Section A - 3

IDENTIFYING HAZARDOUS MATERIALS

A. Procedure for filing Material Safety Data Sheets (MSDS)

MSDS sheets are provided by chemical vendors and should accompany chemical orders. If no MSDS is supplied and the appropriate MSDS is not on file, immediately contact the vendor and request one be sent. (Contact EHS if you are unable to locate one). Keeping hard copies of MSDSs in your area is still probably the best information resource for department employees, but in any case, **MSDSs must be available for employees at all times, and be clearly marked for easy access.** MSDSs are available at the following locations:

1. Locally

Check with your authorized user or area supervisor to learn the location of MSDS sheets within your area.

2. EHS Files

EHS maintains a hardcopy file of MSDSs. If you receive an MSDS for a new or uncommon chemical, ensure a copy is forwarded to EHS, EAB Room 100, to be added to safety files.

3. The Internet

Several MSDS databases are available on the Internet. Contact EHS at extension 4-3921 for a listing of Uniform Resource Locators (URL).

B. How to Read a Material Safety Data Sheet

Hazardous materials are common in the modern workplace, and it is clearly important that workers know when they are handling these materials to ensure adequate protection and compliance with the proper safety procedures. Fortunately, the Hazard Communication Standard created by OSHA requires that employers who use hazardous substances must make Material Safety Data Sheets (MSDSs) available for employee use and reference, and provide appropriate warning labels on containers of hazardous substances within the facility.

The MSDS is usually prepared by the manufacturer or distributor of a hazardous substance. MSDS forms do not follow a standard format and are found in a wide variety. Regardless of the format, each must contain certain key information for employee reference. In many cases, more information is provided on the MSDS than is required by law. The Hazard Communication Standard requires that the following categories of information be written in English on an MSDS form. (A sample MSDS, identified as Attachment A, is found at the end of this section.)

C. Contents of MSDS

1. The Identity of the Substance

This category features required information on the identity of the material as given on the product label. If the material is a single hazardous substance, its chemical and any common names that it is known by must be given. If the material is a mixture, which has been tested as a whole to determine its hazards, the chemical and common name(s) of the ingredients which contribute to these known hazards will be listed. If the product is a mixture and has not been tested as a whole, the hazardous ingredients which comprise 1% or greater of the mixture must be given. If the hazardous ingredient is a carcinogen, those contents which comprise greater than 0.1% must be listed.

2. Physical and Chemical Characteristics

This category includes the physical and chemical characteristics of the hazardous substance such as whether it is a liquid, gas, or solid, and data pertaining to characteristics such as vapor pressure and flash point.

The physical data may provide information on how the product will act under a variety of temperatures and conditions. You may learn from this category of information if the material has an odor (and at what level the odor becomes noticeable), the color of the material, and other items about the material's behavior.

3. Physical Hazards

The physical hazards of the material must be noted on the MSDS, including the potential for fire, explosions, or reactions and the conditions under which they may occur. The recommended extinguishing media (water, foam, dry chemical, carbon dioxide graphite, etc.) for fires can be found here--this information is of great value to community emergency responders.

Some chemicals are stable by nature -- that is, they are unlikely to undergo a chemical reaction or change that may result in a dangerous situation, such as an explosion, fire or toxic release. On the other hand, some chemicals are unstable and are likely to react either alone or in combination with other chemical and substances. This knowledge can be of great value when selecting storage locations for the product.

4. Health Hazards

The health hazards of the hazardous substance must be given including the signs and symptoms of exposure (such as a rash or burning of the eyes and throat) and any medical conditions which are generally recognized as aggravated by exposure to the material. For example, people with respiratory problems should avoid the inhalation of solvent vapors from paint since these vapors may bring on breathing difficulties.

5. Routes of Entry

Potential routes of entry into the body for a hazardous substance must be noted on its MSDS. This may include absorption, ingestion, inhalation or injection.

6. Permissible Exposure Limits

The OSHA Permissible Exposure Limit (PEL), the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), and any other exposure limit recommended by the manufacturer, distributor, or employer preparing the MSDS must be given if such values are available.

If such values are listed, they may indicate the maximum exposure a worker should have to the substance during an eight-hour working day, as expressed in parts per million (ppm) in air. The PEL is set by OSHA and is a mandated exposure level. However, some PELs have not been updated recently and a number of employers follow exposure limits based on TLVs.

The TLV is the recommended level set by the ACGIH. TLVs are advisory guidelines that are reviewed each year as more information becomes available for different chemicals.

7. Carcinogens

If the material is listed in the National Toxicology Program (NTP) Annual Report on Carcinogens or has been found to be a potential carcinogen by OSHA or the International Agency for Research on Cancer, this information must be noted on the MSDS.

8. Safe Handling

This category of required information includes any generally applicable precautions for safe handling and use of the product which are known to the preparer of the MSDS, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for spills and leaks of the material.

9. Control Measures

Any generally applicable control measures which are known to the preparer of the MSDS, such as appropriate engineering controls, work practices, or personal protective equipment that is needed to safely handle the material, are included in this category.

10. First Aid Procedures

The first aid procedures that are to be used on a person who is exposed to the product must be listed for the various routes of exposure and noted on the MSDS.

On some MSDS Forms, this category may be expanded to include procedures that should be followed by medical authorities treating those who have been exposed to the material. In all cases of suspected overexposure, medical advice should be sought.

11. Date of Preparation

The date that the MSDS was prepared, and the date that the information was last updated, if applicable, must be noted on the MSDS. This lets you know exactly how current an MSDS is. Some MSDS forms may be updated once or twice a year, while others, such as those for steel, do not require frequent updating. A call to the manufacturer or supplier can determine if you have the most recent update of the MSDS form that is available.

12. Manufacturer Information

The name, address and telephone number of the chemical manufacturer or responsible party who prepared the MSDS and can provide additional information on the hazardous chemicals and appropriate emergency procedures to be followed, if necessary, must be listed on the form.

If no relevant information can be located for a required category, the MSDS will be marked to indicate that no applicable information has been found for that entry.

D. The National Fire Protection Association (NFPA) 704M System

The National Fire Protection Association (NFPA) has devised a voluntary marking system to alert firefighters to the characteristics of hazardous materials stored in stationary tanks and facilities. This system, known as NFPA 704M, assists in readily identifying the hazard presented by the stored substance.

The NFPA 704M label is diamond-shaped, and is divided into four parts, or quadrants (See Figure 2).

The left quadrant is blue, and contains a numerical rating of the substance's health hazard. Ratings are made on a scale of 0 to 4, with a rating of 4 indicating a danger level so severe that a very short exposure could cause serious injury or death. A zero, or no code at all in this quarter, means that no unusual hazard would result from the exposure.

The top quadrant of the NFPA symbol contains the substance's fire hazard rating. As you might expect, this quadrant is red. Again, number codes in this quadrant range from 0 to 4, with 4 representing the most serious hazard.

The NFPA label's right quadrant, colored yellow, indicates the substance's likelihood to explode or react. As with the health and fire hazard quadrants, ratings from 0 to 4 are used to indicate the degree of danger. If a 4 appears in this section, the chemical is extremely unstable, and even under NORMAL conditions may explode or react violently. A zero in this quadrant indicates that the material is considered to be stable even in the event of a fire.

The bottom quadrant is white, and contains information about any special hazards that may apply. There are three possible codes for the bottom quarter of the NFPA symbol:

- OXY means this material is an oxidizer. It can easily release oxygen to create or worsen a fire or explosion hazard.
- The symbol Ψ indicates a material that reacts with water to release a gas that is either flammable or hazardous to health.
- If the material is radioactive, the usual tri-blade symbol for radioactivity will appear.

It is important to remember that the system is chemical-specific. No chemical identification system can accurately assess the synergistic effects of one chemical combining with another, or the possible effects of combining unknown amounts of several chemicals.

E. The Hazardous Material Identification Guide (HMIG) System

The HMIG is a system similar to the NFPA 704M system, and is used at UNO for chemical labeling. The appearance differs slightly from the NFPA, as the four quadrants are stacked rectangular boxes. The first three boxes are: blue, red and yellow, respectively. These represent Health, Fire and Reactivity as explained above. The fourth quadrant, however, is used to indicate the Personnel Protective Equipment required to handle the chemical.

(Note : Protective Equipment requirements may differ greatly if the chemical is opened and used in a fume hood). Contact your Authorized User or area supervisor to see if these requirements apply. See examples in Figures 2 through 4.

F. UNO Room Labeling System

A room or area is required to be posted in the presence of chemical or hazardous materials, and shall be posted by the responsible department. Environmental Health and Safety will offer assistance in assigning appropriate designations. This posting will indicate the following parameters as applicable:

- 1. Room Identification
- 2. Universally accepted symbol for the hazard(s) present
- 3. The NFPA 704M System
- 4. Radioactive Materials
- 5. In case of emergency, Contact:
- a. Campus Security X4-2911
- b. Primary contact phone number
- c. Secondary contact phone number
- 6. No smoking, eating or drinking

NOTE: It is important that the room labeling adequately reflects the hazard(s) associated with materials used and stored. Any time different materials are to be used, or if current materials will no longer be needed, notify the Authorized User or area supervisor. They will assess the change(s) and modify the room labeling as needed.

G. Identifying Hazardous Materials During Transportation

The Department of Transportation, working with the United Nations, has developed an international classification system for hazardous materials. A substance is classified as hazardous if it "poses an unreasonable risk to public health and safety" when transported. Transportation of hazardous contents between States bear a four-digit code number. This code, called a North American (NA) or United Nations (UN) number, is located on placards placed on all four sides of the vehicle. Interpretations of these codes are found in DOT's Emergency Response Guidebook, which may be viewed at the EHS Office.

Some placards also have a hazard class number at the bottom corner which indicates the substance's particular class. These numbers are standardized throughout the U.N. participant countries using the system, and are as follows:

Number Class

- 1 Explosives
- 2 Gases
- 3 Flammable Liquids
- 4 Flammable Solids
- 5 Oxidizers
- 6 Poisons
- 7 Radioactives
- 8 Corrosives
- 9 Miscellaneous Dangerous Substances

Each of these classes is then broken down into specific subsets. For example, gases may be poisonous, flammable, or nonflammable. Oxygen and chlorine are gases that have their own individual labels. Each class has a symbol that suggests the primary type of hazard it poses. (A single chemical may pose several hazards, only one of which is on the placard.)

Most transportation accidents involve flammable or combustible liquids. These are substances that have low flash points, and include the frequently transported fuel, gasoline. The flash point of a liquid is the point at which sufficient vapor is produced to cause it to flash in the presence of an ignition source. The lower the flash point, the more volatile the substance.

The second most frequent type of incident involves corrosives, defined by DOT as "any liquid or solid that can destroy human skin tissue, or any liquid that has a severe corrosion rate on steel." This class includes acids (such as sulfuric acid, used in chemical processing; and nitric acid, commonly used in the manufacture of fertilizers, explosives, and synthetic fibers) and bases

(such as sodium hydroxide, used to purify petroleum products and in the manufacture of soap, pulp, and paper).

Examples:

Room and Container Labels



Room Label

Chemical Container Labels

(example is Denatured Ethanol)



HMIG

2	H	CHEMICAL NAME Ethanol, denatured			
4	F D	COMMONNAME Alcohol			
<u> </u>	Γ	MANUFACTURER	DATE		
$\underline{\mathbf{G}}$	PE	Sigma	7/1/96		

National Fire Protection Association NFPA 704M Label



FIRE HAZARD

Flash Points 4 Below 73 F 3 Below 100 F 2 Above 100 F not exceeding 200 F 1 Above 200 F 0 Will not Burn

REACTIVITY

4 May Detonate 3 Shock & Heat

may Detonate 2 Violent Chemical

Change

1 Unstable if heated 0 Stable

CLASSIFICATION AS TO SEVERITY OF HAZARD

HEALTH	FLAMMABLE	REACTIVE		
Type of possible injury	Susceptibility of materials to burning	Susceptibility to release of energy		
4 Too dangerous to enter vapor or fluid	4 Extremely Flammable	May Detonate - vacate 4 area if materials are exposed to fire		
Extremely Dangerous - use full protective clothing	3 Ignites at normal temperatures	Strong Shock or heat may detonate - use monitors from behind explosion resistant barriers		
2 Hazardous - use breathing apparatus	2 Ignites when moderately heated	Violent chemical change possible - use hose stream from distance		
1 Slightly Hazardous	1 Must be preheated to burn	1 Unstable if heated - use normal precaution		
0 Like ordinary material	0 Will not burn	0 Normally Stable		

Hazardous Materials Identification Guide (HMIG)





HAZARD RATING AND PROTECTIVE EQUIPMENT

Health	Flamm able	Reactive	
Type of Possible Injury	Susceptibility of materials to burn	Susceptibility of materials to release of energy	
Highly Toxic. May be fatal on short term exposure. Special protective equipment required.	4 Extremely flammable gas or liquid. Flash Point below 73°F.	Extreme. Explosive at room 4 temperature.	
3 Toxic. Avoid inhalation or skin contact.	3 Flammable. Flash Point 73°F to 100°F.	Serious. May explode if shocked, heated under confinement or mixed w/ water.	
2 Moderately Toxic. May be harmful if inhaled or absorbed.	Combustible . Requires moderate heating to ignite. Flash Point 100°F to 200°F.	2 Moderate. Unstable, may react with water.	
1 Slightly Toxic. May cause slight irritation.	1 Slightly Combustible. Requires strong heating to ignite.	1 Slight. May react if heated or mixed with water.	
0 Minimal. All chemicals have a slight degree of toxicity.	0 Minimal. Will not burn under normal conditions.	Minimal. Norm ally stable, does not react with water.	

Protective Equipment

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D	spectral + that + the	Η	32 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	X	Ask your supervisor for guidance.

SAMPLE MATERIAL SAFETY DATA SHEET

BOUGHT ACCORDING TO SPECIFICATION -- O-E-760 GR III - ALCOHOL, DENATURED MATERIAL SAFETY DATA SHEET FSC: 6810 NIIN: 008238011 Manufacturer's CAGE: 81348 Part No. Indicator: A Part Number/Trade Name: O-E-760 GR III _______General Information _______General Information ________Item Name: ALCOHOL, DENATURED

Company's Name: BOUGHT ACCORDING TO SPECIFICATION Record No. For Safety Entry: 002 Tot Safety Entries This Stk#: 002 Date MSDS Prepared: 01JAN85 Safety Data Review Date: 10JAN83 MSDS Serial Number: BFRDD Specification Number: O-E-760 Hazard Characteristic Code: F3 Unit Of Issue Container Qty: BULK

Ingredients/Identity Information

Proprietary: NO Ingredient: DENATURED ALCOHOL Ingredient Sequence Number: 01 Percent: 94.9 NIOSH (RTECS) Number: 1000041DA

Physical/Chemical Characteristics

Fire and Explosion Hazard Data

Flash Point: 59F

Reactivity Data

Health Hazard Data

Precautions for Safe Handling and Use

Control Measures

Suppl. Safety & Health Data: ITEM COMPOSITION IS IN PERCENT BY VOLUME.

Transportation Data

_____ Trans Data Review Date: 90060 DOT PSN Code: EGH DOT Symbol: D DOT Proper Shipping Name: DENATURED ALCOHOL DOT Class: 3 DOT ID Number: NA1986 DOT Pack Group: I DOT Label: FLAMMABLE LIQUID, POISON IMO PSN Code: ANB IMO Proper Shipping Name: ALCOHOLS, TOXIC, N.O.S. * **IMO Regulations Page Number: 3176** IMO UN Number: 1986 IMO UN Class: 3.2 IMO Subsidiary Risk Label: TOXIC * IATA PSN Code: ARM IATA UN ID Number: 1986 IATA Proper Shipping Name: ALCOHOLS, TOXIC, N.O.S. * * IATA UN Class: 3 IATA Subsidiary Risk Class: 6.1 IATA Label: FLAMMABLE LIQUID & TOXIC * AFI PSN Code: ARM AFI Symbols: 0 AFI Prop. Shipping Name: ALCOHOLS, TOXIC, N.O.S. AFI Class: 3 AFI ID Number: UN1986 AFI Pack Group: II AFI Label: FLAMMABLE LIQUID & POISON AFI Basic Pac Ref: 7-7 N.O.S. Shipping Name: ETHANOL & METHANOL _____ _____ Disposal Data

Label Data

Label Required: YES Label Status: G Common Name: O-E-760 GR III Label Name: BOUGHT ACCORDING TO SPECIFICATION

URL for this MSDS http://hazard.com. If you wish to change, add to, or delete information in this archive please sent updates to dan@hazard.com.MSDS
