance.

mg/kg - Milligrams per kilogram: An expression of toxicological dose. See "g/kg."

mg/m^3 - Milligrams per cubic meter: A unit for measuring concentrations of dusts.

ml - Milliliter: A metric unit of volume, equal to one cubic centimeter (cc) or about 1/16 of a cubic inch. There are 1,000 milliliters in one liter (l).

mm Hg - Millimeters (mm) of mercury (Hg): A unit of measurement for pressures or vacuums. One atmosphere (sea level, 20°C) is 760 mm Hg.

mppcf - Million particles per cubic foot: A unit for measuring particles of a substance suspended in air. Exposure limits for mineral dusts (silica, graphite, Portland cement, nuisance dusts and others), formerly expressed as mppcf, are now more commonly quoted in mg/m^3.

MSHA - Mine Safety and Health Administration of the U.S. Department of Labor: A federal agency with safety and health regulatory and enforcement authority for the mining industry. Also see "OSHA."

Mutagen - A substance or agent capable of altering the genetic material in a living cell.

N_2 - Nitrogen: A colorless, odorless, tasteless gas that will not burn and will not support combustion. The earth's atmosphere (air) is about 78 percent nitrogen; at higher concentrations, nitrogen can displace oxygen and become a lethal asphyxiant. See "Asphyxiant."

NaOH - Sodium Hydroxide, or caustic soda (see "caustic").

Necrosis - Tissue death at the site of contact or injection.

NRC - National Response Center: A notification center in the Coast Guard Building in Washington D.C., with a toll-free telephone number (1-800-424-8802) which must be called when significant oil or chemical spills or other environmentally-related accidents occur.

NBUAC (or n-BuAC) - normal-butyl acetate. See "evaporation rate."

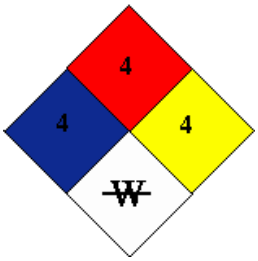
NFPA - National Fire Protection Association: An international membership organization to promote/improve fire protection and prevention and establish safeguards against loss of life and property by fire. Best known on the industrial scene for the National Fire Codes -- 16 volumes of codes, standards, recommended practices and manuals developed (and periodically updated) by NFPA technical committees. Among these is NFPA 704, the code for showing hazards of materials AS THEY MIGHT BE ENCOUNTERED UNDER FIRE OR RELATED EMERGENCY CONDITIONS, using the familiar diamond-shaped label or placard with appropriate numbers or symbols. The brief explanation below illustrates the NFPA principle of using scales of 0 to 4 (low to high) to classify material hazards:

FIRE HAZARD (RED)

0 - Will not burn
1 - Will ignite if preheated
2 - Will ignite if moderately heated
3 - Will ignite at most ambient conditions
4 - Burns readily at ambient conditions

HEALTH HAZARD (BLUE)

0 - No more than ordinary combustible hazards in a fire
1 - Slightly hazardous
2 - Hazardous
3 - Extreme danger
4 - Deadly



REACTIVITY (YELLOW)

0 - Stable and not reactive with water
1 - Unstable if heated
2 - Violent chemical change
3 - Shock and heat may detonate
4 - May detonate

SPECIFIC HAZARD

OXY	Oxidizer
ACID	Acid
ALK	Alkali
COR	Corrosive
W	Use No Water
☢	Radiation Hazard

NIOSH - National Institute for Occupational Safety and Health of the Public Health Service, U.S. Department of Health and Human Services (DHHS): A federal agency which -- among other activities -- tests and certifies respiratory protective devices and air sampling detector tubes, recommends occupational exposure limits for various substances and assists OSHA and MSHA in occupational safety and health investigations and research.

NO_X - Oxides of Nitrogen: Undesirable air pollutants. NO_X emissions are regulated by EPA under the Clean Air Act.

Olfactory - Relating to the sense of smell. The olfactory organ in the nasal cavity is the sensing element that detects odor and transmits information to the brain through the olfactory nerves.

Oral - Used in or taken into the body through the mouth.

Oral Toxicity - Adverse effects resulting from taking a substance into the body via the mouth. Ordinarily used to denote effects in experimental animals.

OSHA - Occupational Safety and Health Administration of the U.S. Department of Labor: A federal agency with safety and health regulatory and enforcement authority for most U.S. industry and business. Also see "MSHA."

Oxidation - In a literal sense, oxidation is a reaction in which a substance combines with oxygen provided by an oxidizer or oxidizing agent (see definitions below), in a broader sense, based on modern atomic theory, science today defines oxidation as a reaction brought about by an oxidizing agent in which atoms, molecules or ions lose electrons. In this broader sense, an oxidation reaction may occur even when oxygen is not present. However it may be defined, an oxidation reaction is always accompanied by an offsetting (balancing) reduction reaction in which: (1) oxygen is removed from a compound; or (2) atoms, molecules or ions gain electrons.

Oxidizer - The DOT defines an oxidizer or oxidizing material as a substance that yields oxygen readily to stimulate the combustion (oxidation) of organic matter. Compounds containing chlorate (ClO_3), permanganate (MnO_4) and nitrate (NO_3) are examples of oxidizers; note that all contain oxygen (O).

Oxidizing Agent - A chemical or substance which brings about an oxidation reaction. The agent may: (1) provide the oxygen to the substance being oxidized (in which case the agent has to be oxygen or contain oxygen); or (2) it may receive electrons being transferred from the substance undergoing oxidation (chlorine is a good oxidizing agent for electron-transfer purposes, even though it contains no oxygen).

PEL - Permissible Exposure Limit: An exposure limit established by OSHA regulatory authority. May be a time-weighted average (TWA) limit or a maximum concentration exposure limit. Also see "Skin."

Percent (%) Volatile - Percent volatile by volume: The percentage of a liquid or solid (by volume) that will evaporate at an ambient temperature of 70°F (unless some other temperature is stated). Examples: butane, gasoline and paint thinner (mineral spirits) are 100% volatile; their individual evaporation rates vary, but over a period of time each will evaporate completely. EPON solutions however may be only 10% to 60% volatile; only the solvent evaporates, leaving the resin as a non-volatile residue.

PMCC - Pensky-Martins Closed Cup: A flashpoint test method.

Poison, Class A - A DOT term for extremely dangerous poisons, that is, poisonous gases or liquids or such nature that a very small amount of the gas or vapor of the liquid is dangerous to life. Some examples: phosgene, cyanogen, hydrocyanic acid, and nitrogen peroxide.

Poison, Class B - A DOT term for a liquid, solid, paste or semi-solid substance -- other than Class A Poisons or irritating materials -- which are known (or presumed on the basis of animal tests) to be toxic to people as to afford a hazard to health during transportation.

Polymerization - A chemical reaction in which one or more small molecules combine to form larger molecules. A hazardous polymerization is one which takes place at a rate which releases large amounts of energy. If a hazardous polymerization can occur with a given material, the MSDS usually will list conditions which could start the reaction and, since the material usually contains a polymerization inhibitor, the expected time period before the inhibitor is used up.

ppm - Parts per million: A unit for measuring the concentration of a gas or vapor in air -- parts (by volume) of the gas or vapor in a million parts of air. Also used to indicate the concentration of a particular substance in a liquid or solid.

ppb - Parts per billion: A unit for measuring the concentration of a gas or vapor in air -- parts (by volume) of the gas or vapor in a billion parts of air. Usually used to express measurements of extremely low concentrations of unusually toxic gases or vapors. Also used to indicate the concentration of a particular substance in a liquid or solid.

psi - Pounds per square inch: For MSDS purposes, a unit for measuring the pressure a material exerts on the walls of a confining vessel or enclosure. For technical accuracy, pressure must be expressed as psig (pounds per square inch gauge) or psia (pounds per square inch absolute; that is, gauge pressure plus sea level atmospheric pressure, or psig plus about 14.7 pounds per square inch). Also see "mm Hg."

Reaction - A chemical transformation or change; the interaction of two or more substances to form a new substance(s).

Reactivity - A description of the tendency of a substance to undergo chemical reaction with the release of energy. Undesirable effects, such as pressure buildup, temperature increase, formation of noxious, toxic or corrosive by-products, may occur because of the reactivity of a substance to heating, burning, direct contact with other materials or other conditions in use or in storage. A solid waste which exhibits a "characteristic of reactivity," as defined by RCRA, may be regulated (by EPA) as a hazardous waste.

Reducing Agent - In a reduction reaction (which always occurs simultaneously with an oxidation reaction) the reducing agent is the chemical or substance which: (1) combines with oxygen; or (2) loses electrons in the reaction. See "Oxidation."

Respiratory system - The breathing system; includes the lungs and the air passages (trachea or "windpipe," larynx, mouth and nose) to the air outside the body, plus the associated nervous and circulatory systems.

RCRA - Resource Conservation and Recovery Act: Federal environmental legislation administered by EPA, aimed at controlling the generation, treatment, storage, transportation and disposal of hazardous wastes.

Sensitizer - As defined by OSHA, a chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical. Skin sensitization is the most common form of sensitization in the industrial setting, although respiratory sensitization to a few chemicals is also known to occur.

SETA - Setaflash Closed Tester: A flashpoint test method.

"Skin" - A notation, sometimes used with PEL or TLV exposure data; indicates that the stated substances may be absorbed by the skin, mucous membranes or eyes -- by direct contact or airborne exposures -- and that this additional exposure must be considered part of the total exposure when comparing exposures to the PEL or TLV for the substance.

Skin Sensitizer - See "Sensitizer."

Skin Toxicity - See "Dermal Toxicity."

Solubility in water - A term expressing the percentage of a material (by weight) that will dissolve in water at ambient temperature. Solubility information can be useful in determining spill cleanup methods and fire-extinguishing agents and methods. Terms used to express solubility are:

negligible	less than 0.1 percent
slight	0.1 to 1.0 percent
moderate	1.0 to 10 percent
appreciable	more than 10 percent
complete	soluble in all proportions

SO_x - Oxides of Sulfur: Undesirable air pollutants. SO_x emissions are regulated by EPA under the Clean Air Act.

Species - A biological type: On MSDS, species refers to the test animals -- usually rats, mice or rabbits -- which were used to obtain the toxicty test data reported.

Specific gravity - The weight of a material compared to the weight of an equal volume of water; an expression of the density (or heaviness) of the material. Example: if a volume of a material weighs 8 pounds, and an equal volume of water weighs 10 pounds, the material has a specific gravity of 0.8:

$$\frac{8 \text{ lbs.}}{10 \text{ lbs.}} = 0.8$$

Insoluble materials with specific gravity of less than 1.0 will float in (or on) water. Insoluble materials with specific gravity greater than 1.0 will sink in water. Most (but not all) flammable liquids have a specific gravity less than 1.0 and, if not soluble, will float on water -- an important consideration for fire suppression.

Stability - An expression of the ability of a material to remain unchanged for MSDS purposes, material is stable if it remains in the same form under expected and reasonable conditions of storage or use. Conditions which may cause instability (dangerous change) are stated, e.g., temperatures above 150°F or shock from dropping.

STEL - Short Term Exposure Limit: ACGIH terminology. See "TLV/STEL."

Superfund - See CERCLA.

Synonym - Another name or names by which a material is known. Methyl alcohol, for example, is also known as methanol or wood alcohol.

TCC - Tag (Tagliabue) Closed Cup: A flashpoint test method.

Teratogen - A substance or agent to which exposure of a pregnant female can result in malformation in the fetus.

TLV - Threshold Limit Value: ACGIH defines three categories of TLV's:

TLV/TWA: The Time Weighted Average concentration for a normal workday and a 40 hour work week to which nearly all persons may be exposed day after day, without adverse effects.

TLV/STEL: The Short Term Exposure Limit: A 15 minute time weighted average exposure which should not be exceeded at any time during a work day, even if the 8-hour TWA is not exceeded (should not be longer than 15 minutes nor repeated more than four times per day, with at least 60 minutes between successive exposures at the STEL).

TLV/C: The Ceiling exposure limit: The concentration that should not be exceeded during any part of the working exposure.

Also see "Skin" in the Glossary relative to TLV's.

TOC - Tag (Tagliabue) Open Cup: A flashpoint test method.

Toxicity - The sum of adverse effects resulting from exposure to a material, generally by the mouth, skin or respiratory tract. For RCRA purposes, solid or liquid wastes which exhibit certain specified "characteristics of toxicity" may be regulated by EPA as hazardous wastes.

Trade name - The trademark name or commercial trade name for a material.

TSCA - Toxic Substances Control Act: Federal environmental legislation administered by EPA, for regulating the manufacture, handling and use of materials classified as "toxic substances."

TWA - Time-Weighted Average: The airborne concentration of a material to which a person is exposed, averaged over the total exposure time -- generally the total workday (8 to 12 hours). Also see "TLV."

UEL or UFL - Upper Explosive Limit or Upper Flammable Limit of a vapor or gas; the highest concentration (highest percentage of the substance in air) that will provide a flash of fire when an ignition source (heat, arc or flame) is present. At concentrations higher than the UEL, the mixture is too "rich" to burn. Also see "LEL."

Unstable - Tending toward decomposition or other unwanted chemical change during normal handling or storage.

USDA - U.S. Department of Agriculture: A federal department that prior to 1971 performed tests and issued approvals on respirators for use with pesticides. In 1971 the Bureau of Mines took over the respirator testing/approval functions -- procedures later delegated to the Testing and Certification Branch (TCB) of NIOSH. Also see "BOM."

Vapor density - The weight of a vapor or gas compared to the weight of an equal volume of air; an expression of the density of the vapor or gas. Materials lighter than air have vapor densities less than 1.0 (examples: acetylene, methane and hydrogen). Materials heavier than air have vapor densities greater than 1.0 (examples: propane, hydrogen sulfide, ethane, butane, chlorine and sulfur dioxide). All vapors and gases will mix with air, but the lighter materials will tend to rise and dissipate (unless confined). Heavier vapors and gases are likely to concentrate in low places -- along or under floors or in sumps, sewers, manholes, trenches and ditches -- where they may create fire or health hazards.

Vapor pressure - The pressure exerted by a saturated vapor above its own liquid in a closed container. When quality control tests are performed on products the test temperature is usually 100°F and the vapor pressure is expressed as pounds per square inch (psig or psia). Vapor pressures reported on MSDS's are in millimeters of mercury (mm Hg) at 68°F (20°C), unless stated otherwise. Three facts are important to remember:

1. Vapor pressure of a substance at 100°F will always be higher than the vapor pressure of the substance at 68°F (20°C).

2. Vapor pressures reported on MSDS's in mm Hg are usually very low pressures; 760 mm Hg is equivalent to 14.7 pounds per square inch.

3. The lower the boiling point of a substance, the higher its vapor pressure.

Ventilation - See "General Exhaust," "Local Exhaust," and "Mechanical Ventilation."

4.4 Guide To Understanding MSDS's

This section provides information on understanding and interpreting the information contained in MSDS's. An example MSDS is shown and then analyzed section-by-section to aid in understanding of the MSDS's terms and contents. The Glossary of MSDS terms should be referred to if unfamiliar words are encountered. Note that there will be some variation between different MSDS preparers as to where certain information is included.

Material Safety Data Sheet
May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

Identity (As Used on Label and List)	**Note:** Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name	Emergency Telephone Number
Address (Number, Street, City, State, and ZIP Code)	Telephone Number for Information
	Date Prepared
	Signature of Preparer *(optional)*

Section II—Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s)	OSHA PEL	ACGIH TLV	Other Limits Recommended	% *(optional)*

Section III—Physical/Chemical Characteristics

Boiling Point		Specific Gravity (H_2O = 1)	
Vapor Pressure (mm Hg.)		Melting Point	
Vapor Density (AIR = 1)		Evaporation Rate (Butyl Acetate = 1)	

Solubility in Water

Appearance and Odor

Section IV—Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL

Extinguishing Media

Special Fire Fighting Procedures

Unusual Fire and Explosion Hazards

Section V—Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable		

Incompatibility *(Materials to Avoid)*

Hazardous Decomposition or Byproducts

Hazardous	May Occur		Conditions to Avoid
Polymerization	Will Not Occur		

Section VI—Health Hazard Data

Route(s) of Entry: Inhalation? Skin? Ingestion?

Health Hazards (Acute and Chronic)

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated?

Signs and Symptoms of Exposure

Medical Conditions Generally Aggravated by Exposure

Emergency and First Aid Procedures

Section VII—Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

Waste Disposal Method

Precautions to Be Taken in Handling and Storing

Other Precautions

Section VIII—Control Measures

Respiratory Protection (Specify Type)

Ventilation	Local Exhaust	Special
	Mechanical (General)	Other
Protective Gloves		Eye Protection

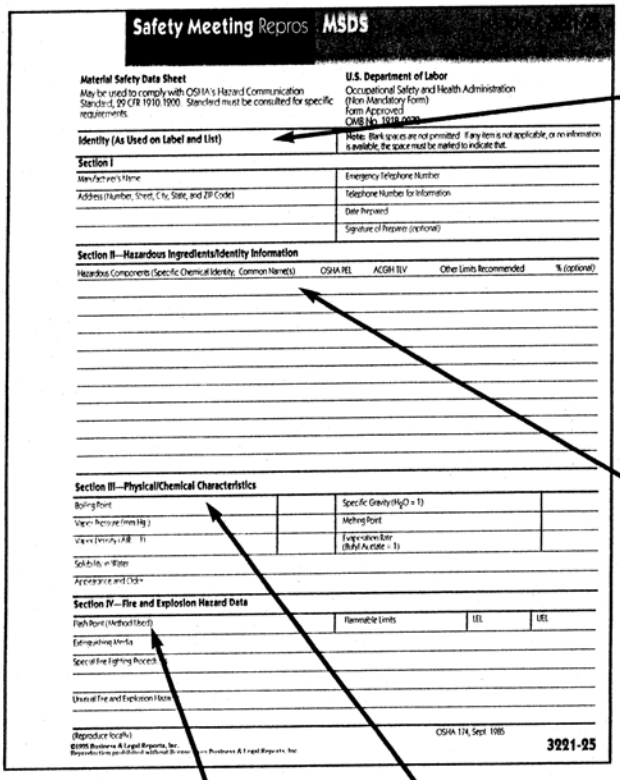
Other Protective Clothing or Equipment

Work/Hygienic Practices

U.S.G.P.O.: 1986-491-529/45775

Material Safety Data Sheets: Your Lifeline (Sections I-IV)

This hazard communication tool gives details on chemical and physical dangers, safety procedures, and emergency response procedures. Your employer must have one for every chemical and hazardous product in your workplace. It provides additional information which cannot easily be put on the label.


Safety Meeting Repros MSDS

Material Safety Data Sheet
May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

Identity (As Used on Label and List)

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I
Manufacturer's Name
Emergency Telephone Number
Address (Number, Street, City, State, and ZIP Code)
Telephone Number for Information
Date Prepared
Signature of Preparer (optional)

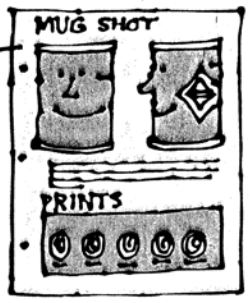
Section II—Hazardous Ingredients/Identity Information
Hazardous Components (Specific Chemical Identity; Common Name(s)) | OSHA PEL | ACGIH TLV | Other Limits Recommended | % (optional)

Section III—Physical/Chemical Characteristics
Boiling Point | Specific Gravity (H_2O = 1)
Vapor Pressure (mm Hg.) | Melting Point
Vapor Density (AIR = 1) | Evaporation Rate (Butyl Acetate = 1)
Solubility in Water
Appearance and Odor

Section IV—Fire and Explosion Hazard Data
Flash Point (Method Used) | Flammable Limits | LEL | UEL
Extinguishing Media
Special Fire Fighting Procedures
Unusual Fire and Explosion Hazards

(Reproduce locally)
OSHA 174, Sept. 1985
3221-25

The MSDS covers:



I. Identity. Manufacturer name and address and/or supplier's information, emergency phone number, and date prepared.

II. Hazardous ingredients. You'll find the substance's hazardous ingredients. Worker exposure limits to the chemical, such as the OSHA PEL, ACGIH TLV, and other recommended limits are also included.

The only time you won't find the specific ingredients of a chemical is when it's protected as a trade secret. But the MSDS will still tell you about its hazards and the safety measures required.

III. Physical and chemical characteristics.

- Boiling point
- Vapor pressure
- Vapor density
- Melting point
- Evaporation rate
- Water solubility
- Appearance and odor under normal conditions.

IV. Physical hazards such as fire and explosion—and ways to handle those hazards, such as fire fighting equipment and procedures.

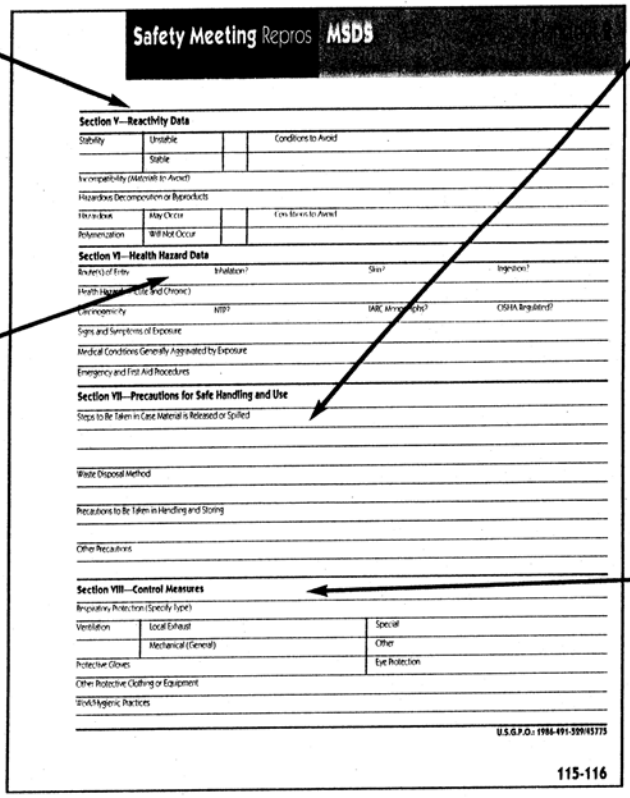
Material Safety Data Sheets: Your Lifeline (Sections V-VIII)

V. Reactivity tells you whether the substance is stable. You'll learn which other substances and situations to keep it away from to prevent reaction.

VI. Health hazards. This section will tell you how the chemical could enter the body, for instance:

- Inhaling
- Through the skin
- Swallowing

You'll also learn about all the possible health hazards that could come from exposure. If the chemical is believed to be a carcinogen, that will also be listed.



Health hazards also covers signs and symptoms of exposure, such as:

- Eye irritation
- Nausea
- Dizziness
- Skin rashes
- Headache
- Existing medical conditions that could be aggravated by exposure
- Plus emergency and first-aid procedures if an accident happens
- Any other precautions.

VII. Precautions for safe handling and use:

- What to do if the substance spills or leaks
- How to dispose of the substance
- Equipment and procedures needed for cleaning up spills and leaks.

Plus

- How to handle the substance properly
- How to store it
- Any other precautions

VIII. Control measures to reduce harmful exposure are listed in this section.

You'll find out what type of

- Respirator
- Gloves
- Eye protection
- Protective clothing
- Ventilation to use when handling the particular chemical.

Special work or hygiene practices that should be followed will also be included in Section VIII.

5.0 LABELING OF HAZARDOUS SUBSTANCES

5.1 Labeling Requirements

A. Review of the Key Requirements

Proper labeling is essential to the success of a hazard communication program. If a container is improperly labeled, or not labeled at all, employees will not be able to recognize the container as being hazardous. It could be mishandled, resulting in an accident.

Here is a matrix of labeling requirements and those who must follow them, for chemical manufacturers, importers, employers and distributors.

	Chemical Manfct	Import	Employ	Distr
(1) Label Contents	X	X		X
(2) DOT HMTA Label req.	X	X		X
(3) OSHA 1910.1000 et seq. req.	X	X		X
(4) Containers in workplace			X	
(5) Stationary process containers			X	
(6) Portable containers			X	
(7) Removing existing labels			X	
(8) English labels			X	
(9) Existing label compliance	X	X	X	X

Chemical manufacturers, importers and distributors must make sure hazardous chemical containers have the following information labeled, tagged or marked on them before being shipped:

*identity of hazardous chemical(s)
*appropriate hazard warnings
*name and address of chemical manufacturer, importer, distributor or responsible party.

Labeling and warning requirements found in chemical-specific OSHA regulations must be complied with, in addition to the requirements of the Standard. Appendix B has a list of OSHA regulated chemicals and the regulatory citation.

This labeling cannot interfere with or confuse the DOT-required labeling and placarding placed on the containers during transport.

1. Hazard Warning

The OSHA defines "hazard warning" as "any words, pictures, symbols or combination thereof appearing on a label or other appropriate form of warning which convey the hazards of the chemical(s) in the container(s)."

"Label" is defined as "any written, printed or graphic material displayed on or affixed to containers of hazardous materials."

The OSHA defines "container" as "any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank or the like that contains a hazardous chemical."

The OSHA does not consider pipes or piping systems to be containers under this law. Also excepted from labeling requirements are portable containers of hazardous chemicals for immediate use.

2. Check Labels on Incoming Containers

Employers should check incoming chemicals to make sure they are properly marked. If not, the shipper should be notified. Improper labeling is a hazard. If the labels on incoming containers present the required information, they do not have to be replaced.

3. Label Contents

Hazardous chemical containers used in the workplace, whether they are original or reusable, must be labeled, tagged or marked with the following information:

*identity of hazardous chemical(s) contained
*appropriate hazard warnings

Labels must be in English, but can be in other languages in addition to English.

B. Excluded Materials

The OSHA is not the only agency that requires labeling of chemicals. The Department of Transportation (DOT) also requires shippers of hazardous materials to label packages with special hazard warnings. Labels are also regulated by OSHA under the Hazard Communication Regulations.

Labels and other forms of warning:

1. Each hazardous chemical container leaving the workplace must be labeled, tagged or marked with: (i) the chemical's identity; (ii) appropriate hazard warning; and (iii) the name and address of the chemical manufacturer, importer or distributor.

2. Chemical manufacturers, importers and distributors must label, tag or mark every container of hazardous chemicals leaving the workplace.

3. If the chemical is regulated by a more specific OSHA standard, labels must conform to the requirements of that standard.

4. Containers of hazardous chemicals must be labeled, tagged or marked with: (i) the identity of the chemical(s) contained; and (ii) appropriate hazard warnings.

5. Signs, placards, process sheets, batch tickets, operating procedures or other such written materials may be used instead of labels as long as the alternative method provides the same information required by (4) above. These alternative materials must be readily accessible to employees in each work area during each work shift.

6. Labeling is not required on portable containers into which hazardous chemicals are transferred from labeled containers, when they are intended for the immediate use of the employee performing the transfer.

7. Labels must not be removed or defaced on incoming containers unless the required information is immediately re-affixed.

8. Labels must be legible, in English, and prominently displayed or readily available in the work area throughout each work shift.

9. New labels are not required as long as existing labels meet the requirements of this section.

Any substance that is covered either by definition or by reference must be properly labeled with a warning of known hazards. The label warning must contain information about all the hazards known to be associated with the substance. That is, not just the most common or most serious hazard must be described, but all of them. For some materials this will involve several hazards.

In general the only items of information required on the labels by this Standard are: (1) the identity of the material; (2) the hazard warnings; and (3) the name and address of a responsible party from whom additional information can be obtained if needed. However, OSHA has previously required (29 C.F.R. 1910.1001-1047) specific wording on the labels of certain specific materials. A list of those materials is given below. You should consult the indicated regulation for the actual text of the required wording.

Materials that require labeling under other laws but are exempted for Hazard Communication Regulations include:

*Pesticides regulated by the EPA under the Federal Insecticide, Fungicide and Rodenticide Act;

*Food, food or color additive, drug or cosmetic, or related materials regulated by the Food and Drug Administration under the Federal Food, Drug and Cosmetic Act;

*Distilled spirits, wine, or malt beverage intended for non-industrial use regulated by the Bureau of Alcohol, Tobacco and Firearms under the Federal Alcohol Administration Act;

*Consumer Products and hazardous substances regulated by the Consumer Products Safety Commission under the Federal Hazardous Substances Act.

C. Recommendations

Because labeling is so important to the success of the Hazard Communication Program, you should consider ways to assure its effectiveness in your facility.

Substances For Which OSHA Requires Specific Wording On Labels

---

2-Acetylaminoflourene	4-Dimethylaminoazobenzene
Acrylonitrile	Ethyleneimine
4-Aminodiphenyl	Inorganic arsenic
Asbestos	alpha-Naphthylamine
Benzidine	beta-Naphthylamine
bis-Chloromethyl ether	4-Nitrosodimethylamine
1,2-Dibromo-3-chloropropane	beta-Propiolactone
3,3'-Dichlorobenzindine	Vinyl Chloride

---

29 C.F.R. 1910.1001-1047

5.2 Language

The labels must be in English, but if there are a significant number of workers who do not read or speak English well, it may be desirable to add a second label with the required information translated into the appropriate language. This may actually be required in some geographical areas.

The statements on the label should be worded as simply as possible. A hazard warning label must be interpreted easily and quickly, without having to read excessive material to get needed information. Thus the wording should be simple and practical and it should be aimed at avoiding hazards that might reasonably be expected to be a problem if handling, storage and use are improper or are accidentally disrupted.

Because much of the American adult population can only read at the eighth grade level and many other adults are either illiterate or functionally illiterate, hazard warning labels should use as few polysyllabic, pedantic words as possible. Avoid such statements as "wash the affected area with copious amounts of water." Many people don't know the meaning of "copious," and even if they did there is still a question of just how much is copious. It is better to say "wash off the material with running water for at least thirty minutes." This language is both plainer and more definite as to what to do. Lawsuits have been settled on the basis of whether the "copious amounts" phrases provided definite enough information to the non-chemist.

5.3 Designs

For quick reference, it is appropriate to use a pictorial representation of hazards, both for protection of those workers who cannot read well and for the convenience of everyone. A graphic symbol that can be understood at a glance is more effective than the simplest sentence that gives the same information.

A suitable form of graphic symbol is the type that is specified as part of the DOT labels and placards used for shipment of hazardous materials. They have the advantage that they correspond to shipping labels already familiar to industrial personnel, and for the most part require no special training to interpret their meaning. Pictorial symbols can also be used to indicate recommended protective equipment, such as gloves or goggles.

5.4 Hazard Class Definitions

The Department of Transportation (DOT) has established the following hazardous materials classes (49 CFR 173.2). When a hazardous material is to be shipped, it must be labeled and the transportation vehicle placarded, with the appropriate hazard class.

HAZARD CLASS	DEFINITION
EXPLOSIVES 1	Any explosive that has a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.
EXPLOSIVES 2	Any explosive that has a projection hazard but not a mass explosion hazard.
EXPLOSIVES 3	Any explosive that is a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.
EXPLOSIVES 4	Any explosive that presents a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.
VERY INSENSITIVE EXPLOSIVES	Any substance which has a mass explosion hazard but is so insensitive that there is very little probably of initiation or of transition from burning to detonation under normal conditions of transport.
EXTREMELY INSENSITIVE DETONATING SUBSTANCES	Any substance which does not have a mass explosion hazard and is so extremely insensitive it demonstrates a negligible probability of accidental initiation or propagation.

HAZARD CLASS	DEFINITION
FLAMMABLE GAS	Any material which is a gas at 20 °C (68 °F) or less at 101.3 kPa (14.7 psia) of pressure (a material which has a boiling point of 20 °C (68 °F) at 101.3 kPa (14.7 psia)) which: 1. Is ignitable at 101.3 kPa (14.7 psia) when in a mixture of 13 percent or less by volume with air; or 2. Has a flammable range at 101.3 kPa (14.7 psia) with air of at least 12 percent regardless of the lower limit.
NON-FLAMMABLE COMPRESSED GAS (Includes liquefied gas, pressurized cryogenic gas, compressed gas in solution, asphyxiant gas and oxidizing gas)	Any material (or mixture) which: 1. Exerts in the packaging an absolute pressure of 280 kPa (40.6 psia) or greater at 20 °C (68 °F) and; 2. Does not meet the definition for flammable gas or poisonous gas.
POISONOUS GAS	Any material which is a gas at 20 °C (68 °F) or less and a pressure of 101.3 kPa (14.7 psia) (a material which has a boiling point of 20 °C (68 °F) at 101.3 kPa (14.7 psia)) which: 1. Is known to be so toxic to humans as to pose a hazard to health during transportation; or 2. In the absence of adequate data on human toxicity, is presumed to be toxic to humans because when tested on laboratory animals it has an LC_{50} value of not more than 5000 mL/m^3.

HAZARD CLASS	DEFINITION
FLAMMABLE AND COMBUSTIBLE LIQUID	Any liquid having a flash point of not more than 60.5 °C (141 °F), or any material in a liquid phase with a flash point at or above 37.8 °C (100 °F) that is intentionally heated and offered for transportation or transported at or above its flash point in a bulk packaging is a flammable liquid. Any liquid that does not meet the definition of any other hazard class and has a flash point above 60.5 °C (141 °F) and below 93 °C (200 °F) is a combustible liquid.
FLAMMABLE SOLID	Any of the following three types of material: 1. Desensitized explosives that: a. When dry are Explosives of Class 1 other than those of compatibility group A, which are wetted with sufficient water, alcohol, or plasticizer to suppress explosive properties; and b. Are specifically authorized by name either in the regulations or have been assigned a shipping name and hazard class. 2. Self-reactive materials that are thermally unstable and that can undergo a strongly exothermic decomposition even without participation of oxygen. 3. Readily combustible solids that: a. Are solids which may cause a fire through friction such as matches; b. Show a burning rate faster than 2.2 mm (0.087 inches) per second when tested in accordance with UN manual of Test and Criteria; or c. Any metal powders that can be ignited and react over the whole length of a sample in 10 minutes or less, when tested in accordance with UN manual of Test and Criteria.

HAZARD CLASS	DEFINITION
SPONTANEOUSLY COMBUSTIBLE MATERIAL	Any material that is: 1. A pyrophoric material. A pyrophoric material is a liquid or solid that, even in small quantities and without an external ignition source, can ignite within five (5) minutes after coming in contact with air when tested according to UN Manual of Tests and Criteria. 2. A self-heating material. A self-heating material is a material that, when in contact with air and without an energy supply, is liable to self-heat. A material of this type which exhibits spontaneous ignition or if the temperature of the sample exceeds 200 °C (392 °F) during the 24-hour test period when tested in accordance with UN Manual of Tests and Criteria, is classed as spontaneously combustible material.
DANGEROUS WHEN WET MATERIAL	A material that, by contact with water, is liable to become spontaneously flammable or to give off flammable or toxic gas at a rate greater than 1 L per kilogram of the material, per hour, when tested in accordance with UN Manual of Tests and Criteria.
OXIDIZER	Any material that may, generally by yielding oxygen, cause or enhance the combustion of other materials.
ORGANIC PEROXIDE	Any organic compound containing oxygen (O) in the bivalent -0-0 structure and which may be considered a derivative of hydrogen peroxide, where one or more of the hydrogen atoms have been replaced by organic radicals.

HAZARD CLASS	DEFINITION
POISONOUS MATERIALS	A material, other than a gas, which is known to be so toxic to humans as to afford a hazard to health during transportation, or which, in the absence of adequate data on human toxicity: 1. Is presumed to be toxic to humans because it falls within any one of the following categories when tested on laboratory animals (whenever possible, animal test data that has been reported in the chemical literature should be used): a. Oral Toxicity. A liquid with an LD_{50} for acute oral toxicity of not more than 500 mg/kg or a solid with an LD_{50} for acute oral toxicity of not more than 200 mg/kg. b. Dermal Toxicity. A material with an LD_{50} for acute dermal toxicity of not more than 1000 mg/kg. c. Inhalation Toxicity. (1) A dust or mist with an LC_{50} for acute toxicity on inhalation of not more than 10 mg/L; or (2) A material with a saturated vapor concentration in air at 20 °C (68 °F) greater than or equal to one-fifth of the LC_{50} for acute toxicity on inhalation of vapors and with an LC_{50} for acute toxicity on inhalation of vapors of not more than 5000 mL/mm^3; or 2. Is an irritating material, with properties similar to tear gas, which causes extreme irritation, especially in confined spaces.
INFECTIOUS SUBSTANCE (ETIOLOGIC AGENT)	An infectious substance means a viable microorganism, or its toxin, that causes or may cause disease in humans or animals, and includes those agents listed in the regulations and any other agent that causes or may cause severe, disabling or fatal disease. The terms infectious substance and etiologic agent are synonymous.

HAZARD CLASS	DEFINITION
RADIOACTIVE MATERIAL	Any material that spontaneously emits ionizing radiation and having specific activity greater than 70 Bq per gram (0.002 microcuries per gram).
CORROSIVE MATERIAL	Any liquid or solid that causes full thickness destruction of human skin at the site of contact within a specified period of time, or a liquid that has a severe corrosion rate on steel or aluminum based on the criteria in 49 CFR 173.137(c)(2).
MISCELLANEOUS HAZARDOUS MATERIAL	A material which presents a hazard during transportation but which does not meet the definition of any other hazard class. This class includes: 1. Any material which has an anesthetic, noxious or other similar property which could cause extreme annoyance or discomfort to a flight crew members so as to prevent the correct performance of assigned duties; or 2. Any material that meets the definition in 49 CFR 171.8 for an elevated temperature material, a hazardous substance, a hazardous waste, or a marine pollutant.
OTHER REGULATED MATERIAL: ORM-D	A material such as a consumer commodity, which, although otherwise subject to the regulations, presents a limited hazard during transportation due to its form, quantity and packaging. It must be a material for which exceptions are provided for in the regulations.

5.5 Hazardous Materials Warning Labels

This section provides information on understanding and interpreting the information contained on labels. Examples of three different kinds of labels are shown and explanations are given of the information that is provided.

Labels Tell Lots

A Label Tells You . . .

The identity of the chemical— the common name, chemical name, or product name.

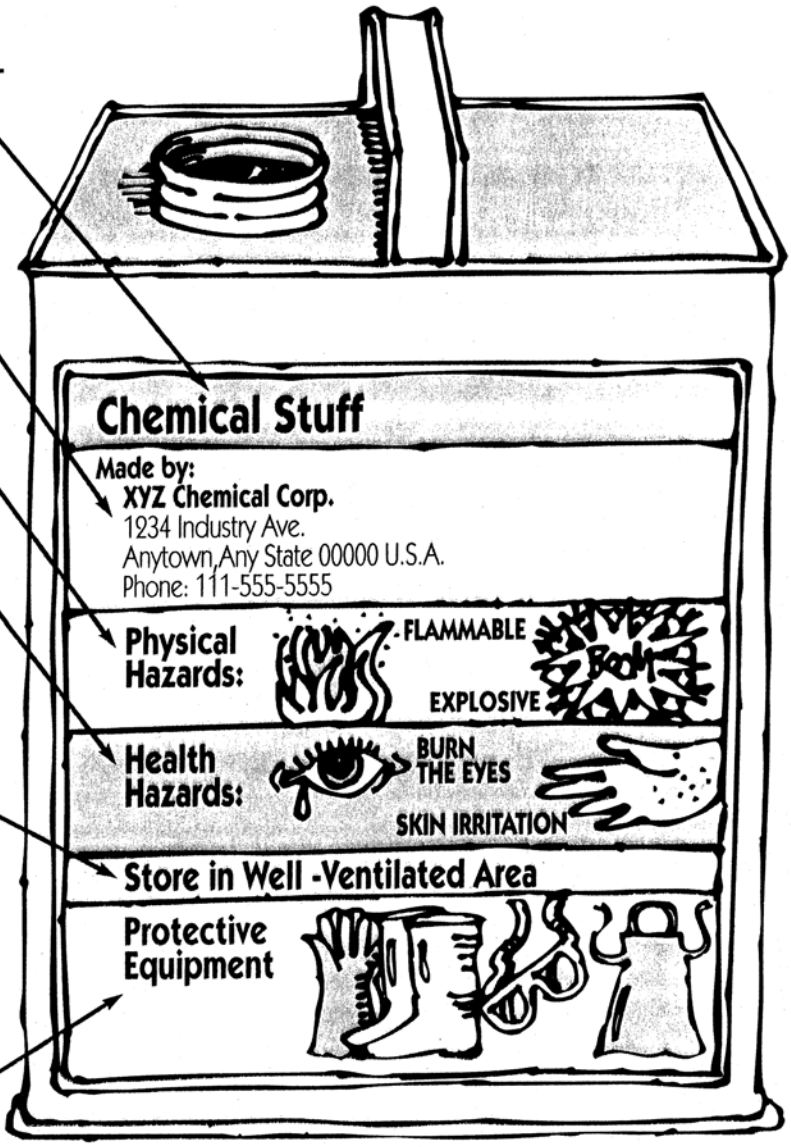
The name and address of the company that manufactured or imported the chemical.

The chemical's physical hazards. That's what could happen if you don't handle it properly. Is it flammable or combustible? explosive? Is it reactive?

The chemical's health hazards. These are the possible health problems that could result from overexposure. Is it toxic? an irritant? Could it cause cancer?

Although not required by OSHA, some labels also include important information such as storage and handling instructions. This could include information like "Use only in well-ventilated areas," or "Store in tightly closed containers."

Although OSHA doesn't require it, some labels list basic protective clothing, equipment, and procedures that should be used to work safely with the chemical. Here, you might be told, "Avoid contact with skin," or "Use eye protection," etc.

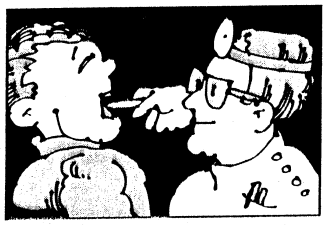


Color/Number Labels

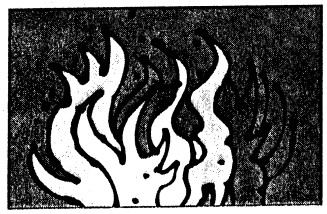
Two commonly used systems with numbers and colors on labels are the NFPA (National Fire Protection Association) system and the color-bar system.

Colors Show Type of Hazard

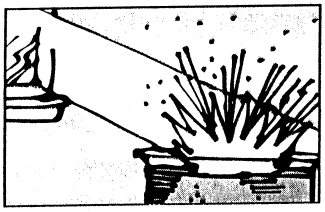
In both systems, each color on the label stands for a different type of hazard:



● **Blue =** health hazard



● **Red =** fire hazard



● **Yellow =** reactive hazard

● **White =** special hazard (NFPA) or protective equipment required (color bar)

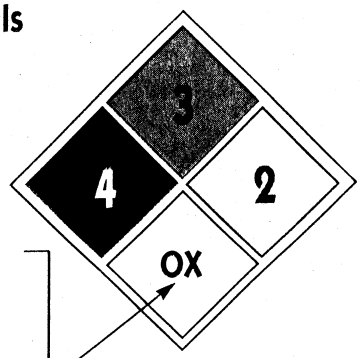
Numbers Show Degree of Hazard

Both the NFPA and the color-bar systems also use numbers from 0 to 4 to show the degree of hazard in an uncontrolled situation.

0=Minimum hazard
1=Slight hazard
2=Moderate hazard
3=Serious hazard
4=Severe hazard

Example: A label with a 4 in its red section means a high degree of fire risk, if you don't handle the chemical correctly.

NFPA-type Labels



White=Specific Hazard
OX = Oxidizer
ACID = Acid
ALK = Alkali
COR = Corrosive
W = Use no water
= Radioactive

Label Colors

Blue
Red
Yellow
White

Color Bar-Type Labels

White= Personal Protection

② HEALTH
③ FLAMMABILITY
① REACTIVITY
Ⓐ PROTECTIVE EQUIPMENT

The letter that appears in the white bar is keyed to specific personal protective gear.

For example:

A =
B =
C =
D-Z = etc.

Note: Reactivity numbers refer to the measure of stability and the danger of reactivity with air or water.

6.0 RESOURCES

CAL/OSHA CONSULTATION SERVICE can assist employers and manufacturers who have questions about their responsibilities under the Hazardous Substances Information and Training Act, the Hazard Communication Standard and other related CAL/OSHA Standards.

Information .....Toll Free (800) 652-1476

HEADQUARTERS

San Francisco .....(415) 557-2870

AREA OFFICE

Fresno.....(559) 454-1295
1901 N. Gateway Blvd. 93727

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH. Workers who have questions about their rights under the Hazardous Substances Information and Training Act, the Hazard Communication Standard and other related CAL/OSHA Standards can contact CAL/OSHA'S RIGHT TO KNOW UNIT at (415) 540-3037 or CAL/OSHA'S EMPLOYEE EDUCATION UNIT at (415) 557-2037.

Workers who want to make a complaint alleging failure of an employer to abide by the provisions of this law, can contact any office of the Division of Occupational Safety and Health.

DISTRICT OFFICE

Fresno	2550 Mariposa St. 93721	(559) 445-5302

CAL/OSHA'S RIGHT TO KNOW UNIT. Manufacturers and employers who have questions about the Hazardous Substances Information and Training Act, the Hazard Communication Standard and other related CAL/OSHA Standards can contact the RIGHT TO KNOW UNIT for information and assistance.

Berkeley	1625 Shattuck Ave. 94709	(415) 540-3030