

## VI. USE OF PLACARDS, LABELS, AND MSDS

Three outputs can result from the data developed in Chapter V: (a) a placard, (b) a label, and (c) a Material Safety Data Sheet.

(a) A placard may be simple or detailed, large or small, depending on its intended area of effectiveness. It may contain a hazard symbol only, a hazard symbol and label statements, or only label statements. The placard is used in three major ways:

(1) On exterior tanks, buildings, and fenced-in areas. This use requires large lettering visible from considerable distances and contains the minimum of information.

(2) On signboards or affixed to interior areas to warn of hazardous areas. This use requires lettering sized in relation to the work area so that the warning can be clearly seen by all workers involved. More detailed warning information may be included.

(3) On doors or machinery to warn workers of immediate hazards. This use requires the most detailed warnings and action statements because of the proximity of the hazard and the regular use of the hazardous material.

Color, if used, letter size, and style shall be determined by reference to 29 CFR 1910.144. Suggested colors for the numerical relative degrees of hazard and key words are:

- Health - blue numerals or letters on white background or  
black numerals or letters on a blue background
- Fire - red on white or black on red
- Reactivity - yellow on white or black on yellow

Figure V-3 is an example of a placard for exterior use.

|   |                       |
|---|-----------------------|
| 4 | Extreme Health Hazard |
| 3 | Highly Flammable      |
| 2 | Moderately Reactive   |

Fatal if swallowed, inhaled, or absorbed through the skin.

Causes severe eye burns.

Protect from all sources of ignition.

Subject to violent polymerization.

FIGURE V-3 - PLACARD

(b) The label shall include the trade name of the product, or be positioned near the trade name. It must appear near the bung or opening on drums or on the major or front side of the container. It shall be sized and separated so as to be readily identified as a hazard warning and at least as legible as any other printed material on the container, excepting the product name.

The label to be affixed to every container holding hazardous materials shall bear the hazard alert symbol, statements on the nature of the hazard, appropriate action statements, and first aid statements where useful. If overexposure requires unusual treatment or specific counteractive drugs, this must be noted on the label. Where applicable, specific clean-up and disposal statements shall be included.

The label shall contain the relative numerical ratings and associated key words, appropriate amplifying and precautionary statements, first aid statements, and a reference to the appropriate MSDS. Labels, when colored, should use the same color formats as for placards.

Figure V-4 is an example of a complete label.



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## VIII. APPENDIX I

### GLOSSARY OF TERMS

|                    |  |
|--------------------|--|
| Acute              | A short time period of action measured in seconds, minutes, hours, or days.  |
| Acute Effect       | Applies to injuries which rapidly follow exposure to a hazardous material without implying degree of severity.   |
| Chronic            | Applies to long time period of action in weeks, months, or years.  |
| Chronic Effect     | Applies to injuries which are delayed after exposure to a hazardous material without implying degree of severity.  |
| Container          | A drum, box, can, tube, or the like which confines a material.   |
| Hazardous Material | A substance or mixture of substances having intrinsic properties capable of producing adverse effects on the health, physical integrity, or well-being of the worker.  |
| Label              | Any display of written, printed or graphic matter on the immediate containers holding a hazardous material or in any manner affixed to the container.                  |
| LC50               | The air concentration which is required to produce death in 50% of the exposed animals.  |
| LD50               | The dose which is required to produce death in 50% of the exposed animals.   |
| Placard            | A sign posted in a work area for notification of the worker that hazardous materials are being used in that work area or are being held in storage.                    |
| Risk               | An assessment of the probability of adverse effects occurring in a defined set of circumstances. Risk is not a factor in the above definition of a hazardous material. |
| Sensitizer         | A substance which can cause an allergic-like response.   |



IX. APPENDIX II

TABLES OF SUGGESTED LABEL STATEMENTS

TABLE IX-1  
HEALTH RELATED STATEMENTS

Fatal if swallowed  
Fatal if inhaled  
Fatal if absorbed through the skin  
Harmful if swallowed  
Harmful if inhaled  
Harmful if absorbed through the skin  
Can cause allergic respiratory reaction  
Can cause allergic skin reaction  
Vapor (gas) may cause suffocation  
Causes eye burns  
Causes eye irritation  
Causes burns  
Causes irritation  
Can be fatal or cause blindness if swallowed  
Cannot be made nonpoisonous  
Repeated absorption can cause bladder tumors  
Rapidly absorbed through skin  
Inhalation can be fatal or cause delayed lung damage  
Harmful if inhaled and can cause delayed lung damage  
Can cause delayed effect  
Vapor extremely irritating  
Extremely irritating gas and liquid under pressure  
Gas extremely irritating  
Lung injury and burns may be delayed  
Contact with water or moist air liberates irritating gas  
Contact with acid liberates poisonous gas  
Contact with water or acid slowly liberates poisonous and  
flammable hydrogen sulfide gas  
Liberates gas which may cause suffocation  
Repeated inhalation or skin contact can, without symptoms,  
increase hazard  
Causes severe burns which may not be immediately painful or visible  
Can cause rash or external sores  
Can cause burns of external sores  
Liquid or vapor causes burns which may be delayed  
May cause eye injury-effects may be delayed  
Liquid penetrates shoes and leather causing delayed burns  
May cause sterility  
May affect unborn children  
Cancer suspect agent

TABLE IX-2  
HEALTH HAZARD ACTION STATEMENTS

Do not breathe dust  
Do not breathe vapor  
Do not breathe mist  
Do not breathe gas  
Do not get in eyes, on skin, on clothing  
Prevent contact with food, chewing or smoking materials  
Wash thoroughly after handling  
Use only in well ventilated area  
Keep container closed  
Avoid prolonged or repeated contact with skin  
Do not enter storage areas unless well ventilated  
Avoid breathing dust or solution spray or vapor  
Avoid prolonged or repeated breathing of vapor  
Use special protective clothing and gloves  
Wear goggles; neoprene, butyl rubber, or vinyl gloves,  
neoprene shoes or boots; and clean protective outer clothing  
Wear goggles; neoprene, butyl rubber, or vinyl gloves  
Always wear a self-contained breathing apparatus or full-face  
air-line respirator when using this product  
Have available emergency self-contained breathing apparatus  
or full-face air-line respirator when using this product  
Wear respirator approved by NIOSH or the US Bureau  
of Mines for organic vapor, dust, etc.  
Wear goggles or face shield, rubber gloves, and protective  
clothing when handling  
Do not wear ordinary rubber protective clothing, including  
gloves and boots  
Do not taste  
This gas deadens the sense of smell. Do not depend on odor  
to detect presence of gas  
Use fresh clothing daily. Take hot shower at end of work shift  
using plenty of soap  
POISON (with skull and crossbones symbol)  
Avoid exposing women of child-bearing age

TABLE IX-3  
FIRE AMPLIFYING STATEMENTS

Strong Oxidizer - contact with other materials may cause fire  
Catches fire if exposed to air  
Spillage may cause fire or liberate dangerous gas  
Highly volatile  
Contact with water or acid slowly liberates flammable gas  
Contact with water may cause flash fire  
May ignite if allowed to become damp  
Heat, shock, or contact with other materials may cause fire  
or explosive decomposition  
Contact with other materials may cause fire or explosion,  
especially if heated

TABLE IX-4  
FIRE HAZARD ACTION STATEMENTS

Keep away from fire, sparks and open flame  
Keep from contact with clothing and other combustible materials to avoid fire  
Drying of this product on clothing or combustible materials may cause fire  
Spills on clothing or combustible materials may cause fire  
Contents packed under water will ignite if water is removed  
Avoid friction or rough handling because of fire hazard  
Keep wet in storage--dry powder may ignite by friction, static electricity or heat  
Wear goggles or face shield and fire-retardant clothing when handling  
Clothing and vegetation contaminated with chlorate or its solutions are DANGEROUSLY FLAMMABLE. Remove clothing and wash thoroughly in water. Keep persons and animals off treated areas  
Store in cool place  
Keep container tightly closed  
Loosen closure cautiously before opening  
Store in cool dry place  
Store in a cool place in original container and protect from direct sunlight  
In case of fire, stop flow of gas. Use dry chemical or carbon dioxide when necessary to gain access to valve  
Avoid spillage and contact with moisture or combustion  
In case of spillage, flush with plenty of water and remove contaminated articles  
Flush area with water spray  
In case of fire, smother with dry sand, dry ground limestone or dry powder type materials specially designed for metal powder fires.  
Spillage may cause fire. Do not get on floor. Sweep up and remove immediately

TABLE IX-5  
REACTIVITY AMPLIFYING STATEMENTS

Powerful Oxidizer  
Strong Oxidizer  
Strong Acid  
Strong Caustic (alkali)  
Causes severe burns which may not be immediately painful or visible  
Heat, shock, or contact with other materials may cause fire or explosive, especially if heated  
Contact with other material may cause fire or explosive, especially if heated  
Reacts violently with water liberating and igniting hydrogen  
May form explosive peroxides  
Forms shock-sensitive mixtures with certain other materials  
May explode if water content is 10% or below  
Contamination may result in dangerous pressure  
Liquid and gas under pressure  
Extremely hazardous liquid and vapor under pressure  
Extremely cold (( F ( C) below zero))  
High Explosive  
Explosive  
Inhibited monomer subject to violent polymerization  
Liquid and gas under pressure  
Gas under pressure

TABLE IX-6  
REACTIVITY HAZARD ACTION STATEMENTS

Keep from contact with oxidizing materials, highly oxygenated or halogenated solvents, organic compounds containing reducible function groups, or aqueous ammonia

Keep from contact with oxidizing materials

Keep from contamination from any source including metals, dust, and organic materials. Such contamination can cause rapid decomposition, generation of high pressures, or formation of explosive mixtures

Solidifies at about F ( C) and may break container. Store in moderately warm place

Keep from any contact with water

Use only dry, clean utensils in handling

While making solutions, add slowly to surface to avoid violent splattering

Keep wet in storage--dry powder may ignite by friction, static electricity, or heat

Do not add to hot materials; do not grind or subject to frictional heat or shock--explosive decomposition may result

Prevent contamination with readily oxidizable materials and polymerization accelerators

Do not allow to evaporate to near dryness. Addition of water or appropriate reducing materials will lessen peroxide formation

Do not add water to contents while in a container because of violent reaction and possible flash fire

Do not attempt to loosen or remove material from container with any tool

Wear goggles and DRY gloves when handling

Put nothing else in this container

Keep dry and handle only in suitable equipment to prevent metallic contamination. Consult manufacturer

Keep container tightly closed and away from water or acids

Keep container tightly closed; flush container clean before discarding

Do not put in stoppered or closed container

Note: Suck-back into cylinder may cause explosion. Under no circumstances should the cylinder entry tube be inserted in a liquid or gas without a vacuum break or other protective apparatus in the line to prevent suck-back

Store in original vented container

Store in cool place

Keep drum in upright position. Do not roll drum on side

Handle under inert gas atmosphere in DRY equipment

Keep from freezing

Loosen closure cautiously before opening

Store separately from, and avoid contact with, dehydrating materials and other materials

Keep away from fire

Open container carefully and only in dry oxygen-free or inert atmosphere

TABLE IX-6 (continued)  
REACTIVITY HAZARD ACTION STATEMENTS

Store in cool dry place  
Store in cool place in original container and protect from direct sunlight  
Keep container closed to prevent drying out  
Do not heat cylinders  
Keep away from acids and heat  
Never return unused HYDROGEN PEROXIDE to container. Dilute  
with plenty of water  
Avoid spillage and contact with moisture or combustibles  
Fire or high temperatures may cause explosive decomposition if confined  
In case of fire, smother with dry sand, dry ground limestone,  
or dry powder type materials specially designed for metal  
powder fires. Do not use carbon tetrachloride, carbon dioxide  
extinguishers, or water  
Do not use air pressure to transfer

TABLE IX-7  
FIRST AID STATEMENTS

First Aid                   CALL A PHYSICIAN AS SOON AS POSSIBLE

    If swallowed, induce vomiting by sticking finger down throat or by giving soapy or strong salty water to drink. Repeat until vomit is clear. Never give anything by mouth to an unconscious person.

First Aid                   CALL A PHYSICIAN AS SOON AS POSSIBLE

    In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. (Discard contaminated shoes.)

First Aid                   CALL A PHYSICIAN AS SOON AS POSSIBLE

    If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen.

First Aid                   CALL A PHYSICIAN AS SOON AS POSSIBLE

    In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses if worn.

First Aid                   CALL A PHYSICIAN AS SOON AS POSSIBLE

    In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Flush skin with water. (Wash clothing before reuse.)

First Aid

    In case of contact, immediately wash skin with soap and plenty of water.

First Aid

    Do NOT induce vomiting. Call a physician as soon as possible.

Antidote: (indicate commonly available antidote.)

Note to Physicians: (Give detailed specific treatment including drug dosage.)

Call the Life Squad or local emergency unit.



TABLE IX-8  
STATEMENTS SPECIFYING SPECIFIC DISPOSAL INSTRUCTIONS

Flush spill area with water spray.  
Soak up spill with sand or earth. Do not use water.  
Flush away spill by flooding with water applied quickly to entire spill.  
Keep upwind of leak: Evacuate enclosed places until gas has dispersed.  
Dike spill and decontaminate by...  
Do not flush into sewers.  
Dispose of sodium by burning carefully in an open fire.  
Sweep up spillage with strong calcium hypochlorite solution.  
Treat spillage with strong calcium hypochlorite solution and flush to sewer.  
In case of spillage, keep wet and remove carefully.  
Soak up with rags and dispose in covered metal containers.  
Consult local solid waste regulations for safe disposal.  
Do not sweep. Use vacuum cleaning equipment only.

## X. APPENDIX III

### SOURCES OF HEALTH HAZARD RATINGS AND TEST METHODS

The numerical ratings for assessing the relative toxicity of a material or product are listed in Table V-2. The criteria are derived from articles published in 1949 by Hodge and Sterner [4] and as extended in 1954 by Hine and Jacobsen [5]. Both publications list a sixth category called "Relatively Harmless" which was deleted since it was considered inapplicable.

The rating scheme was selected because it is comprehensive and has been accepted and regularly cited in succeeding years as a useful rating scheme. The table was reproduced by Spector [6] in 1955, Deichmann and Gerarde [8] in 1969, and Thienes and Haley [9] in 1972. Gleason et al [7] used the same criteria with a change in the "super" toxic oral level to less than 5 mg/kg from less than 1 mg/kg. In their Table VI-1, however, the ratings were applied to human ingestion by a 70-kg (150-lb) man rather than to LD50 for rats.

Smyth [10] used a similar rating scheme with a general elevation of the numbers to powers of 10. For example, Smyth uses for the oral rating of extremely toxic the range 10-99 mg/kg rather than 5-50 mg/kg. Given the variability of toxicological data, Smyth's ratings are essentially in agreement with those of Hodge and Sterner. [4]

Table V-1 is an expression of the most severe human effects which could result from exposure to a material. It includes carcinogens and sensitizers as well.

A variety of test methods exist in the literature for determining LD50 and LC50 values. The acute toxicity data obtained from published sources is based on animal studies done by different methods at different times with different species and strains of animals. Since these values are used in the system for rating in broad categories, it is unreasonable to specify a particular test method for published data. The appropriate test method is the one which gives the best appraisal of the hazard of the material with respect to its nature and the ways it will be encountered by employees.

In the interest of standardization, the animal testing procedures of the National Academy of Sciences [29] or of The Food and Drug Administration as published by The Association of Food and Drug Officials of the United States [30] are recommended.

## XI. APPENDIX IV

### SOURCES OF FLAMMABILITY AND REACTIVITY RATINGS

Classifying all burnable materials into five categories which will be useful to employees presents two major difficulties: a) how to rate liquids based on flash point data and b) how to rate all other materials.

In Table V-3 flammable liquids are divided into two flammable and two combustible categories. These are based on the definitions in 29 CFR 1910.106 as amended by publication in the Federal Register by OSHA, September 28, 1973, Volume 38, pages 27047-27049. The basic division at 100 F between flammable and combustible was also adopted by the Department of Transportation by publication in the Federal Register on January 24, 1974, Volume 39, pages 2768-2771.

OSHA divides Class I flammable liquids into subclasses A, B, and C. Class IA and B liquids are grouped in rating 4 since they have the same flash point cutoff of 73 F. They differ in boiling point which is considered secondary, since industrial operations may involve using liquids at elevated temperatures and provide numerous hot surfaces. Separation of class by boiling point is most useful for storage considerations where ambient temperature is a controlling factor in assessing the evaporation rate.

Rating 3 includes Class IC liquids classifying them as highly flammable in agreement with the OSHA revised cut-off of 100 F.

The combustible liquids are divided into two ratings. Rating 3 includes Class II and Class III A liquids which are generally treated the

same for storage requirements except in respect to volume stored (Tables H-12, 14, 15, 16, and 17 in 29 CFR 1910.106 as amended by 37 FR, October 18, 1972, pages 22177-22179, as modified by 38 FR of September 28, 1973, pages 27048-27049).

The basic structure and text for the relative rating criteria for flammability and reactivity were taken from the NFPA 704M system [3]. Many of the NFPA fire codes were adopted by OSHA (37 FR, October 18, 1972, page 22231). The 704M system was developed under standard procedures which are described by the first page of the 704M manual as:

"This material has been developed in the interest of safety to life and property under the published procedures of the National Fire Protection Association. These procedures are designed to assure the appointment of technically competent Committees having balanced representation from those vitally interested and active in the areas with which the Committees are concerned. These procedures provide that all Committee recommendations shall be published prior to action on them by the Association itself and that following this publication these recommendations shall be presented for adoption to the Annual Meeting of the Association where anyone in attendance, member or not, may present his views."

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