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MANUFACTURING CHEMISTS' ASSOCIATION, INC.

1825 CONNECTICUT AVENUE, N. W.

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GUIDE TO PRECAUTIONARY LABELII OF HAZARDOUS CHEMICALS



MANUAL L-1

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The information, recommendations, and illustrative labels contained in Manual L-1 have been compiled from sources believed to be reliable and to represent the best current opinion on the subject. No warranty, guarantee, or representation is made by the Association as to the absolute correctness or sufficiency of any information, recommendation, or illustrative labels herein, and the Manufacturing Chemists' Association, Inc. assumes no responsibility in connection therewith; nor can it be assumed that all necessary warnings and precautionary measures are contained in this Guide, or that other or additional measures may not be required under particular or exceptional conditions or circumstances.

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MCA PRECAUTIONARY LABELING ACTIVITY

A Review

Accidental experience and willful experiment led man early to recognize the hazards which typify some substances. In 1450, Scotland enacted one of the first statutes governing product hazard. The Court Apothecary there ruled "that all persons are forbidden under the pain of treason to bring house poisons for any use by which Christian man or woman can take harm." From such beginnings came today's laws and regulations covering the identification of hazardous substances.

One of the earliest United States statutes in the chemical field was the Federal Caustic Poison Act (1927). It covered twelve caustic or corrosive substances in certain concentrations, in containers "suitable for household use." Interpretation and enforcement was by the Food and Drug Administration. In its simplest terms, packages of the specified materials were required by law to carry labels containing the word "POISON" in particular type size along with an "antidote" statement.

The year 1932 saw the introduction into Congress of a Volatile Poisons Bill. A first draft contained a general definition of hazardous materials. A subsequent one followed the earlier plan of listing specific chemicals. The second draft authorized the Surgeon General to enlarge the list after investigation. While these bills did not become law, they marked a sharp acceleration in the evolution of precautionary labeling and its recognition by statutory requirement in the United States. With this same renewed awareness of responsibility by producers and by industry groups such as the Manufacturing Chemists' Association, Inc.

From such group activity came the Chemical Products Agreement Committee appointed by the Surgeon General. The work of this group evolved the voluntary "Surgeon General's Agreements" entered into by the U.S. chemical industry in 1933-35. The texts of the precautionary labels to be used on specific products were agreed upon and made a part of executed agreements. These continued in effect and were honored by industry until 1952. The Surgeon General then agreed to their replacement by broader and more widely applicable practices formulated through the continued work of MCA and its Labels and Precautionary Information Committee.

The Manufacturing Chemists' Association, Inc., and its members, had early recognized the place of precautionary labeling in relations both with its customers and with state and federal governments. There were

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PRECAUTIONARY LABELING OF HAZARDOUS CHEMICALS

Introduction

Many products present no hazard in normal handling and storage. For these products, no precautionary statements are necessary on the label. The development of new chemical products and the introduction of chemical processes into ever-widening fields, have accentuated the need for form-fitting appropriate information in those cases where there are hazards requiring special precautions. Precautionary information should, so far as is practicable, reach every person using, handling, or storing hazardous substances.

The most practical means of disseminating this information appears to be by precautionary labels, affixed to containers of hazardous substances, bearing appropriate precautionary statements expressed as simply and briefly as possible. Such label information, however, cannot take the place of the education of personnel regarding product hazards and the use of safety clothing and equipment. This education is, and must remain, the direct responsibility of their employers. The wording on precautionary labels cannot be expected to cover complete information as to the properties of a material nor the complete details of its proper handling under all conditions. Such information may be found in the producers' technical bulletins or in the Manufacturing Chemists' Association's Chemical Safety Data Sheets.

To achieve uniform and adequate labeling of hazardous substances, the Labels and Precautionary Information of the MCA's Committee of the Manufacturing Chemists' Association, Inc. (MCA) offers Manual L-1

numerous strong reasons for taking the initiative in this phase of chemical marketing. The industry had an outstanding safety record in its manufacturing units. The Association believed this safety record could be projected to the plants and homes of its customers to their mutual benefit. There was always the shadow of litigation that faces any producer as the result of real or fancied injury by a product. Chemical manufacturers had already seen the possible alternative of federal and state legislation which might or might not be wisely framed. MCA chose the path of self-correction. In 1944 it convened a conference on a chemical precautionary labeling code. Attended by over ninety member representatives, it resulted in the formation of the Labels and Precautionary Information Committee of the Association. This committee continues as the group longest active in this endeavor. One of its earliest concerns was the compilation of a manual on precautionary labeling practices for chemicals. First issued in March 1945, Manual L-1 of the MCA LAPI Committee has become a widely recognized text on this subject.

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as a guide in preparing precautionary label texts. Part I sets forth general principles. Part II presents precautionary texts selected to illustrate the application of these principles to the major types of hazards encountered. Part III presents precautionary texts illustrating the labeling of a group of substances used in the pesticide (economic poisons) field.

The labeling of radioactive materials is a complex problem outside the scope of this Guide. In preparing precautionary labels for such materials, it is suggested that reference be made to the series of handbooks published by the United States Department of Commerce, National Bureau of Standards, covering the safe handling of radioactive materials.

The Surgeon General of the United States Public Health Service has discontinued the labeling agreements entered into some years ago with the manufacturers of a few specific chemicals. This was done because today adequate precautionary labels are in general use by the producers. The United States Public Health Service has approved the principles of precautionary labeling developed by MCA and continues its interest in this field in cooperation with the Association. It is felt that cooperation on the present broad basis will best serve the purpose intended where the earlier more specific agreements were made.

This Guide will be found extremely useful in the preparation of precautionary text for any hazardous chemical even though the *General Principles* and illustrative texts were designed originally for hazardous chemicals intended for industrial users. The precautionary texts as presented in this Guide should be used in addition to, or in combination with any specific wording required by law. Since individual statutes, regulations, or ordinances may require that particular information be included in a label, that certain information be displayed in a particular manner, or that a specific label be affixed to a container, the use of the *General Principles* or the illustrative texts in this Guide will not necessarily insure compliance with such laws. The specific requirements of each such law and regulations issued thereunder must be observed in order to insure compliance. Such laws include the Federal Hazardous Substances Labeling Act and similar state and municipal legislation; the Federal Insecticide, Fungicide, and Rodenticide Act and similar state legislation; Interstate Commerce Commission Regulations for Transportation of Explosives and Other Dangerous Articles; and others.

DEFINITIONS

Laws making precautionary labeling mandatory mark the evolution of labeling from its earliest beginnings. Complementary to the development of such codes has been the definition of terms used in specifying such labeling. This part of the development has received extensive study by the MCA Labels and Precautionary Information Committee. This has resulted in the following definitions encompassing the modes in which substances are hazardous and the types of materials which exhibit such behavior.

Combustible Liquid—Any liquid which gives off flammable vapors above 200°F. to and including 150°F. as determined by flash point with Tagliabue's Open-Cup Method as used for testing of burning oils.

Corrosive (Physiological)—A substance which in contact with living tissue causes destruction of the tissue by chemical action. This term shall not refer to action on inanimate surfaces.

Dust—Solid particles generated by handling, crushing, grinding, rapid impact, detonation, or decomposition of organic or inorganic materials such as rock, ore, metal, coal, wood, grain, etc. Dusts do not diffuse in air but settle under the influence of gravity.

Economic Poison (Pesticide)—(1) Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, weeds, or other forms of plant or animal life or viruses, except viruses on or in living man or other animals, and (2) any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant.

Extremely Flammable Liquid—Any liquid which gives off flammable vapors at or below a temperature of 20°F., as determined by flash point with Tagliabue's Open-Cup Method as used for testing of burning oils.

Flammable Liquid—Any liquid which gives off flammable vapors above 20°F. to and including 150°F. as determined by flash point with Tagliabue's Open-Cup Method as used for testing of burning oils.

Fume—Solid particles generated by condensation from the gaseous state, generally after volatilization from molten metals, etc., and often accompanied by a chemical reaction such as oxidation. Fumes flocculate and sometimes coalesce.

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rabbits tested in a dosage of 200 milligrams or less per kilogram of body weight, when administered by continuous contact with the bare skin for 24 hours or less.

If available data on human experience with any substance in the above-named concentrations indicate results different from those obtained on animals, the human data shall take precedence in any classification of a substance as poisonous.

Sensitizer—A substance which will cause no normal living tissue through an allergic or photodynamic process a hypersensitivity which becomes evident on reapplication of the same substance.

Toxic Substance—A substance which has the inherent capacity to produce personal injury or illness to man through ingestion, inhalation, or absorption through any body surface.

Vapor—The gaseous form of a substance which is normally in the solid or liquid state. A vapor diffuses.

Gas—A normally formless fluid which occupies the space of enclosure and which can be changed to the liquid or solid state by the effect of increased pressure or decreased temperature or both. A gas diffuses.

Hazardous Substance—Any substance or mixture of substances which is (1) toxic; (2) corrosive; (3) an irritant; (4) a strong sensitizer; (5) flammable or which (6) generates pressure through decomposition, heat, or other means, if such substance or mixture of substances may cause substantial personal injury or substantial illness during or as a direct result of any customary or reasonably anticipated handling or use.

Irritant (Physiological)—Any substance which on immediate, prolonged, or repeated contact with normal living tissue will induce a local inflammatory reaction.

Mist—Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming, or atomizing.

Mixture—A physical commingling of two or more substances which may or may not bear a fixed proportion to one another and which have not reacted chemically with one another.

Oxidizing Material—A substance that yields oxygen readily to stimulate the combustion of organic matter.

Pesticide—[same as Economic Poison]

Poison—Any substance or mixture of substances which falls within any of the following categories:

(1) Produces death within 14 days in half or more than half of a group of 10 or more laboratory white rats each weighing between 200 and 300 grams, at a single dose of 50 milligrams or less per kilogram of body weight, when orally administered; or (2) produces death within 14 days in half or more than half of a group of 10 or more laboratory white rats each weighing between 200 and 300 grams, when inhaled continuously for a period of one hour or less at an atmospheric concentration of 200 parts per million or less by volume of gas or vapor or 2 milligrams or less per liter of mist, fume or dust, provided such concentration is likely to be encountered by man when the substance is used in any reasonable foreseeable manner; or (3) produces death within 14 days in half or more than half of a group of 10 or more

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PART I

Preparation of Precautionary Labels

General Principles

The following *General Principles* serve as a guide in the preparation of precautionary labels for hazardous substances.

(1) Each hazardous substance presents a distinct problem and must be treated individually in the light of its own characteristics. Conclusions regarding the hazards of a product cannot safely be drawn either from the properties of the materials from which it is formed or by analogies based upon chemical structure.

Mixtures of two or more chemicals may have properties that vary in kind or degree from those of the individual components. Any precautionary label for mixtures should be based on the properties of the finished product.

Impurities may contribute hazardous properties and should not be overlooked.

(2) All statements on precautionary labels should be brief, accurate, and expressed in simple, easily understood terms.

(3) Precautionary labeling should be used only when and to the extent necessary. The language should be practical, and based alone upon the inherent properties of a product, but directed toward the avoidance of hazards resulting from such use, handling, and storage as may reasonably be anticipated. The use of precautionary labels for relatively harmless products, or the use of unnecessary words, will develop a disregard for labels and defeat their purpose as surely as will failure to give adequate notice of hazards.

(4) the labels for different products, uniformity in language to indicate the same hazards and same degree of hazard is most desirable in order to gain greater understanding through standardization.

(5) The following subject matter should be considered for inclusion on a precautionary label:

A. Name of Product.

B. Signal Word designating degree of hazard—DANGER!, WARNING!, or CAUTION!

C. Affirmative Statement of Hazards.

D. Precautionary Measures covering actions to be followed or avoided.

E. Instructions in Case of Contact or Exposure, where advisable. (Note: Under some laws antidotes or first aid procedure are required when the word "POISON" is used.)

Instructions for the handling and storage of containers should also be considered for inclusion on the label. This is information relating to characteristics of the container as well as those of its contents, and is discussed separately under Container Handling and Storage on Page 24. "

(6) The inclusion of the word "POISON" and the skull and crossbones on a label should be limited to those cases where the product is a poison according to the definition appearing on Page 10, or where such use is prescribed by law. When used, this legend should be in addition to the other label warnings and should not take the place of the Signal Words DANGER!, WARNING!, and CAUTION! which are designed to show the relative degree of hazard.

(7) A non-descriptive trade designation or trade name should not be used as the only identification of a hazardous substance. If the complete chemical name is not shown, the label should clearly state the type of chemical, e.g., "corrosive acid", "lead compound".

(8) Precautionary statements should be grouped together in a prominent location on the label and should be printed in easily legible type which is in contrast by typography, layout, or color with other printed matter on the label. The label should be affixed firmly to and in a conspicuous place on the container.

Preparation of Labels

In the preparation of a precautionary label, the compilation of all available relevant information on the product is a necessary first step. An adequate knowledge of the toxicity of the material (obtained from the literature or through laboratory tests and data on physical and chemical properties, packaging, and methods of handling and use of the product) are needed to make possible a description of the hazards. In the case of an established product advantage should be taken of the experience of people involved in manufacturing, shipping, and using

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the material. All the *General Principles* should be kept in mind and the following information considered for inclusion on the label:

A. Name of Product This is important information for the safety of handlers and users. It is preferable that the chemical name of the product be used. The recommendations of the American Chemical Society for nomenclature should be followed. Trade names may be used in addition to chemical names. A non-descriptive code designation or trade name should not be used as the only identification of a hazardous chemical. If the complete chemical name is not shown, the label should at least clearly state the type of chemical, e.g., "corrosive acid", "lead compounds".

B. Signal Word This word is intended to draw attention to the presence of hazard, and to indicate the degree of severity. The Signal Words recommended are, in the order of diminishing severity of hazard:

(1) DANGER!
(2) WARNING!
(3) CAUTION!

Degrees of severity can be expressed only in relative terms. "DANGER!" is the strongest of the three words and should be used for those products presenting the most serious hazards. "CAUTION!" is recommended for those compounds presenting the least serious hazards. "WARNING!" is intermediate between "DANGER!" and "CAUTION!" Reference to the illustrative labels in Part II of this Guide will help in the selection of the proper Signal Word.

C. Statement of Hazards This statement should give notice of the hazards that are present in connection with the customary or reasonably anticipated handling or use of the product. Examples are:

CAUSES BURNS
VAPOR EXTREMELY HAZARDOUS

Many chemicals will present more than one type of hazard, in which case appropriate statements for each significant type should be included on the label. In general, the most serious hazard should be stated first.

While one component may be hazardous if improperly used, it is impractical to cover every possible contingency on a label. Efforts should be directed toward giving notice of the significant hazards. A minor hazard may frequently be controlled easily and briefly by an appropriate precautionary statement alone. In some cases, the total hazard of a product, while justifying one or more Precautionary Measures, may be of such order as to require the Statement of Hazard on the label.

D. Precautionary Measures These instructions are intended to supplement the Statement of Hazards in setting forth briefly measures to be taken to avoid injury or damage from stated hazards.

Examples are:

Keep away from heat, sparks, and open flame.
Avoid breathing dust.

Precautionary Measures may be included for hazards not considered of sufficient importance to require mention in the Statement of Hazards.

Statements similar to: **"Do not take internally."** deserve special attention. They are seldom necessary where the Precautionary Measure to be followed is obvious as, for example, when the product is labeled **"POISON"** or the Statement of Hazards contains the words, **"MAY BE FATAL IF SWALLOWED"**. On the other hand, the instruction may be desirable if the name appearing on the label identifies the chemical or the chemical is one which is being taken in health through accident or mistaken identity.

E. Instructions in Case of Contact or Exposure The primary purpose of precautionary labeling is to prevent injury or damage. However, instructions in Case of Contact or Exposure may be included in those instances where the results of contact or exposure are severe and immediate treatment is highly desirable, and where simple remedial measures may be taken safely by unprejudiced personnel before medical assistance is available.

Instructions should be limited to recognized first aid procedures based on simple methods and commonly available materials. Instructions for strictly medical treatment should be omitted except when specific aids required by law or industrial or special circumstances.

Because of the serious and lasting effects that may result from eye injuries, a recommendation to get medical attention should accompany any specific instructions directed to treatment of the eyes.

In certain instances, simple remedial measures such as washing, or removal of clothing, may be included where they will serve to avoid serious injury, following contact or exposure.

All precautionary information should appear on the label as a unit and should be printed on the same general plane. The labels in Part II and III illustrate suitable arrangements and indicate the relative promi-

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sense that should be given to the individual statements. Such relative prominence may be achieved in a number of ways such as by variation in type size, color, or layout of the printed material.

Note: Some state laws and regulations require, on labels, the use of special or strictly defined antidotes or prescribe special ways in which there must be shown for certain hazardous substances. The requirements for any given poison may, therefore, vary greatly, and the responsibility of choosing, in the illustrative labels, antidotes which might be nationally acceptable has led to the practice of indicating only the need for an appropriate first aid or antidote statement where the "POISON-shall send crossbones" legend is used.

Table I, on Pages 20 and 21, is intended as a guide in the selection of precautionary statements for labels. Listed are classifications of materials according to the hazardous properties most frequently encountered. Opposite each classification are given Statements of Hazard, Precautionary Measures and, in most cases, Instructions in Case of Contact or Exposure. It is important to recognize that hazardous substances can have inherent in them more than one of such hazardous properties, and that the label wording for such products should include an appropriate combination of the pertinent statements.

As each hazardous substance must be treated individually in the light of its own characteristics and customary or reasonably anticipated handling or use, there will be many instances in which the illustrative statements in Table I will not be applicable, either because they do not accurately express the degree of hazard or because they fail to cover the particular characteristics. In such cases, suitable statements should be chosen to fit the situation. The illustrative labels in Part II of this Guide may be helpful in the choice of appropriate wording.

EXAMPLE OF LABEL PREPARATION

To give as complete an illustration as possible of the procedure to be used in writing a precautionary label, Ethylene Chlorohydrin has been selected. A study of available physical, chemical, and toxicological data shows that this chemical presents several hazards for consideration. It is a poison, as defined in this Guide, by skin absorption and is dangerously toxic by oral ingestion and by vapor inhalation. On contact it can cause serious damage to the eyes. There is a hazard of combustibility since the flashpoint of the liquid is 140 F., which is within the range of combustibility in Class of Hazard I-C in Table I. A special hazard of Ethylene Chlorohydrin is its ability to penetrate ordinary rubber.

The selection of the "Signal Word" depends on the seriousness of the hazards and to a lesser extent on the number of hazards. In the case of Ethylene Chlorohydrin, both major hazards—its toxicity and its action on the eyes—are serious and acute. Therefore, the Signal Word "DANGER" is indicated.

Since ethylene chlorohydrin is dangerous by any type of contact with the body, strong Statements of Hazard should be used, so far as possible, hazards should be listed in the order of decreasing importance. Thus, from Table I, Classes of Hazard III, IV, and V, appropriate Statements of Hazard are selected to describe the various hazards.

From III:

VAPOR EXTREMELY HAZARDOUS
VAPOR MAY BE FATAL IF INHALED

From IV:

EXTREMELY HAZARDOUS LIQUID
ABSORBED THROUGH SKIN

From V:

MAY BE FATAL IF SWALLOWED

For brevity and better emphasis, the above statements are combined and rearranged:

EXTREMELY HAZARDOUS LIQUID AND VAPOR
MAY BE FATAL IF SWALLOWED, INHALED, OR
ABSORBED THROUGH SKIN

For the major hazard of eye damage, the appropriate Statement of Hazard as selected from Table I, Class of Hazard VII, is modified to:

CAUSES BURNS TO EYES

The Statement of Hazard "COMBUSTIBLE" is not necessary to be given as required by Law, since the Precautionary Measure, "Keep away from heat and open flame," is considered adequate.

Since ordinary rubber protective clothing, including gloves, will not eliminate the hazard of skin absorption, a special Precautionary Statement to this effect should be prepared and included.

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Statements of Precautionary Measures are selected from Table I, Column 3, Classes of Hazard I, III, VII, IX and X.

From I:
Keep away from heat and open flame.

From III:
Do not breathe vapor.
Use only with adequate ventilation.

From VII:
Do not get in eyes, on skin, on clothing.

From IX:
Do not get in eyes, on skin, on clothing.

From X:
Do not take internally.

Special Precautionary Statement to cover special hazard of material:
Ordinary rubber protective clothing, including gloves, will not prevent skin absorption.

Instructions in Case of Contact or Exposure are selected from Table I, Column 4, Class of Hazard IX:

From IX:
In case of contact, immediately remove all contaminated clothing and flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash clothing before re-use.

Directions to a person in absorption into the body by skin contact therefore the "POISON-skull and crossbones" legend is used, followed by first aid instructions:

POISON

Call A Physician

First Aid

If swallowed: If conscious, make patient vomit immediately by putting finger down throat or by giving warm mustard water or salt water freely.

General: Keep patient warm; if conscious, give black coffee.

Note to Physician: Do not give adrenalin.

Thus, the completed precautionary label, combining and rearranging selected material according to *General Principles* as outlined in this Guide, will include the following components as shown below:

1. Name of Product, 2. Signal Word, 3. Statement of Hazards, 4. Precautionary Measures, 5. Instructions in Case of Contact or Exposure, 6. Poison Legend and 7. First Aid Statement

1 ETHYLENE CHLOROHYDRIN (ANHYDROUS OR 38%)

2 DANGER! EXTREMELY HAZARDOUS LIQUID AND VAPOR
MAY BE FATAL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN
CAUSES BURNS TO EYES

3 Do not get in eyes, on skin, on clothing. Ordinary rubber protective clothing, including gloves, will not prevent skin absorption.
Do not breathe vapor.
Use only with adequate ventilation.
Do not take internally.
Keep away from heat and open flame.

4 In case of contact, immediately remove all contaminated clothing and flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash clothing before re-use.

5 POISON

6 Call A Physician
First Aid
If swallowed: If conscious, make patient vomit immediately by putting finger down throat or by giving warm mustard water or salt water freely.
General: Keep patient warm; if conscious, give black coffee.
Note to Physician: Do not give adrenalin.

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Labels for Small Commercial Packages

The *General Principles* governing the preparation of precautionary labels discussed in Part I and the illustrative labels in Part II of this Guide have been developed primarily for bulk packages of chemicals intended for industrial use. The *General Principles* may be applied, however, to chemicals packaged in small containers. These may include, among others, hazardous substances in retail packages intended for the ultimate consumer; highly purified chemicals intended for research, testing, or control; and chemicals intended for professional use such as in pharmacy.

As stated in the *General Principles* on Page 12, each hazardous substance presents a distinct problem and must be treated individually in the light of its own characteristics. This same principle will apply to small containers. Small containers may present a problem of less available space for labeling purposes. Careful and selective shortening of precautionary statements for such containers may be in order if necessary to permit legibility, or if the wording on labels for the chemical in industrial packages is not applicable. Consideration should always be given to (1) the intended or reasonably anticipated handling or use of the particular product, (2) the training and experience of the expected user, and (3) the extent to which the hazard is modified by the size or type of container.

The following principles are recommended for condensation of suggested label wording where necessary or advisable:

(1) Retain the Signal Word;

(2) Retain the Statement of Hazards, shortened if necessary to a practical equivalent;

(3) Consider omission of Precautionary Measures if they are clearly implied or implied from the Statement of Hazards or can be clearly indicated or implied by revising the Statement of Hazards;

(4) Consider omission of wording relating to hazards that may be less serious because of the particular characteristics of the package, the nature of the use, and the training and experience of the user. Care must be taken to include Precautionary Measures for any additional hazard which may be present as a result of such characteristics, use, or training and experience.

Care should be taken that labels prepared in accordance with the above principles include all information required by law.

Labels for Samples and for New Products for Investigational Use

Samples

In general, the label for samples of a product should bear the same precautionary information that is on the commercial label, with the exception of possible differences in container instructions. If the product is not in commercial production, the label for samples should be prepared in accordance with the *General Principles* stated on Page 12 in this Guide.

New Products for Investigational Use

Chemical, physical, and toxicological data should be obtained on any product before it is distributed, so that hazardous properties can be described on the label. However, it may occasionally be necessary to make delivery of a new product for investigational use before all of these data are obtained. For instance, the quantity available may be too small for necessary tests, or the product may have to be delivered to investigators for the purpose of obtaining the desired information. These deliveries should be made as qualified investigative only, and should be labeled as adequately as possible with the information available. To cover such cases, and such cases only, the following illustration is suggested for preparing labels to be used during the period of investigation.

(NAME OR DESCRIPTION OF PRODUCT)

FOR INVESTIGATIONAL USE ONLY

SIGNAL WORD! STATEMENT(S) OF KNOWN HAZARD(S)

Appropriate precautionary measures.
Appropriate instructions in case of contact or exposure.

IMPORTANT!! The chemical, physical, and toxicological properties of this product have not been fully investigated, and its handling or use may be hazardous! (present additional hazards). Exercise due care.

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CONTAINER HANDLING AND STORAGE

Care should always be exercised in handling and storing containers of hazardous chemicals and in removing the contents. The Chemical Packaging Committee of the Manufacturing Chemists' Association, Inc., has recommended the general precautions given below for handling and storing certain classes of containers. Applicable phrases may be selected from these statements. These may be used either as separate labels or in combination with the precautionary labels illustrated in Part II. Where the properties of the substance require special or additional precautions, such instructions are indicated in some instances in conjunction with the individual label in Part II.

Metal Drum Handling and Storage (for liquids and semi-liquids)

Keep plug upright to prevent leakage.
Keep drum out of sun and away from heat.
Release internal pressure when received and at least weekly thereafter by slowly unscrewing plug. Heighten immediately.
Drums should be grounded when being emptied.
Do not strike plug or close a non-sharp projection.
Never use pressure to empty. Drum is not a pressure vessel.
Keep light, fire, and sparks away from drums.
Drum must not be washed out or used for other purposes.
Replacing after each withdrawal and return with empty drum to general storage, flush with plenty of water.

Glass Carboy Handling and Storage

Do not use if crystals have formed around threaded closure.
Avoid tipping, handling or dropping.
Leave in shipping case carefully.
Keep cool, out of sun and away from heat.
Never use pressure to empty. Carboy is not a pressure vessel.
Keep vent clean; carboy below is turning.
In case of spillage, flush with plenty of water.

Wooden Barrel Handling and Storage (for liquids and semi-liquids)

Keep barrel out of sun and away from heat.
Store with bung up.
Never use pressure to empty.
Drain completely.
Keep barrel moist—shrinkage may cause leaks.
In case of spillage, flush with plenty of water.

Cylinder Handling and Storage

Keep cylinder out of sun and away from heat.
Never drop cylinder.
Keep cylinder locked with slip-proof falling and or dropping.
Be sure connections are tight.
Do not attempt to refill cylinder without permission of owner.
Have all gas regulator or valve connections always requester available for emergency.

Aerosol Containers

The term "aerosol container" is generally applied to a container which holds its contents under pressure and is equipped with a dispensing nozzle designed to release the container's contents through a very small orifice. While a true aerosol is a mist or spray of fine particles or droplets propelled in air, aerosol type containers are used for packaging and dispensing many products which do not form true aerosols on release. Thus, there are aerosol products dispersed as depositing sprays, paints or invisible gases or as multiphase foams, shipping cream or shaving lathers. In all cases, aerosol containers require more care in handling and storage than similar unpressurized containers, and particularly require protection from elevated temperatures. When the contents are released as an aerosol or fine spray, there may be greater flammability or inhalation hazard than would be presented by the same product in other types of packaging and use.

The Chemical Specialties Manufacturers Association supports the following precautionary text for the pressure hazard presented by a metal aerosol container:

WARNING! Contents under pressure. Do not puncture.
Exposure to heat or prolonged exposure to sun may cause bursting.
Do not throw into fire or incinerator.
NOTE Additional hazard statements as to hazards to persons and property, the use thereof of contents, etc. will depend upon the particular product.

Appropriate modifications of the above text may be required for an aerosol container made of a non-metallic material. Also, additional precautionary labeling may be needed to warn against hazards presented by the contents of an aerosol container after release. Special test procedures developed by the Chemical Specialties Manufacturers Association are used in determining the flammability hazards of products in aerosol containers.

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MANUAL L-1—SIXTH EDITION
1961

In this new edition of Manual L-1, certain illustrative label texts have been added to illustrate specific new material types. Other texts which appeared in the 5th Edition have been revised in order to recognize new information concerning the products' properties, or in consideration of revised **Container Handling and Storage** precautions as set forth on Page 21. Finally, some texts have been deleted since the labeling principles which they illustrated are adequately illustrated by other texts in this Guide.

The fact that a label text formerly used in Manual L-1 is deleted from this edition does not imply that the material no longer requires precautionary labeling. Furthermore, the omission of a label text for a particular product does not indicate that the product does not require precautionary labeling.

Individual states, regulations, or ordinances may require that particular information be included in a label or that a specific label be affixed to a container. In such case, the requirements of such laws should be studied.

PART II

LABELS ADDED

Acrolein
Benzoic Acid, Liquid
Benzoic Anhydride
Benzoyl Chloride
Beryllium Oxide Powder
Butyl Alcohol (normal)
Calcium Cyanide
Dichloroacetone
Dichloropropane or Dichloropropene
Ethyl Acrylate
Ethylene Dichloride
Ethylene Oxide
Formaldehyde Solutions
Hydrochloric Acid
Hydrocyanic Acid
Hydrogen Chloride, Anhydrous
Hydrogen Peroxide (stronger than 52%)
Hydrogen Peroxide (stronger than 52%) but not exceeding 52%
Hydrogen Sulfide
Lead Monoxide (Litharge)
Mercuric Chloride (Mercury Bichloride)
Methyl Bromide
Methyl Chloride
Methyl Ethyl Ketone
Methyl Methacrylate Monomer
Methyl Morpholine
Monel Metal (Sulfuric and Nitric)
Morpholine
Nicotine Salts
Naphthylamine (alpha)

LABELS REVISED

Bromine
Butadiene (non-flammable inhibited)
Butyl Alcohol (normal or secondary)
Butylamine (non-flammable, normal)
Butyraldehyde
Caustic Potash
Caustic Soda
Chlorine
Chlorosulfonic Acid
Chromium Metal (Chromium Trioxide)
Chromium Trioxide (Chromic Acid)
Cresol (Cresylic Acid)
Cresylic Antiseptic
Diethylamine
Dimethylamine (non-flammable)
Dimethyl Sulfate
Dioxane (1,4-Diethylene Dioxide)
Ethyl Acetate
Ethylene Chlorohydrin (Ankydrous or 85%)
Ethylene Dichloride
Ethylene Oxide
Formaldehyde Solutions
Hydrochloric Acid (Muriatic Acid)
Hydrocyanic Acid
Hydrogen Chloride, Anhydrous
Hydrogen Peroxide (52% or less)
Hydrogen Peroxide (stronger than 52%)
Hydrogen Sulfide
Lead Monoxide (Litharge)
Mercuric Chloride (Mercury Bichloride)
Methyl Bromide
Methyl Chloride
Methyl Ethyl Ketone
Methyl Methacrylate Monomer
Methyl Morpholine
Monel Metal (Sulfuric and Nitric)
Morpholine
Nicotine Salts
Naphthylamine (alpha)

PART II—Continued

LABELS REVISED

Dichloroethyl Ether
Dichloroisopropyl Ether
Diethylamine
Diethylbenzene
Dimethylamine, Anhydrous
Dimethyl Sulfate
Dioxane (1,4-Diethylene Dioxide)
Ethyl Acetate
Ethylene Chlorohydrin (Anhydrous or 85%)
Ethylene Dichloride
Ethylene Oxide
Formaldehyde Solutions
Hydrochloric Acid (Muriatic Acid)
Hydrocyanic Acid
Hydrogen Chloride, Anhydrous
Hydrogen Peroxide (52% or less)
Hydrogen Peroxide (stronger than 52%) but not exceeding 52%
Hydrogen Sulfide
Lead Monoxide (Litharge)
Mercuric Chloride (Mercury Bichloride)
Methyl Bromide
Methyl Chloride
Methyl Ethyl Ketone
Methyl Methacrylate Monomer
Methyl Morpholine
Monel Metal (Sulfuric and Nitric)
Morpholine
Nicotine Salts
Naphthylamine (alpha)

LABELS DELETED

Ammonia, Anhydrous
Barium Nitrate
Benzidine
1,2 Dichloroethane
Dimethylaniline
Dipropyl Ketone
Ethyl Formate
Ethylene Dibromide
Ethyl Ether (Diethyl Oxide)
Methyl Acrylate
Methyl Amyl Acetate
Methyl Amyl Alcohol
Methyl Butyl Ketone
Methyl Isobutyl Ketone

PART III

LABELS ADDED

2,4-Xylidine (2,4-Dimethylaniline)
Dichloroisopropyl Ether
Ethyl Alcohol
2-Methoxyethanol
Monochlorobenzene and Sodium Salt
Nitrobenzene
Phenylhydrazine and Salts
Propyl Alcohol
Pyridine
Silver Nitrate
Sodium Cyanide
Sodium Fluoride
Sodium Hydroxide
Sodium Hydroxide (Caustic Soda)
Sodium Hypochlorite, Anhydrous
Sodium Sulfide
Sulfur Dichloride
Sulfuric Acid
Tar Acids
Thionyl Chloride
Toluidine (ortho or meta)
Toluidine (para)
Uranyl Nitrate
Xylene (Xylol)

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PART III—Continued

LABELS ADDED

Dichloropropane Dichloropropene Mixture
Diethyl Diglycol Dichlorocarbonate
Dioxane
Hexaethyl Tetraphosphate
Methyl Hydrazine, Dichloroformate Salt

1-Naphthyl N-Methylcarbamate
Pentachloronitrobenzene
Phorate
Phosdrin
N-Trichloromethylthiophthalimide

LABELS REVISED

Acrylonitrile
Arsenic, Liquid, Weed Killers, non-Botanical
Botanical Weed Killers, Organic
Calcium Arsenate
Calcium Cyanide
Chlorinated Camphene, Toxaphene
Dichlone
Dichlorodiethyl Ether
Dichlorvos (Dibrompole)
Dimethyl Dichloride
Dimethyl Sulfate, 95% and over
Hydrocyanic Acid

Lead Arsenate
Malathion
Methyl Bromide
Nicotine Sulfate
Parathion
Paris Green
Sodium Fluoride
Sodium Fluosilicate
Tetraethyl Pyrophosphate
Thallium Sulfate
Toxaphene
Zinc Arsenite

LABELS DELETED

Ants
Bromine

Barium Fluosilicate
Glycidol

PART II

Illustrative Labels for Hazardous Chemicals

The precautionary labels in this section have been prepared to demonstrate the practical application of the *General Principles* in Part I to a number of chemical products intended for industrial use. The user should familiarize himself with Part I before adapting any of the label statements contained in Part II to his products. The chemicals were selected to illustrate labeling for the major types of hazards commonly encountered. Consequently, the listing covers only relatively few of the hazardous chemicals for which precautionary labels are necessary. In many cases, these labels would be applicable to other products having the same hazards, and examples of this are listed by appropriate cross references.

The labels are based on the properties of the named chemicals; the presence of other substances, including impurities, may alter these properties and necessitate additional or different precautionary information.

General information regarding the handling and storage of containers is not included on these labels. This subject is discussed under the heading, "Container Handling and Storage", beginning on Page 24.

First aid treatment is given for a few products only. Such information may be desirable on other products. Where "clothing" is mentioned in first aid instructions, it should be understood to mean all articles of clothing, including shoes, gaiters, and other accessories. Shoes are specifically named in some instructions because of special hazards arising from absorption of the chemical by leather.

The notation, "MCA Chemical Safety Data Sheet available", appearing with certain labels in this section, refers to Data Sheets published by the Manufacturing Chemists' Association, Inc. These publications contain detailed information on the chemical, physical, and toxicological properties of the product, as well as information on shipping containers, labeling, storage, handling, and protective equipment. Prices and a complete list of available Chemical Safety Data Sheets may be obtained directly from the Manufacturing Chemists' Association, Inc. (See Pages 93 and 96 for complete listing of Chemical Safety Data Sheets now available.)

The labeling of radioactive material is a complex problem outside the scope of this Guide. [illegible] pairing precautionary labels for such

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materials. It is suggested that reference be made to the series of handbooks published by the U. S. Department of Commerce, National Bureau of Standards, covering the safe handling of radio-active materials.

The illustrative precautionary labels suggested in Manual L-1 should be used in addition to, or in combination with, any label required by law.

ACETALDEHYDE

DANGER! EXTREMELY FLAMMABLE
MAY FORM EXPLOSIVE PEROXIDES
UNDER AIR PRESSURE

Keep away from heat, sparks, and open flame.
Keep container closed.
Use with adequate ventilation.
Avoid prolonged breathing of vapor.

*Cool to below 68°F. before opening.
*Do not use air pressure to transfer.

MCA Chemical Safety Data Sheet SD-42 available

ACETIC ACID, GLACIAL

DANGER! CAUSES SEVERE BURNS

Do not get liquid or vapor in eyes, on skin, on clothing.
Keep away from heat and open flame.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

*Glacial Acetic Acid freezes at 62°F., forming hard lumps which may break carboy when moved.
*Store in area maintained above 62°F.
*If frozen, thaw by carefully moving carboy to warm area.

MCA Chemical Safety Data Sheet SD-41 available

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* Addition to "Container P... and Storage", Page 24

ACETIC ACID, 80%

DANGER! CAUSES SEVERE BURNS

Do not get liquid or vapor in eyes, on skin, on clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

MCA Chemical Safety Data Sheet SD-41 available

ACETIC ACID, 56% - 70%

WARNING! MAY CAUSE BURNS

Avoid contact with skin, eyes, and clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

MCA Chemical Safety Data Sheet SD-41 available

ACETIC ACID, 28%

CAUTION! MAY CAUSE BURNS

Avoid contact with skin, eyes, and clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

MCA Chemical Safety Data Sheet SD-41 available

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ACETIC ANHYDRIDE

DANGER! CAUSES SEVERE BURNS
VAPOR HARMFUL

Do not get liquid or vapor in eyes, on skin, on clothing.
Do not breathe vapor.
In case of contact, immediately remove contaminated clothing and flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash clothing before re-use.

MCA Chemical Safety Data Sheet SD-12 available

ACETONE

DANGER! EXTREMELY FLAMMABLE

Keep away from heat, sparks, and open flame.
Keep container closed.
Use with adequate ventilation.
Avoid prolonged or repeated contact with skin.

ACETYL CHLORIDE

DANGER! FLAMMABLE
CAUSES SEVERE BURNS

Keep away from heat, sparks, and open flame.
Keep container closed
Do not get in eyes, on skin, on clothing.
Avoid exposure to concentrated vapor.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.
Do not allow water to get into container because of violent reaction.

ACROLEIN

DANGER! EXTREMELY FLAMMABLE
MAY BE FATAL IF INHALED
LIQUID CAUSES SEVERE BURNS

Keep away from heat, sparks, and open flame.
Keep container closed.
Do not breathe vapor.
Do not get in eyes, on skin, on clothing.
Use only with adequate ventilation.
In case of contact, immediately remove contaminated clothing, including shoes, and flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash clothing thoroughly before re-use.

POISON
Call A Physician
First Aid

If inhaled: Move patient to fresh air; if breathing becomes difficult, start oxygen inhalation through suitable equipment.
If swallowed: If conscious, make patient vomit immediately (finger down throat or give warm mustard water or salt water freely).
General: Keep patient warm; if conscious, give coffee.

ACRYLONITRILE

DANGER! VAPOR HAZARDOUS
FLAMMABLE

Do not breathe vapor.
Do not get in eyes, on skin, on clothing.
Use only with adequate ventilation.
Keep away from heat, sparks, and open flame.
Keep container closed.

POISON
First Aid

For additions, INCLUDE the same First Aid and Antidote as recommended for CYANIDES, INORGANIC shown on Page 31;

MCA Chemical Safety Data Sheet SD-31 available

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BENZENE (BENZOL)

DANGER! EXTREMELY FLAMMABLE
VAPOR HARMFUL

Keep away from heat, sparks, and open flame.
Keep container closed.
Use only with adequate ventilation
Avoid prolonged or repeated breathing of vapor.
Avoid prolonged or repeated contact with skin.

POISON
Call A Physician
First Aid

MCA Chemical Safety Data Sheet SD-3 available

BENZIDINE HYDROCHLORIDE

DANGER! HAZARDOUS SOLID
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN
REPEATED ABSORPTION MAY RESULT IN BLADDER TUMORS

Do not get in eyes, on skin, on clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash clothing before re-use.
Take hot shower after work, using plenty of soap.

BENZIDINE SULFATE—
***Same label as* BENZIDINE HYDROCHLORIDE**

ARSENIC TRIOXIDE

DANGER! MAY BE FATAL IF SWALLOWED

Avoid breathing dust or spray mist.
Avoid contact with skin, eyes, and clothing.
Wash thoroughly after handling.

POISON
Call A Physician
First Aid

MCA Chemical Safety Data Sheet SD-40 available

BARIUM CHLORIDE

DANGER! MAY BE FATAL IF SWALLOWED

Do not take internally.
Avoid breathing dust.
Wash thoroughly after handling.

POISON
Call A Physician
First Aid

If swallowed: Give Epsom salt or sodium sulfate in water.

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CARBON DIOXIDE, SOLID ("DRY ICE")

WARNING! EXTREMELY COLD (109°F. below zero)
CAUSES SEVERE BURNS
LIBERATES HEAVY GAS WHICH MAY CAUSE SUFFOCATION

Do not get on skin or hands.
Do not taste.
Do not put in stoppered or closed containers.
Do not enter places where used or stored until adequately ventilated.

CARBON DISULFIDE

DANGER! EXTREMELY FLAMMABLE
VAPOR HARMFUL
HIGHLY VOLATILE

Keep away from fire, sparks, or heated surfaces.
Store in cool place and keep container closed.
Use only with adequate ventilation.
Avoid breathing vapor.
Avoid contact with skin and eyes.

POISON
Call A Physician
First Aid

MCA Chemical Safety Data Sheet SD-12 available

CARBON TETRACHLORIDE

DANGER! HAZARDOUS VAPOR AND LIQUID
MAY BE FATAL IF INHALED OR SWALLOWED

Use only with adequate ventilation.
Do not breathe vapor.
Avoid prolonged or repeated contact with skin.
Do not take internally.

POISON
Call A Physician
First Aid

MCA Chemical Safety Data Sheet SD-3 available

CAUSTIC POTASH—
Same label as **SODIUM HYDROXIDE**

MCA Chemical Safety Data Sheet SD-10 available

CAUSTIC SODA—
Same label as **SODIUM HYDROXIDE**

MCA Chemical Safety Data Sheet SD-9 available

CHLORAL

DANGER! EXTREMELY HAZARDOUS LIQUID AND VAPOR
INHALATION MAY CAUSE DELAYED FATAL LUNG INJURY

Do not get in eyes, on skin, on clothing.
Do not breathe vapor.
Use only with adequate ventilation.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes, for eyes, get medical attention.
In case of inhalation or suspicion of inhalation, move patient at once to fresh air and call a physician. Keep patient absolutely quiet and start CPR. Inhalation through suitable equipment.

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EN SULFIDE

ERI POISONOUS LIQUID AND GAS UNDER PRESSURE
FLAMMABLE

! USING, READ MCA CHEMICAL SAFETY DATA SHEET SD-36

breathe gas.
way from heat, sparks, and open flame—may form explosive
ire with air.

This gas deadens the sense of smell.
Do not depend on odor to detect presence of gas.

POISON
Call A Physician
First Aid

ient to fresh air.
ial has stopped breathing, apply artificial respiration imme-
ely.
ient warm.
afety Data Sheet SD-36 available

YLAMINE

ERI EXTREMELY FLAMMABLE
VAPOR EXTREMELY HAZARDOUS
LIQUID CAUSES BURNS

way from heat, sparks, and open flame.
container closed.
breathe vapor.
ly with adequate ventilation.
get in eyes, on skin, on clothing.
, of contact, immediately remove contaminated clothing, in-
ing shoes, and flush skin or eyes with plenty of water for at
15 minutes, for eyes, get medical attention. Wash clothing
re re-use.
Safety Data Sheet SD-72 available

ISOPROPYL ETHER — *Same label as* ETHYL ETHER

LEAD ACETATE

WARNING! HARMFUL DUST

Avoid breathing dust.
Wash thoroughly before eating or smoking.
Keep away from feed or food products.

LEAD MONOXIDE (LITHARGE) —
Same label as LEAD ACETATE

MCA Chemical Safety Data Sheet SD-66 available for LEAD OXIDES

LEAD OXIDE (RED LEAD) —
Same label as LEAD ACETATE

MCA Chemical Safety Data Sheet SD-66 available

MALEIC ANHYDRIDE

WARNING! CAUSES BURNS

Avoid contact with skin, eyes, and clothing.
Avoid exposure to concentrated vapor.
In case of contact, immediately flush skin or eyes with plenty of water
for at least 15 minutes; for eyes, get medical attention.

MERCURIC CHLORIDE (MERCURY BICHLORIDE)

DANGER! HARMFUL DUST
MAY BE FATAL IF SWALLOWED

Do not breathe dust or vapor.
Avoid contact with eyes or prolonged contact with skin.
Keep away from feed or food products.
Wash thoroughly before eating or smoking.
Use fresh clothing daily. Take hot shower after work, using plenty
of soap.

POISON
Call A Physician
First Aid

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NAPHTHYLAMINE (alpha) (*containing* beta-NAPHTHYLAMINE)—
Same label as NAPHTHYLAMINE (beta)

NAPHTHYLAMINE (beta)

WARNING! HARMFUL DUST AND VAPOR
MAY RESULT IN BLADDER TUMORS

NITRIC ACID

DANGER! CAUSES SEVERE BURNS
VAPOR EXTREMELY HAZARDOUS
MAY CAUSE NITROUS GAS POISONING
SPILLAGE MAY CAUSE FIRE OR LIBERATE DANGEROUS GAS

Do not breathe vapor.
Do not get in eyes, on skin, on clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; get medical attention.

MCA Chemical Safety Data Sheet SD-5 available

MIXED ACID (SULFURIC and NITRIC)

DANGER! CAUSES SEVERE BURNS
VAPOR EXTREMELY HAZARDOUS
MAY CAUSE NITROUS GAS POISONING
SPILLAGE MAY CAUSE FIRE OR LIBERATE DANGEROUS GAS

Do not breathe vapor.
Do not get in eyes, on skin, on clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; get medical attention.

MCA Safety Data Sheet SD-45 available

MONO-COMPOUNDS—
See alternative chemical name, e.g.,
CHLOROPHENOL *for* MONOCHLOROPHENOL

MORPHOLINE

WARNING! CAUSES EYE BURNS
MAY CAUSE SKIN IRRITATION
ABSORPTION THROUGH SKIN HARMFUL

Do not get in eyes.
Avoid contact with skin or clothing.
Keep away from heat and open flame.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Remove contaminated clothing and wash before re-use.

MURIATIC ACID—
Same label as HYDROCHLORIC ACID

MCA Chemical Safety Data Sheet SD-39 available for HYDROCHLORIC ACID

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CHEMICAL SAFETY DATA SHEETS

ZINC CHLORIDE (Granular, Fused, or Solution)

WARNING! MAY CAUSE SEVERE SKIN IRRITATION

Avoid contact with skin or eyes.
In case of contact, flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention.

ZIRCONIUM METAL POWDER (Minimum 25% Water)

DANGER! FLAMMABLE SOLID
MAY EXPLODE IF WATER CONTENT IS 10% OR BELOW

Keep wet in storage—dry powder may be ignited by friction, static electricity, or heat.
DO NOT ATTEMPT TO LOOSEN OR REMOVE MATERIAL FROM CONTAINER WITH ANY TOOL.
Keep away from heat, sparks, and open flame.
Keep from freezing.
In case of spillage, keep wet and remove carefully.
In case of fire, smother with foam-type fire extinguisher or sand.
Do not use carbon tetrachloride, CO_2 extinguishers or water.
Wear goggles or face shield and fire-retardant clothing when handling.

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CHEMICAL SAFETY DATA SHEETS

(Continued from Page 95)

Lead Oxides	SD-64
Methanol	SD-22
Methylamines	SD-57
Methyl Acrylate	SD-79
Methyl Bromide	SD-35
Methyl Chloride	SD-40
Methyl Ethyl Ketone	SD-83
Mixed Acid	SD-65
Naphthalene	SD-58
Nitric Acid	SD-5
Nitrobenzene	SD-21
Paraformaldehyde	SD-6
Perchloric Acid Solution	SD-11
Perchloroethylene	SD-24
Phenol	SD-4
Phosphoric Acid	SD-70
Phosphorus, Elemental	SD-16
Phosphorus Oxychloride	SD-26
Phosphorus Pentasulfide	SD-71
Phosphorus Pentoxide (Phosphoric Anhydride)	SD-28
Phosphorus Trichloride	SD-27
Phthalic Anhydride	SD-61
Potassium Dichromate	SD-46
Potassium Hydroxide (Caustic Potash)	SD-10
Propylene	SD-59
Sodium Chlorate	SD-42
Sodium Cyanide	SD-30
Sodium Dichromate	SD-46
Sodium, Metallic	SD-47
Sodium Hydroxide (Caustic Soda)	SD-9
Styrene Monomer	SD-37
Sulfur	SD-74
Sulfur Chlorides	SD-77
Sulfur Dioxide	SD-52
Sulfuric Acid	SD-20
Tetrachloroethane	SD-34
Toluene	SD-63
Tolylene Diisocyanate	SD-73
Toluidine	SD-82
Trichloroethylene	SD-14
Vinyl Acetate	SD-75
Vinyl Chloride	SD-56

PART III

Illustrative Labels for Pesticides

This section contains suggested precautionary texts for a group of hazardous chemicals commonly used as, or in the formulation of, insecticides, fungicides, rodenticides, herbicides, nematocides, plant regulators, defoliants, and desiccants. The term ***"Pesticide"*** is used in this Guide to indicate these products but the term **"Economic Poison"** is synonymous. Wording is based on the ***General Principles*** set forth in Part I. Careful study should be given to Part I and the special considerations discussed below before any suggested wording is used for a pesticide. These labels have been selected for illustrative purposes only, and the listings do not purport to cover all pesticides for which precautionary labeling is necessary. **Omission of a label for any particular product should not be interpreted to mean that such product requires no precautionary label.**

The principles in Part I apply primarily to the labeling of hazardous chemicals intended for industrial consumption, some of which are also used as, or for processing into forms of, pesticides intended for home, farm, or other ultimate consumer use. Labels for such packages of pesticides require consideration of additional factors since they will be handled, stored, and used differently from those intended for industrial consumption. Pesticide labels should include warnings not only of hazards to man, but also of hazards to domestic animals, useful invertebrates, and desirable vegetation. The usual legally-required ingredient statement may make unnecessary a separate showing of chemical identification of hazardous components on labels using code or nondescriptive names.

A producer or distributor of a pesticide should be familiar with all pertinent laws, regulations, and interpretations affecting these products, including those of the federal government, states, territories, and other political subdivisions; and with any applicable statutes, ordinances, or regulations affecting labeling in general. **Statements suggested in Part III should be used in addition to, or in combination with, any other wording required by law.**

Each suggested precautionary text in this section applies to a commercial chemical or to an indicated concentration range of a chemical. Many pesticides are marketed in a variety of formulations containing different concentrations or combinations of their ingredients. **Formulations of two or more constituents may have properties that**

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vary in kind or degree from those of the constituents. In all cases, the precautionary statements should be based on the properties of the finished formulation.

It has not been practical to propose statements for all special packages, extraordinary uses, or other unusual circumstances surrounding individual products. Each statement is designed for the normal and customary use of a particular product when packaged for sale as a pesticide. Each labeler of a pesticide should recognize that his product must be treated individually, in the light of its own characteristics, including, among others, concentration and grade, package sizes and types, channels of distribution, normal storage and transportation conditions, intended consumers, and intended uses.

The label statements in Part III are confined mainly to measures necessary to prevent injury to man and domestic animals arising out of the ordinary handling, storage, or use of a pesticide. Additional statements may be indicated by the particular form or manner in which a product is sold or the circumstances surrounding its use. There also may be other hazards to man or animals which can arise only from specific uses for which directions are given in the labeling. Frequently a pesticide may also be hazardous to useful invertebrates or useful vegetation, or by reason of residues on edible vegetation. The omission of reference to any of these hazards from any text in Part III does not imply that they may be disregarded. As a rule, such statements are properly incorporated in directions for use. By way of illustration, notes directed to the foregoing appear in connection with some of the illustrative labels. Even though they may be separated from the principal warnings, they should, nevertheless, be prominently displayed.

Examples:

Do not apply within ..... days of harvest.
Avoid use during flowering and pollination periods.
Do not consume or market fruits or vegetables until residue is removed.
Do not use this powder on drainboards, shelves or other places where contact with food is likely.
Do not allow spray to come in contact with garden plants.
For protection of fish and wildlife, avoid contamination of streams, lakes, or ponds.

The Federal Insecticide, Fungicide, and Rodenticide Act and most state acts require the "POISON - skull and crossbones" legend and an antidote on all "Economic Poisons" deemed "highly toxic to man". The definition of "Poison" in Part I of this Guide is similar to the definition of "highly toxic to man" in the regulations under the federal act. The products in this section have been classified according to the "highly toxic to man" definition. Other states, while not following the federal act on the definition of "highly toxic to man", require the "POISON - skull and crossbones" legend and antidote on all substances which are defined as "Poisons" in their poison laws.

The term "Poison" has been commonly understood by the layman to mean toxic by oral intake only. The controlling criteria should consider oral intake, inhalation, and skin absorption. To clarify the use of the term, labels on packages of pesticides "highly toxic to man" should specify the modes of entry into the body by which the product is poisonous. Examples:

POISONOUS IF SWALLOWED
POISONOUS BY SKIN CONTACT
MAY BE POISONOUS IF INHALED
POISONOUS IF SWALLOWED OR ABSORBED THROUGH SKIN

It is not intended that the word "POISON" should take the place of a signal word. One of the signal words "DANGER!" or "WARNING!" will be applicable when a product is a "Poison". The selection of the appropriate word will depend not only on the degree of toxicity of the product, but more particularly on the risk of injury presented under normal conditions of handling or use. The word "POISON" (or its derivatives) should be reserved exclusively for those products coming within the definitions of the federal act as "highly toxic to man" except where it may be required by other laws or regulations. For products that are less toxic, statements like the following are preferred:

MAY BE FATAL IF SWALLOWED
HARMFUL IF INHALED OR SWALLOWED

First aid in case of contact is given for a few products only. The Federal Insecticide, Fungicide, and Rodenticide Act and most state acts require a statement of an antidote on all "Economic Poisons" deemed "highly toxic to man". The term "antidote" is defined in the federal act as "a practical immediate treatment in case of poisoning and includes first aid treatment" and the regulations state that "the antidote statement shall include directions to call a physician immediately." Some state laws and regulations require, on labels, the use of special or strictly defined antidotes or prescribe special ways in which these must be shown for certain chemicals. The requirements for any

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given pesticide may, therefore, vary greatly and the impossibility of showing in the illustrative labels, antidotes which might be nationally acceptable has led to the practice of indicating only the need for an appropriate antidote statement where the "POISON-skull and crossbones" legend is used. Such information may be desirable on other products. Where "clothing" is mentioned in first aid instructions, it should be understood to mean all articles of clothing, including shoes, garters, and other accessories. Shoes are specifically named in some instructions because of special hazards arising from absorption of the chemical by leather.

An important principle of good labeling is to avoid the indiscriminate use of precautionary statements since this tends to detract from the importance which should be given to the vital warnings. Common-sense indicates certain fundamental precautions in the handling of nearly all household and farm supplies and a label statement cannot substitute for it. Phrases such as "Avoid contamination of feed and foodstuffs," and "Do not take internally," should be never-ars such where the inherently high toxicity of the product, special use of the material, size of the package, likelihood of mistaken identity, or actual use experience strongly indicates their need.

3-(alpha-ACETONYLFURFURYL)-4-HYDROXYCOUMARIN and SODIUM SALT

1. Over 3.0%:

WARNING!

If swallowed by humans, domestic animals, or pets, this material may reduce the clotting ability of the blood and cause bleeding. In such case, intravenous and oral administration of Vitamin K combined with blood transfusions are indicated as in the case of hemorrhage caused by overdoses of bishydroxycoumarin.

Keep away from humans, domestic animals, and pets.

POISON
(Antidote)

Note: Directions for use should include a statement directing placement of bait so as to protect children, pets, and domestic animals.

(Continued on next page)

2. 3-(alpha-ACETONYLFURFURYL)-4-HYDROXYCOUMARIN and SODIUM SALT (0.1% to 3.0% inclusive)

CAUTION!

If swallowed by humans, domestic animals, or pets, this material may reduce the clotting ability of the blood and cause bleeding. In such case, intravenous and oral administration of Vitamin K combined with blood transfusions are indicated as in the case of hemorrhage caused by overdoses of bishydroxycoumarin.

Keep away from humans, domestic animals, and pets.

Note: Directions for use should include a statement directing placement of bait so as to protect children, pets, and domestic animals.

3. Finished Baits:

Directions for use should include a statement directing placement of baits so as to protect children, pets, and domestic animals.

ACRYLONITRILE

DANGER! POISONOUS IF INHALED
FLAMMABLE

Do not breathe vapor.
Do not get in eyes, on skin, on clothing.
Keep away from heat, sparks, and open flame.
Keep container closed.

POISON
(Antidote)

Note: Directions for use should include instructions for appropriate respiratory protection.

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ARSENICAL WEED KILLERS, INORGANIC

1. 2% and over as Metallic Arsenic:

WARNING! POISONOUS IF SWALLOWED

Avoid contact with skin, eyes, and clothing.
Do not breathe spray mist, wear respirator.
In case of contact, wash thoroughly.

☠ POISON ☠
(Anilsalt)

2. Less than 2% as Metallic Arsenic:

WARNING! MAY BE FATAL IF SWALLOWED

Avoid contact with skin, eyes, and clothing.
Avoid breathing spray mist.
Keep away from food and out of reach of children and domestic animals.
In case of contact, wash thoroughly.

Note. Directions for use should include reference to the avoidance of spray drift to valuable plants and restriction of persons and animals from treated areas.

BENZENE HEXACHLORIDE (See LINDANE also)

1. BENZENE HEXACHLORIDE Technical and Dry Formulations (25% and over):

WARNING! HARMFUL IF SWALLOWED
MAY CAUSE IRRITATION OF SKIN AND EYES
MAY BE ABSORBED THROUGH SKIN

Avoid breathing dust, vapor, or spray mist.
Avoid contact with skin and eyes.
Avoid contamination of feed and foodstuffs.
In case of contact, wash skin with plenty of soap and water; for eyes, flush with water and get medical attention.

Note. If the product is to be applied to plants that are used as feed, a warning should be included on the Directions for Use to the effect that the material should not be applied where there is danger of residual odor or taste remaining in foodstuffs or edible portions of treated crops.

(continued on next page)

2. BENZENE HEXACHLORIDE Dry Formulations (less than 25%):

CAUTION!

Avoid breathing dust, vapor, or spray mist.
Avoid contact with skin and eyes.
Avoid contamination of feed and foodstuffs.
Wash thoroughly after handling.

3. Solutions or Emulsifiable Formulations:

Some various solvents which differ in toxic properties may be used. Labels should bear the precautionary information covering the combined hazards of benzene hexachloride and solvent

Note. If the product is to be applied to plants that are used as feed, a warning should be included on the Directions for Use to the effect that the material should not be applied where there is danger of residual odor or taste remaining in foodstuffs or edible portions of treated crops.

CADMIUM SALTS

Toxicity varies with the different products; hence, each product must be considered on its own properties.

CALCIUM ARSENATE

WARNING! POISONOUS IF SWALLOWED

Avoid breathing dust or spray mist.
Avoid contact with skin, eyes, and clothing.
Wash thoroughly after handling.
Clean up spillage.

☠ POISON ☠
(Anilsalt)

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HEXAETHYL TETRAPHOSPHATE—
Same label as **TETRAETHYL PYROPHOSPHATE**

HYDROCYANIC ACID

DANGER! EXTREMELY HAZARDOUS LIQUID AND GAS
EXTREMELY FLAMMABLE
MAY BE FATAL IF SWALLOWED, INHALED
OR ABSORBED THROUGH SKIN

USE ONLY IN A CLOSED SYSTEM.

Keep away from heat, sparks, and open flame.
Do not take internally.
Do not breathe gas.
Do not get in eyes, on skin, on clothing.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash contaminated clothing before re-use.

☠ POISON ☠
(Antidote)

Note. Directions for Use should include instructions for appropriate respiratory protection

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HYDROXYMERCURICHLOROPHENOL
(any effective concentration)

WARNING! POISONOUS IF INHALED OR SWALLOWED
MAY CAUSE SKIN IRRITATION

Avoid breathing dust.
Avoid contact with skin, eyes, and clothing.
In case of contact, immediately wash skin with plenty of soap and water; for eyes, flush with water for at least 15 minutes and get medical attention.

☠ POISON ☠
(Antidote)

Note: For certain applications, Persons for Use may need to include more detailed instructions for safe ha... of the product and materials treated with it.

HYDROXYMERCURICRESOL—
Same label as **HYDROXYMERCURICHLOROPHENOL**

HYDROXYMERCURINITROPHENOL—
Same label as **HYDROXYMERCURICHLOROPHENOL**

HYPOCHLORITES

Because of the differences in properties of members of this group, each product containing them must be reviewed individually in light of its own characteristics

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IPC (iso-PROPYLPHENYLCARBAMATE)—
Same label as **CHLORO-IPC**

LEAD ARSENATE

WARNING! POISONOUS IF SWALLOWED
Avoid breathing dust or spray mist.
Avoid contact with skin, eyes, and clothing.
Wash thoroughly after handling.
Clean up spillage.

☠ POISON ☠
(Antidote)

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