



## Chapter 3: Information Sources

There are several different systems used to identify materials and their hazards. Identification information is included on labels fixed to small containers (drums, packages, boxes) and placards fixed to large containers (trailers, rail cars, tanks). Safety Data Sheets must be available for chemicals used on the job.

### Chapter Objectives:

After completing this module, you will be able to:

1. Use the NIOSH Pocket Guide to find information on the properties, hazards, and controls for chemicals.
2. Use DOT symbols and NFPA labels to identify and rate the hazards of shipped and packaged materials.
3. Use a label and a Safety Data Sheet (SDS) to identify:
  - a product's manufacturer or importer;
  - what hazardous chemicals it contains;
  - the safety and health hazards of the product; and
  - what protective measures need to be taken when working with it



## Understanding the NIOSH Pocket Guide to Chemical Hazards

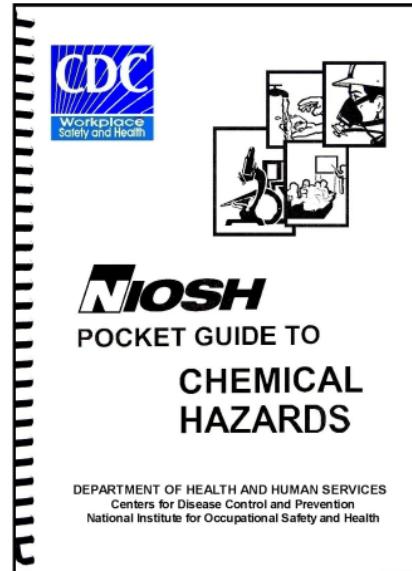
**The NIOSH Pocket Guide (NPG) is a quick source of information on properties, hazards, and controls for chemicals commonly found in the workplace.**

NIOSH evaluates all known and available medical, biological, engineering, chemical, trade, and other information relevant to the hazard. The NIOSH Pocket Guide is 454 pages, including thirty pages of introduction and Appendices A-G, and contains information on 677 chemicals. **All substances in the NPG have a NIOSH REL or an OSHA PEL.**

Chemicals are listed alphabetically, two to a page, with seventeen categories of information for each chemical. Chemical names are cross-referenced to DOT ID numbers, CAS numbers, synonyms, and trade names in the indexes.

The NIOSH Pocket Guide is available on the NIOSH Web site (<http://www.cdc.gov/niosh/npg/>) in the following formats: website, PDF, CD, and print. While the website uses fewer abbreviations, the layout of the NPG is similar for all formats.

A reproduction of the format used in the NIOSH Pocket Guide with each titled, numbered cell is shown below and explained on the following pages.





<b>Chemical Name</b> ↳ #1	<b>Formula</b> ↳ #2	<b>CAS#</b> ↳ #3	<b>RTECS#</b> ↳ #4	<b>IDLH</b> ↳ #5
<b>Conversion</b> ↳ #6	<b>DOT</b> ↳ #7			
<b>Synonyms/Trade Names</b> ↳ #8				
<b>Exposure Limits</b> ↳ #9			<b>Measurement Methods</b> ↳ #11	
<b>Physical Description</b> ↳ #10				
<b>Chemical and Physical Properties</b> ↳ #12	<b>Personal Protection / Sanitation</b> ↳ #13		<b>Respirator Recommendations</b> ↳ #14	
<b>Incompatibilities and Reactivities</b> ↳ #15				
<b>Exposure Routes, Symptoms, Target Organs</b> ↳ #16			<b>First Aid</b> ↳ #17	



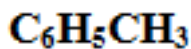
Find the chemical toluene in the NIOSH Pocket Guide. The chemical name can be found at the top of the page. Toluene, will be used as an example in the explanations on the following pages.

### #1 Chemical Name

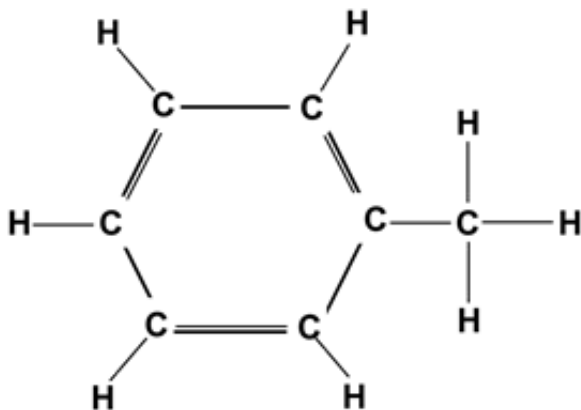
#### Toluene

The NIOSH Pocket Guide contains 677 chemicals listed in alphabetical order. The chemical name used in the OSHA standards is listed in the blue shaded box in the upper left corner. When researching chemicals, care must be taken to ensure that you're looking at the correct chemical. Several chemicals have names that sound similar or are spelled the same except for one or two letters or numbers and some are listed under alternative names (synonyms).

### #2 Formula



This section contains the chemical formula, which indicates the elements in a substance and their configuration. A toluene molecule is made of 7 carbon atoms and 8 hydrogen atoms. The structural formula (below) is a better representation of how the atoms are arranged but is not included in the NPG.





### #3 CAS#

**108-88-3**

Item #3 lists the **Chemical Abstract Service (CAS) number, which is unique to the substance.** Sometimes SDSs or labels on containers will list the CAS number instead of the chemical name.

**A complete listing of the CAS numbers of substances in the NPG begins 374 after Appendix G.**

If you search the CAS number index for toluene, you will find 108-88-3 on page 375, third column, fourth from the bottom. You'll find page number 311 next to CAS number 108-88-3. If you turn back to page 311, you'll find the entry for toluene with 108-88-3 in the CAS number section.

<u>CAS#</u>	<u>Page</u>
108-84-9	165
108-87-2	204
108-88-3	311
108-90-7	62
108-91-8	85
108-93-0	84

### #4 RTECS #

**XS5250000**

The RTECS®, or NIOSH Registry of the Toxic Effects of Chemical Substances, is a collection of toxicity data from the scientific literature. The print and PDF versions of the NPG do not have an index for RTECS# but **the web-based and CD-ROM versions have an index.** The web-based and CD-ROM versions of the NPG allow you to view the RTECS data by clicking on the chemical's RTECS number.



## #5 IDLH

**500 ppm**

This section lists the **immediately dangerous to life or health (IDLH)** concentration. This value **is the concentration above which exposure to a substance poses an immediate threat to life, causes irreversible adverse health effects, or impairs an individual's ability to escape.** Some of the factors taken into consideration when establishing IDLHs were severe eye or respiratory irritation, disorientation, and incoordination. IDLH values are based on effects that might occur following a 30-minute exposure but workers should make every effort to exit the area immediately. "**Ca**" appears in the IDLH field for substances that NIOSH classifies as carcinogens. "**10%LEL**" in the IDLH field indicates that the IDLH concentration was based on the potential for an explosion, not a toxicological hazard. "**N.D.**" indicates that an IDLH concentration has not been determined for the substance. A complete explanation of IDLH values and how they are set is found on page x in the front of the Guide.

## #6 Conversion

**1 ppm = 3.77 mg/m<sup>3</sup>**

**The conversion field shows the relationship between concentration in units of parts per million (ppm) and milligrams per cubic meter (mg/m<sup>3</sup>)** for chemicals with exposure limits given in ppm. If you know the concentration (or exposure limit) of a chemical in units of ppm then you can multiply it by the conversion factor to determine the concentration in mg/m<sup>3</sup>. If you know the concentration of a chemical in units of mg/m<sup>3</sup> then you can divide it by the conversion factor to determine the concentration in ppm.

## #7 DOT

**1294 130**

**The DOT field contains the four digit DOT Identification (ID) number and the corresponding three digit Emergency Response Guide (ERG) number.**

The Department of Transportation (DOT) assigned an identifying number to each chemical, compound, or classification of materials transported on the nation's highways or rail-lines. Each ID number has a corresponding ERG number, which



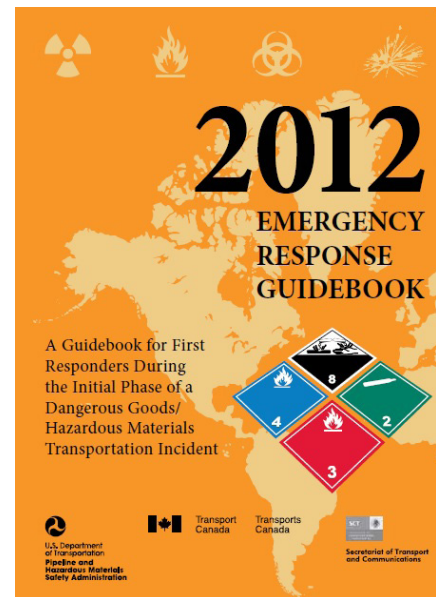
describes actions to stabilize an emergency situation. DOT labels and placards will be discussed in more detail later in this chapter.

**The mustard-colored (DOT) Emergency Response Guide (ERG), pictured on this page, is used by emergency services responding to a spill or fire involving hazardous chemicals.** The NIOSH Pocket Guide contains a list of all DOT numbers used in this guide starting after Appendix G. Remember, these numbers and the information they refer to are not always specific to one chemical; the information may pertain to a group of similar chemicals.

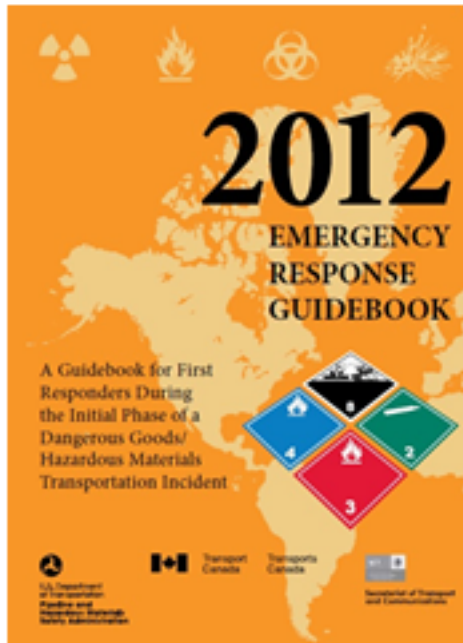
The National Library of Medicine worked with the DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) to develop free ERG applications for Apple and Android phones and tablets.

**Assume that a tanker began leaking on your job site.** Not having the shipping manifest close by, you could use the number on the diamond-shaped placard on the tanker to research the chemical in the NIOSH Pocket Guide and the DOT ERG. If you search the NPG DOT ID number index, you will see "311" next to 1294, on page 379, referring you to page 311 in the NIOSH Pocket Guide. **If you look in the yellow section of the DOT ERG, you'll find that 1294 is toluene.** Next to 1294, you will see the number "130". **If you knew that 1294 was toluene then you could also look it up in by the name in the blue section of the ERG. "130" refers you to Guide # 130 in the orange section of the DOT ERG.**

<u>DOT ID #</u>	<u>Page</u>
1280	270
1282	272
1292	142
1294	311
1296	318
1297	319



The Protective Clothing section of Guide 130 from the ERG has been reproduced below. The Protective Clothing section lists the precautions to be taken concerning the selection of protective clothing when responding to a spill.



## PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

As you can see, this section of **the 2012 ERG doesn't provide enough specific information for use during clean-up operations.** While it addresses the need for maximum respiratory protection during emergency operations, it gives no direction for selection of other protective clothing. Other sources of information, such as the NIOSH Pocket Guide and SDSs, should be used in selecting PPE and determining a proper course of action involving the clean-up of hazardous chemicals.





## #8 Synonyms/Trade Names

**methyl benzene, methyl benzol, phenyl methane, toluol**

Often, products will arrive on the worksite with labels listing the ingredients using a synonym, rather than the proper names of the chemicals. The chemicals in the NIOSH Pocket Guide are organized by the names used in the OSHA standards but synonyms are provided. **There is an index of synonyms and trade names in the Name Index following Appendix G.**

If you receive a container listing the ingredient phenyl methane, you can research the chemical using the Pocket Guide. Phenyl methane is listed on page 414 in the NPG's synonyms index (right column, 10th from the bottom). Next to phenyl methane is page number 311. If you turn to page 311 and search through the synonyms, you will find phenyl methane listed under toluene.

## #9 Exposure Limits

**When available, exposure limits from NIOSH and OSHA are given for each chemical.** These limits are given in ppm, mg/m<sup>3</sup> or µg/m<sup>3</sup>, or both, depending on their composition. Generally, gases and vapors are measured in ppm and particulates are measured by mass (weight), in milligrams or micrograms, per cubic meter of air.

**Toluene**  
**NIOSH REL:**  
TWA 100 ppm (375 mg/m<sup>3</sup>)  
ST 150 ppm (560 mg/m<sup>3</sup>)  
**OSHA PEL:**  
TWA 200 ppm  
C 300 ppm  
500 ppm (10-minute maximum peak)

The notation "Ca" is given for substances that NIOSH considers potential occupational carcinogens.



**The OSHA Permissible Exposure Limits (PELs) are legally enforceable while the NIOSH Recommended Exposure Limits (RELs) are not legally enforceable .** When these exposure limits are preceded by “TWA” it means they are time-weighted average exposures over the course of a workday (OSHA uses an 8-hour workday and NIOSH uses a 10-hour workday ). The ACGIH Threshold Limit Values (TLVs) are not listed in the NPG but are another set of exposure limits that are not generally enforceable. Contractors on DOE sites are required to meet TLVs when they are more protective (lower) than the OSHA PELs.

**The section may also include exposure limits that are not full-shift time-weighted averages.** ST indicates a short-term exposure limit (STEL), which is a 15-minute time-weighted average (TWA), unless otherwise stated. The “C” designation refers to ceiling value, which is a concentration that workers should never be exposed to. OSHA’s ceiling value (C) for toluene is 300 ppm. This means that workers should not be exposed to 300 ppm or higher concentrations of toluene.

These and other terms are explained beginning on page xi in the front of the NIOSH Pocket Guide.

**Example:**

The OSHA Permissible Exposure Limit (PEL) is 200 ppm as an 8-hour TWA. This means that without some form of protection, workers may not be exposed to more than 200 ppm averaged over an 8-hour workday. PELs are legally enforceable.

The NIOSH Recommended Exposure Limit (REL) for toluene is 100 ppm as a 10-hour time-weighted average (TWA). This means that NIOSH recommends that workers not be exposed to more than 100 ppm averaged over a 10-hour workday.



### Time-Weighted Average Activity

You are working 8-hour shifts using a product containing toluene and want to determine if your exposure exceeds the OSHA PEL for toluene. You know that the OSHA Permissible Exposure Limit (PEL) for toluene is 200 ppm averaged over an 8-hour day. Air monitoring results show that you were exposed to 10 ppm for the 4 hours before lunch and 100 ppm for 4 hours after lunch. What is your time-weighted average exposure to toluene for the 8-hour shift?

$$\text{TWA} = \frac{(\text{concentration \#1} \times \text{time \#1}) + (\text{concentration \#2} \times \text{time \#2})}{(\text{time \#1} + \text{time \#2})}$$

$$\text{TWA} = \frac{(\text{ } \text{ppm} \times \text{ } \text{hours}) + (\text{ } \text{ppm} \times \text{ } \text{hours})}{(\text{ } \text{hours} + \text{ } \text{hours})}$$

$$\text{TWA} = (\text{ } + \text{ } ) \text{ ppm}$$

$$\text{TWA} = \text{ } \text{ ppm}$$

Does your exposure exceed the OSHA PEL?

### #10 Measurement Method

**NIOSH 1500, 1501, 3800, 4000**  
**OSHA 111**

This section indicates the NIOSH and/or OSHA methods used to measure exposure to the chemical. No explanation of these methods is given in the NIOSH Pocket Guide. For more information on these methods, visit <https://www.osha.gov/dts/sltc/methods/> or <http://www.cdc.gov/niosh/nmam>



## #11 Physical Description

**Colorless liquid with a sweet, pungent, benzene-like odor**

The **Physical Description** gives a brief explanation of what the chemical looks and smells like. While you should never use your nose to determine the presence of a chemical, this information is important if you smell something unexpected on your work site. It may also list the state (solid, liquid, or gas) in which the chemical is commonly shipped or found, such as a liquefied, compressed gas.

## # 12 Chemical and Physical Properties

The Chemical and Physical Properties section provides information on the specific properties of the chemical. Some items listed are: the molecular weight of the chemical (MW); the flash point (FI.P); upper and lower explosive limits (UEL and LEL); the boiling point (BP) which is the temperature where a liquid turns to a vapor or gas; and the freezing point (FRZ) which is the temperature where a liquid chemical turns to a solid.

How chemicals act depends upon their physical and chemical properties. Understanding how chemicals behave can help you anticipate the hazards.

### Example:

The FI.P. of toluene is 40°F. At 40°F, toluene gives off enough vapors to burn if there is a source of ignition.

Chemical and physical properties are discussed in detail beginning on page 24 in chapter 2 of this manual.

The following abbreviations are used for the chemical and physical properties given for each substance. "NA" indicates that a property is not applicable, and a "?" indicates that it is unknown.

**MW:** 92.1  
**BP:** 232°F  
**Sol (74°F):** 0.07%  
**FI.P:** 40°F  
**IP:** 8.82 eV  
**Sp. Gr:** 0.87  
**VP:** 21 mmHg  
**FRZ:** -139°  
**UEL:** 7.1%  
**LEL:** 1.1%  
Class 1B Flammable Liquid



<b>MW</b>	Molecular weight
<b>BP</b>	Boiling point at 1 atmosphere, °F
<b>Sol</b>	Solubility in water at 68 °F (unless a different temperature is noted), % by weight (i.e., g/100 ml)
<b>Fl.P</b>	Flash point (i.e., the temperature at which the liquid phase gives off enough vapor to flash when exposed to an external ignition source), closed cup (unless annotated “(oc)” for open cup), °F
<b>IP</b>	Ionization potential, eV (electron volts) [Ionization potentials are given as a guideline for the selection of photoionization detector lamps used in some direct-reading instruments.]
<b>VP</b>	Vapor pressure at 68 °F (unless a different temperature is noted), mm Hg; “approx” indicates approximately
<b>MLT</b>	Melting point for solids, °F
<b>FRZ</b>	Freezing point for liquids and gases, °F
<b>UEL</b>	Upper explosive (flammable) limit in air, % by volume (at room temperature unless otherwise noted)
<b>LEL</b>	Lower explosive (flammable) limit in air, % by volume (at room temperature unless otherwise noted)
<b>MEC</b>	Minimum explosive concentration, g/m <sup>3</sup> (when available)
<b>Sp.Gr</b>	Specific gravity at 68 °F (unless a different temperature is noted) referenced to water at 39.2 °F (4 °C)
<b>RGasD</b>	Relative density of gases referenced to air = 1 (indicates how many times a gas is heavier than air at the same temperature)

The flammability classification based on the OSHA criteria (29 CFR 1910.106) is provided for each chemical. A description of the classes can be found on page xiv of the NPG.



## # 13 Personal Protection and Sanitation

*The Personal Protection and Sanitation section gives guidelines to follow when working with the chemical. These recommendations should be followed if additional controls are needed after all feasible process, equipment, and task controls have been implemented.*

An explanation of the categories is provided on page xiv and the codes and their definitions are given in Table 2 on pages xviii and xix in the NPG.

For example, the recommendations when working with toluene are: Prevent skin contact; Prevent eye contact; Wash skin when contaminated; Remove wet clothing immediately due to flammability; No recommendation to change clothing after the work shift. The complete definitions for the recommendation codes for toluene are shown below.

Category	Code	Definition
<b>Skin</b>	Prevent skin contact	Wear appropriate personal protective clothing to prevent skin contact.
<b>Eyes</b>	Prevent eye contact	Wear appropriate eye protection to prevent eye contact
<b>Wash skin</b>	When contam	The worker should immediately wash the skin when it becomes contaminated.
<b>Remove</b>	When wet (flamm)	Work clothing that becomes wet should be immediately removed due to its flammability hazard (i.e., for liquids with a flash point <100°F).
<b>Change</b>	N.R.	No recommendation is made specifying the need for the worker to change clothing after the workshift.



## #14 Recommendations for Respiratory Protection

### NIOSH

**500 ppm:** CcrOv\*/Paprv\*/  
GmFOv/Sa\*/ScbaF

**§:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba

**Escape:** GmFOv/ScbaE

**This section provides a condensed table of recommendations for selecting respirators for the conditions (entry into unknown concentrations or IDLH conditions or escape) and maximum use concentration (500 ppm) listed.** The first line indicates whether the respirator recommendations are based on the NIOSH

or the OSHA exposure limit. The more protective exposure limit is used and “NIOSH/OSHA” is indicated if they are the same. An explanation of the Recommendations for Respirator Selection is found beginning on page xiv of the NIOSH Pocket Guide.

When using this section to choose a respirator, **care must be taken to understand the abbreviations and consider the IDLH values.**

Descriptions of the abbreviations and symbols used in the respiratory protection section are given to the right and a partial list of the codes and their description are given below. A complete listing of the codes for the categories of respirators, their Assigned Protection Factors (APFs), and their descriptions begins on page xx of the NIOSH Pocket Guide.

Symbol	Definition
¥	At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration
§	Emergency or planned entry into unknown concentrations or IDLH conditions
*	Substance reported to cause eye irritation or damage; may require eye protection
£	Substance causes eye irritation or damage; eye protection needed
¿	Only nonoxidizable sorbents allowed (not charcoal)
†	End of service indicator (ESLI) required
APF	Assigned protection factor



Code	Description
CcrOv	Chemical cartridge respirator with organic vapor cartridge or canister
PaprOv	Powered, air-purifying respirator with organic vapor cartridge or canister
GmFOv	Air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor cartridge or canister
Sa	Supplied-air respirator
ScbaF	Any self-contained breathing apparatus with a full facepiece.
ScbaF:Pd,Pp	Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
SaF:Pd,Pp:AScba	Any supplied-air respirator that has a full-facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
GmFOv	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister.
ScbaE	Any appropriate escape-type, self-contained breathing apparatus.

### #15 Incompatibilities and Reactivities

#### **Strong oxidizers**

Incompatibilities and Reactivities refer to specific conditions and types of chemicals to avoid when working with this substance. Toluene lists “Strong oxidizers” as an incompatible group of chemicals. Oxidizers provide a source of oxygen and with toluene, being a flammable chemical, additional oxygen in the atmosphere would create an extremely hazardous atmosphere due to the increased danger of fire or explosion.





## #16 Exposure Routes, Symptoms, Target Organs

**ER:** Inh, Abs, Ing, Con

**SY:** Irrit eyes, nose; lass, conf, euph, dizz, head; dilated pupils; lac; anxi,  
musc ftg, insom; pares; derm; liver, kidney damage

**TO:** Eyes, skin, resp sys, CNS, liver, kidneys

**Exposure Routes (ER)** refers to how the chemical enters the body. Toluene can enter the body through Inh (inhalation), Abs (absorbed through the skin), and Ing (ingestion or swallowing). Con indicates that contact with the skin or eyes may be hazardous (cause burns, irritation, etc.).

**Symptoms (SY)** lists the possible effects of exposure to the chemical and whether NIOSH classifies it as a potential carcinogen. A complete list of the abbreviations used in this section is found beginning on page xxvi but the terms are not explained. Many of the terms can be found in the U.S. National Library of Medicine's dictionary; <http://www.nlm.nih.gov/medlineplus/mplusdictionary.html>.

**Target Organs (TO)** refers to the parts of the body affected by the chemical. Toluene affects the eyes, skin, respiratory system, central nervous system, liver, and kidneys.

## #17 First Aid

**Eye:** Irr immed

**Skin:** Soap wash prompt

**Breath:** Resp support

**Swallow:** Medical attention immed

The last section provides recommendations for first aid for workers who have been exposed to this chemical.

Explanations for these and other terms used in the First Aid section begin on page xxviii of the NIOSH Pocket Guide.

If a person breathes large amounts of this toluene, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention immediately.



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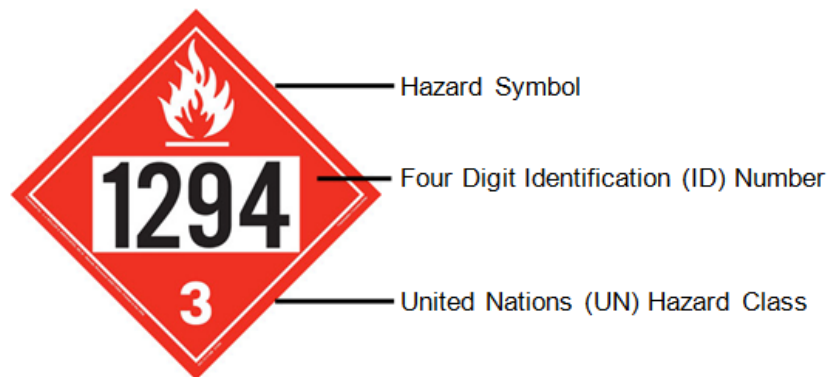
**SAFER ■ HEALTHIER ■ PEOPLE**



## Department of Transportation (DOT) System Placards and Labels

DOT labels and placards are diamond-shaped and use numbers, symbols and colors to warn about hazards. These labels and placards must be posted on large portable tanks, tank trucks, and rail cars. The four-digit ID number that identifies the chemical is listed in the DOT *Emergency Response Guidebook*, the NIOSH *Pocket Guide*, and the National Library's *Wireless Information System for Emergency Responders (WISER)*.

Some labels and placards identify specific chemicals, like this one for toluene (1294).



Others labels give the hazard symbol and UN hazard class number but name the hazard instead of the specific chemical. The four digit ID number may be found on a nearby panel.





The one- or two-digit number at the bottom is the UN (United Nations) Hazard Class or Division. Substances (including mixtures and solutions) and articles subject to the UN numbers are assigned to one of nine classes according to the hazard or the most predominant of the hazards they present.

#	UN Hazard Class
1	Explosives
2	Gases (compressed, liquefied, or dissolved under pressure)
3	Flammable liquids
4	Flammable solids or water reactive substances
5	Oxidizing substances and organic peroxides
6	Toxic/poisonous substances and infectious substances
7	Radioactive substances
8	Corrosive substances
9	Miscellaneous hazardous materials

Some Hazard Classes are further divided into Divisions to provide more information about the hazard. For example, gases are divided into three Divisions: flammable (2.1), non-flammable, non-toxic (2.2), and toxic (2.3). The additional information may be conveyed with the name, the Division Number, or both.










#	UN Hazard Class and Division
2	Gases
2.1	Flammable gases
2.2	Non-flammable, non-toxic gases
2.3	Toxic gases

**The DOT specifies both colors and symbols to represent classes of hazards.**

Color	Hazard
Orange	Explosive
Red	Flammable
Green	Non-flammable
Yellow	Oxidizer/organic peroxides
White	Poisonous
White/red vertical stripes	Flammable solid
White top with black bottom	Corrosive
Yellow top with white bottom	Radioactive
Blue	Dangerous when wet
White top with red bottom	Spontaneously combustible

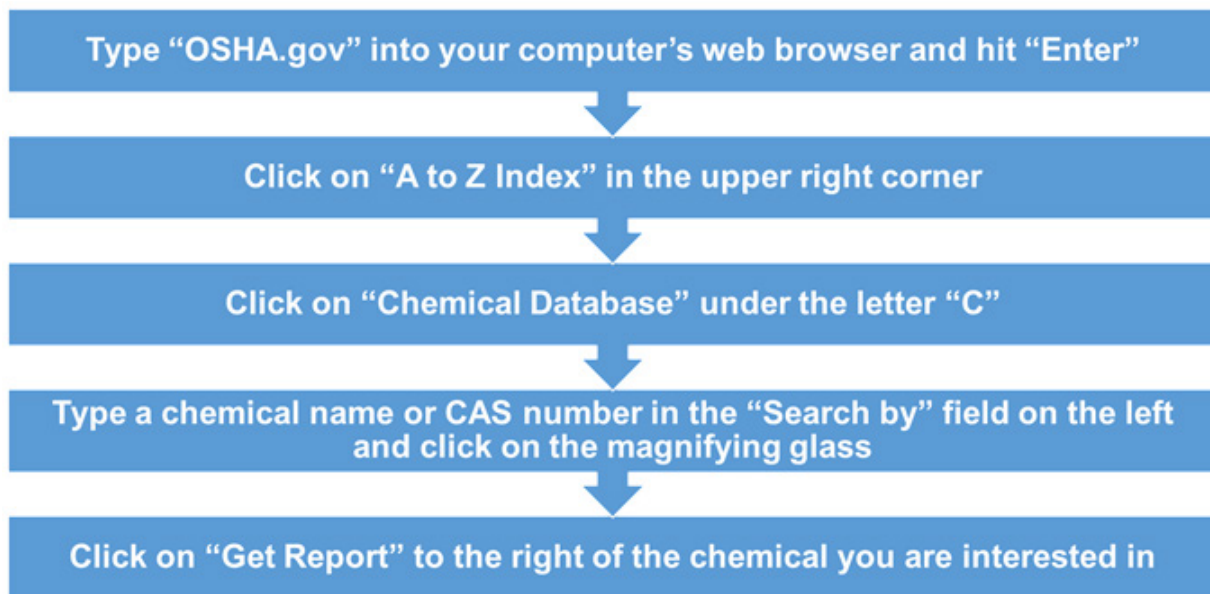


The following are examples of symbols used to represent UN Hazard Classes and Divisions. Note that some substances may fall into more than one Hazard Class or Division and some placards only indicate Class while others are more specific and indicate the Division Number.

Hazard Class Number and Name	
	1 – Explosives
	2 – Gases
	3 – Flammable and combustible liquids
	4 - Flammable solids; Spontaneously combustible materials; and Dangerous when wet materials/Water-reactive substances
	5 – Oxidizers and organic peroxides 5.1 – Oxidizing substances
	6 – Toxic/poisonous substances and infectious substances
	7 – Radioactive materials
	8 – Corrosive
	9 – Miscellaneous hazardous materials



**OSHA maintains a database of chemical information from several government agencies and organizations.** You can search for chemicals by name or CAS number or viewing an alphabetical list. The report for each chemical includes exposure limits, carcinogen classifications, and chemical and physical properties, and other information, from the NIOSH Pocket Guide. The reports also include emergency response information from the DOT Emergency Response Guidebook and from the EPA's Computer-Aided Management of Emergency Operations (CAMEO) software. <https://www.osha.gov/chemicaldata/index.html>

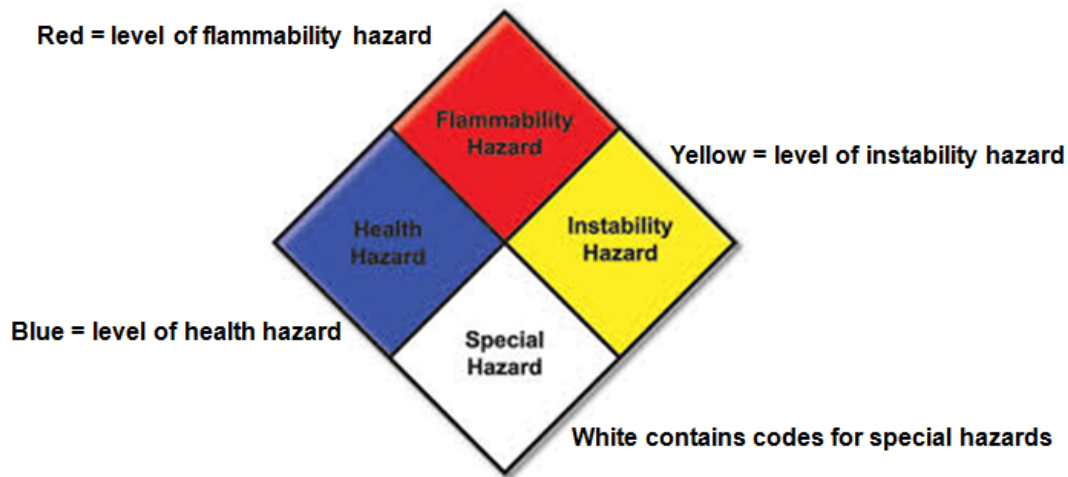


The **NFPA (National Fire Protection Association) 704** (Standard System for the Identification of the Hazards of Materials for Emergency Response) is a standard maintained by the National Fire Protection Association. **The standard describes a system to help emergency personnel quickly and easily identify the short-term hazards posed by nearby hazardous materials during a fire, spill, or similar emergency.**

The 704M system may be used to label storage vessels, containers, buildings, and rooms at stationary facilities. Some facilities use this system throughout their departments and put the NFPA label on all hazardous materials. The facility's hazard communication training should inform the worker if this warning system is being used at the work site.



The system uses numbers and symbols in four divisions of a color-coded diamond to convey the hazard information. The number in the blue section indicates the level (severity) of health hazard, red indicates flammability, yellow instability (chemical reactivity), and white contains codes for special hazards.

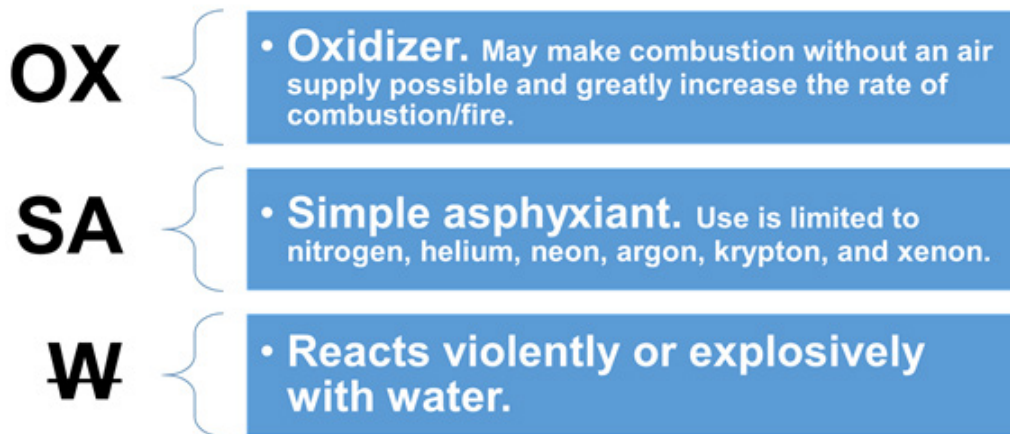


Health, flammability, and instability hazards are rated on a scale from 0 (minimal hazard) to 4 (severe hazard). The NFPA diamond does not name individual chemicals and usually represents the maximum rating in each category for chemicals in the area. In areas with few chemicals, there may be a labeled NFPA diamond for each chemical.

Color	Hazard	Risk (for all hazards)		
red	flammability	4	_____	Severe
blue	health risk	3	_____	
yellow	instability (chemical reactivity)	2	_____	
		1	_____	
		0	_____	Minimal



The special hazard (white) section of the NFPA diamond may contain symbols that give more information about the chemical. **There are three special hazard symbols defined in the NFPA 704 standard.** Local fire jurisdictions may choose to include other symbols not defined by NFPA based on hazards in their area.



**At a minimum, NFPA hazard diamonds should be posted at the following locations: 1) the two exterior walls of a facility, 2) access to a room or area, and 3) each principal means of access to an exterior storage area.** Since the NFPA hazard diamonds are intended to quickly provide hazard information to emergency responders, the placards should be visible where the responders are likely to enter. If there are numerous areas where the responders could enter, then there should be numerous placards.

**NFPA placards allow emergency responders to determine if they should enter and what, if any, specialty equipment should be used, procedures followed, or precautions taken during the first moments of an emergency response.**





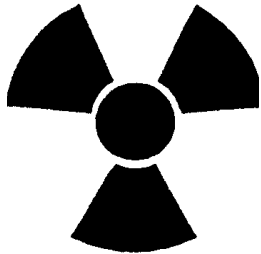
**While not defined in the NFPA standard, infectious and radioactive materials may be indicated in the special hazard section of NFPA diamonds.**

One of the most common types of packaged biological waste is infectious waste from hospitals and other health care facilities. This type of waste should be in boxes, plastic containers, or red plastic bags marked on all sides with the infectious materials symbol shown below.

Examples of infectious materials include used needles and syringes, soiled bandages, test tubes, and disposable vials. Less frequently encountered biological hazards include biological research materials.



**Infectious  
Materials Symbol**



**Radiation Symbol**

Radioactive sources are used in industry and medicine, and radioactive wastes result from energy and weapons production. Do not work with or around radiation hazards unless you have had the training to do so and have the proper PPE and equipment. Radiation hazards should be covered in the Standard Operating Procedures (SOPs) for your work site. **All forms of radiation should be considered very hazardous. Treat Them With Respect!**



**Hazard Materials Identification System (HMIS) is a proprietary labeling system for individual chemical containers.**

**HMIS uses colors, numbers, letters of the alphabet, and symbols of types to convey information to chemical users**

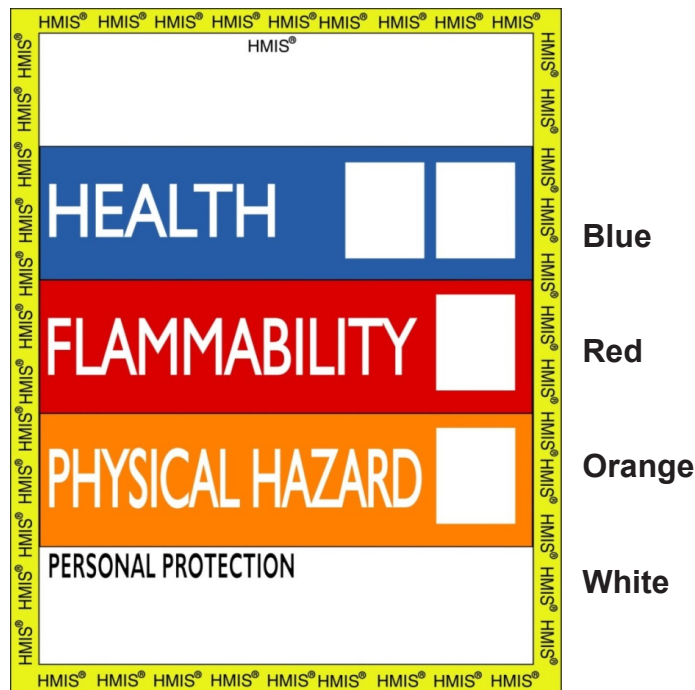
**Blue** = level of health hazard

**Red** = level of flammability hazard

**Orange** = level of physical hazard (similar to instability or reactivity)

**White** contains codes for PPE recommendations for normal use, not emergencies

**Health, flammability, and physical hazard are rated on a scale from 0 (minimal hazard) to 4 (severe hazard), just like the NFPA diamonds. The health section (blue) will include an \* (asterisk) when a substance has chronic effects or may cause cancer.**





HMIS assigns a letter of the alphabet as a code for PPE combinations. This chart shows combinations of PPE and HMIS's corresponding codes and symbols.

HAZARD INDEX				PERSONAL PROTECTION INDEX			
4 = SEVERE HAZARD		An asterisk(*) or other designation corresponds to additional information on a data sheet or separate chronic effects notification		<b>A</b>			
3 = SERIOUS HAZARD				<b>B</b>			
2 = MODERATE HAZARD				<b>C</b>			
1 = SLIGHT HAZARD				<b>D</b>			
0 = MINIMAL HAZARD				<b>E</b>			
Additional Information				<b>F</b>			
PERSONAL PROTECTION EQUIPMENT				<b>G</b>			
<b>A</b> Safety Glasses	<b>n</b> Splash Goggles	<b>o</b> Face Shield & Eye Protection	<b>p</b> Gloves	<b>H</b>			
<b>q</b> Boots	<b>r</b> Synthetic Apron	<b>s</b> Full Suit	<b>t</b> Dust Respirator	<b>I</b>			
<b>u</b> Vapor Respirator	<b>w</b> Dust & Vapor Respirator	<b>y</b> Full Face Respirator	<b>z</b> Airline Hood or Mask	<b>J</b>			
				<b>K</b>			
				<b>X</b>	Consult your supervisor or S.O.P. for "SPECIAL" handling directions		

HMIS labels are different from NFPA 704 diamonds in that they:

1. Provide information on PPE
2. Indicate with an \* when a substance has chronic effects or may cause cancer
3. Are typically on containers to communicate hazards to employees who work with the chemical



**WISER (Wireless Information System for Emergency Responders) is a system designed by the U.S. National Library of Medicine (NLM) to assist emergency responders in hazardous material incidents.** While it was intended for Hazmat First Responders, WISER is a considerable resource for construction workers and those making safety and health decisions.

**WISER provides a wide range of information on hazardous substances, including substance identification support, physical characteristics, human health information, and containment and suppression advice.**

**Hazardous substances include:**

- 400+ chemicals (5000+ aliases/synonyms)
- Radioisotopes
- Biologicals

**WISER is available online and as a stand-alone application for PCs and various mobile devices.** Visit <http://wiser.nlm.nih.gov> to use WISER when you have access to the internet or for information on downloading WISER for iOS (Apple), Android, and Windows devices for when you don't have access to the internet.

**WISER allows you to find information on a known substance by searching for:**

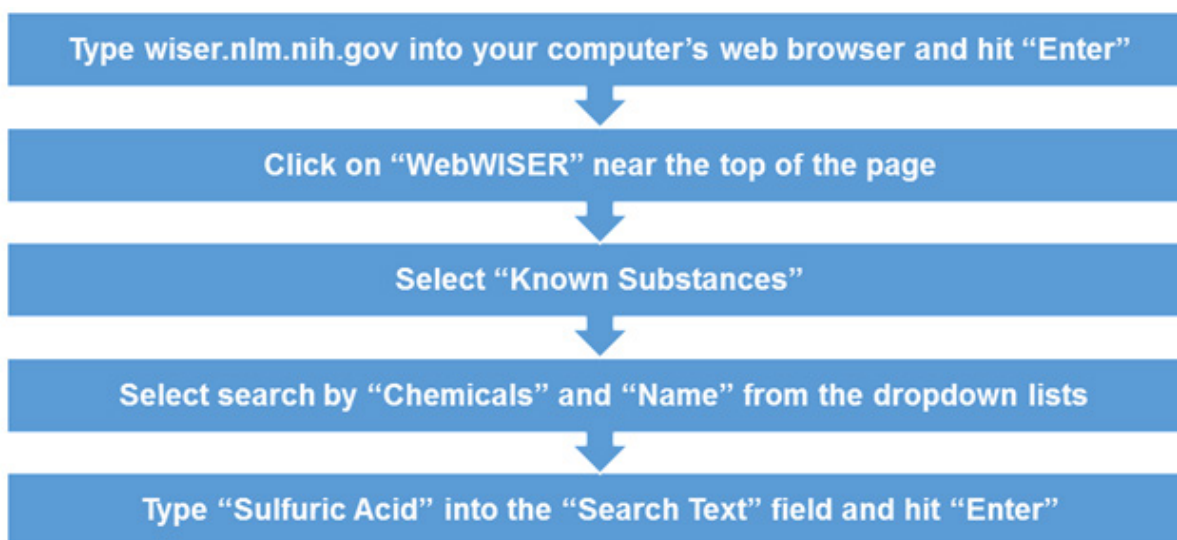
- Name
- UN/NA number
- CAS registry number
- STCC (standard transportation commodity codes)



**Results can be filtered by substance types or categories or a combination.**

1. Types of substances
  - Chemicals
  - Biologicals
  - Radiologicals
2. DOT Hazard Classifications
3. Weapons of mass destruction
4. Miscellaneous categories
5. Chemicals associated with meth labs
6. Chemical weapons precursors

**WISER is available online [wiser.nlm.nih.gov](http://wiser.nlm.nih.gov)**





### **WISER can help you to identify an unknown chemical.**

Using the options on the left side of the page, identify an unknown chemical by selecting criteria for any combination of the following:

- Select the chemical's physical properties
- Select symptoms of exposed victims
- Also narrow results using:
  - NFPA 704 placard
  - Substance categories
    - DOT classification
    - Meth Lab
    - Chemical weapons precursors
    - Weapons of mass destruction (blood, blister, choking, and nerve agents)

### **Labels and Safety Data Sheets (SDS)**

**The OSHA Hazard Communication Standard (29CFR1926.59 or 29CFR1910.1200) requires employers to have a hazard communication (HazCom) program, label chemical containers, and keep Safety Data Sheets (SDS) for each hazardous chemical used in their workplace.**

**Employees must be told the location of the employer's written hazard communication program, SDSs, and hazardous chemical lists.** If you don't know where SDSs are kept on your job, you should ask your supervisor first, your employer next and then the general contractor or the subcontractors.



In 2012, **OSHA revised its HazCom Standard to be consistent with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).** OSHA's use of the GHS helps to ensure a consistent way of classifying hazards and communicating the information to workers. **The new Hazard Communication standard gives workers the right to understand the chemical hazards associated with their jobs.**

**OSHA requires that labels contain these elements:**

1. **Product identifier** is the name, code, or batch number used to identify the hazardous chemical.
2. **Supplier identification** includes the name, address and telephone number of the chemical manufacturer, importer or other responsible party.
3. **Signal words** is used to indicate the relative level of severity of the hazard and alert the reader to a potential hazard on the label. "Danger" is used for the more severe hazards, while "warning" is used for the less severe.
4. **Hazard statement** describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard and is based on the chemical's class and category.
5. **Precautionary statement** describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to the hazardous chemical or improper storage or handling.
6. **Hazard pictograms** - means a composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical.

**The label producer may provide any supplementary information that it determines helpful.** Such information may include hazards not otherwise classified, directions for use, PPE pictograms (as found on HMIS labels), expirations dates, and fill dates. This section must also identify the percentage of ingredient(s) of unknown acute toxicity when it is present in a concentration of  $\geq 1\%$  and the classification is not based on testing the mixture (product) as a whole.










There are 9 pictograms that may be found on labels and SDS.



On the following page, the top row are physical hazards and the bottom row are health hazards, except for the final environmental pictogram.





Pictogram Name	Pictogram	Hazards/Types of Chemicals
Flame		Flammables Self-Reactives Pyrophorics Self-Heating Emits Flammable Gas Organic Peroxides
Flame Over Circle		Oxidizers
Exploding Bomb		Explosives Self-Reactives Organic Peroxides
Corrosion		Skin Corrosion/Burns Eye Damage Corrosive to Metals
Gas Cylinder		Gases under pressure
Health Hazard		Carcinogen Respiratory Sensitizer Reproductive Toxicity Target Organ Toxicity Mutagenicity Aspiration Toxicity
Exclamation		Irritant (skin and eye) Skin (dermal) Sensitizer Acute Toxicity (harmful) Narcotic Effects Respiratory Tract Irritation
Skull and Crossbones		Acute Toxicity (severe)
Environmental Pollutant		Aquatic Toxicity  Part of GHS, but not 1910.1200. OSHA does not have jurisdiction over environmental matters



**If you pour anything into a container it must be labeled unless you are going to use it within the work shift and control it.** Employers can go beyond the minimum standard and require labeling for all containers.

**Safety Data Sheets are an important information source on hazardous chemicals.** Manufacturers and distributors must forward SDSs to the purchaser with the first shipment, and with the first shipment after an SDS is updated. Whenever the employer receives a new or revised SDS that could impact your health, you must be informed within 30 days after receipt. Your employer must maintain SDSs for all hazardous chemicals used on the job. SDSs do not cover hazardous wastes. You can, however, find information on hazardous wastes in shipping papers, manifest forms, and waste profile sheets.

**Instead of Material Safety Data Sheets (MSDS), the 2012 OSHA HazCom standard requires Safety Data Sheets (SDS).** The major improvements with SDS are that the format and information found in them will be more complete and consistent. **Safety Data Sheets must contain the following 16 sections in the specified order.** Sections 1 through 8 contain general information about the chemical, identification, hazards, composition, safe handling practices, and emergency control measures (e.g., fire fighting). Sections 9 through 11 and 16 contain other technical and scientific information, such as physical and chemical properties, stability and reactivity information, toxicological information, exposure control information, and other information including the date of preparation or last revision. The SDS must also state that no applicable information was found when the preparer does not find relevant information for any required element. Sections 12 -15 are not mandatory. The SDS must contain headings for sections 12-15, to be consistent with the GHS, but OSHA will not enforce the content of these sections because they are within other agencies' jurisdictions.



1. Identification
2. Hazard(s) Identification
3. Composition, information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls, personal protection
9. Physical and chemical properties
10. Stability and Reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information



**Section 1: Identification** includes the product identifier, the name of the manufacturer or distributor along with the phone number and address and an emergency number. The name of the product in this section must be the same as the name on the label of the container. If other names, product numbers, or means of identification are used they should be listed. The section also lists the recommended use of the product as well as restrictions.

### 1. Identification

**Product identifier:** Sulfuric Acid

**Other means of identification**

**Product No.:** 9661, 3780, 9704, 9682, V648, V225, V186, V008, 6902, 2900, 2879, 2878, 2877, 2874, 6163, H996, H976, 5859, 2876, 5815, 5802, 9691, 9690, 9684, 9681, 9675, 9674, 9673, 9671, 5557, 5374, 21208, 21201

**Recommended use and restriction on use**

**Recommended use:** Not available.

**Restrictions on use:** Not known.

**Manufacturer/Importer/Supplier/Distributor information**

**Manufacturer**

**Company Name:** Avantor Performance Materials, Inc.  
**Address:** 3477 Corporate Parkway, Suite 200  
Center Valley, PA 18034

**Telephone:** Customer Service: 855-282-6867

**Fax:**  
**Contact Person:** Environmental Health & Safety  
**e-mail:** info@avantormaterials.com

**Emergency telephone number:**

24 Hour Emergency: 908-859-2151

Chemtrec: 800-424-9300

**Section 2: Hazard(s) identification** includes all the dangers about the chemical. The section must include the GHS label elements, hazard classifications, signal word, hazard statement, and precautionary statements. Hazard symbols may be provided as a graphical reproduction (pictograms) or the name of the symbol. Other hazards which do not result in classification (e.g., dust explosion hazard) or are not covered by the GHS would be listed in this section.



**2. Hazard(s) identification**

**Hazard classification**

**Physical hazards**

Corrosive to metals Category 1

**Health hazards**

Skin corrosion/irritation Category 1  
 Serious eye damage/eye irritation Category 1  
 Carcinogenicity Category 1A  
 Specific target organ toxicity - single exposure Category 3

**Environmental hazards**

Acute hazards to the aquatic environment Category 3

**Label elements**

**Hazard symbol:**



**Signal word:** Danger

**Hazard statement:** May be corrosive to metals.  
 Causes severe skin burns and eye damage.  
 May cause respiratory irritation.  
 May cause cancer if inhaled.  
 Harmful to aquatic life.

**Precautionary statement**

**Prevention:** Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep only in original container. Wash thoroughly after handling. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

**Response:** IF exposed or concerned: Get medical advice/attention. Absorb spillage to prevent material damage. Immediately call a POISON CENTER or doctor/physician. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

**Storage:** Store locked up. Store in corrosive resistant container with a resistant inner liner. Store in a well-ventilated place. Keep container tightly closed.

**Disposal:** Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

**Other hazards which do not result in GHS classification:** None.



**Section 3: Composition/information on ingredients** lists the different chemicals in the product and any trade secret claims. Any hazardous chemical comprising 1% or more of the product (or 0.1% if the chemical is a carcinogen, reproductive toxin, or category 1 mutagen) must be listed in this section. Next to each hazardous ingredient, the SDS must list the Chemical Abstracts Service (CAS) number, synonyms, and content in percent. Trade secret claims must be identified on the SDS for any hazardous ingredients that are being withheld. These claims are usually indicated by the phrase “Proprietary Information,” or “Confidential.”

**3. Composition/information on ingredients**

**Substances**

Chemical identity	Common name and synonyms	CAS number	Content in percent (%) <sup>*</sup>
SULFURIC ACID		7664-93-9	90 - 100%

<sup>\*</sup> All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

**Section 4: First-aid measures** describes the important symptoms, immediate or delayed health effects, and required treatment. Descriptions of necessary first-aid measures must be subdivided according to the different routes of exposure, i.e., inhalation, skin and eye contact and ingestion.

**4. First-aid measures**

<b>General information:</b>	Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.
<b>Ingestion:</b>	Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
<b>Inhalation:</b>	Move to fresh air. Call a physician or poison control center immediately. Apply artificial respiration if victim is not breathing. If breathing is difficult, give oxygen.



**Section 5: Fire-fighting measures** lists the proper (and improper) ways to extinguish fires, the types of fire extinguisher that should be used, the specialized equipment, and chemical hazards from a fire involving the product. This information may be of limited value in situations when several chemicals are involved.

Under the federal Emergency Planning and Community Right-to-Know law, firefighters have the right to review workplace chemical inventories and SDSs and to inspect the workplace in order to plan for and prevent fires and explosions.

#### 5. Fire-fighting measures

**General fire hazards:** In case of fire and/or explosion do not breathe fumes.

#### Suitable (and unsuitable) extinguishing media

**Suitable extinguishing media:** Foam, carbon dioxide or dry powder.

**Unsuitable extinguishing media:** Do not use water as an extinguisher.

**Specific hazards arising from the chemical:** Fire may produce irritating, corrosive and/or toxic gases.

#### Special protective equipment and precautions for firefighters

**Special fire fighting procedures:** Move containers from fire area if you can do so without risk. Fight fire from a protected location. Use water SPRAY only to cool containers! Do not put water on leaked material. Cool containers exposed to flames with water until well after the fire is out.

**Special protective equipment for fire-fighters:** Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.



**Section 6: Accidental release measures** explains the emergency procedures, protective equipment and proper methods and materials for containment and cleanup.

#### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures:</b>	Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. See Section 8 of the MSDS for Personal Protective Equipment. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
<b>Methods and material for containment and cleaning up:</b>	Neutralize spill area and washings with soda ash or lime. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.
<b>Notification Procedures:</b>	Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.
<b>Environmental precautions:</b>	Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

**Section 7: Handling and storage** describes precautions for safe handling and conditions for safe storage, including other chemicals that are not compatible with the product.

#### 7. Handling and storage

<b>Precautions for safe handling:</b>	Do not get in eyes, on skin, on clothing. Do not taste or swallow. Wash hands thoroughly after handling. Do not eat, drink or smoke when using the product. Use caution when adding this material to water. Add material slowly when mixing with water. Do not add water to the material; instead, add the material to the water. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Use personal protective equipment as required.
<b>Conditions for safe storage, including any incompatibilities:</b>	Do not store in metal containers. Keep in a cool, well-ventilated place. Keep container tightly closed. Store in a dry place.





**Section 8: Exposure controls/personal protection** lists occupational exposure limits, engineering controls, and personal protective equipment (PPE).

OSHA's Permissible Exposure Limits, ACGIH Threshold Limit Values, NIOSH Recommended Exposure Limits must be listed when available. You may see the notation "skin" after a PEL or TLV. This notation indicates that the chemical can be easily absorbed into the body through the skin.

The information on engineering controls is often limited and vague. Local exhaust ventilation, which captures contaminants at the source, is often the most effective and is often listed as a possible control but rarely recommended for typical use.

This section lists required PPE including respiratory protection and the recommended glove and clothing material. SDSs often indicate that gloves and chemical protective clothing must be "suitable" or "impervious" or "chemical resistant" instead of recommending a specific material.

**8. Exposure controls/personal protection**

**Control parameters**

**Occupational exposure limits**

Chemical identity	Type	Exposure Limit values	Source
SULFURIC ACID - Thoracic fraction.	TWA	0.2 mg/m <sup>3</sup>	US. ACGIH Threshold Limit Values (2011)
SULFURIC ACID	REL	1 mg/m <sup>3</sup>	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	1 mg/m <sup>3</sup>	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	1 mg/m <sup>3</sup>	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)

**Appropriate engineering controls** No data available.

**Individual protection measures, such as personal protective equipment**

- General information:** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.
- Eye/face protection:** Wear safety glasses with side shields (or goggles) and a face shield.
- Skin protection**
  - Hand protection:** Chemical resistant gloves
  - Other:** Wear suitable protective clothing.
- Respiratory protection:** In case of inadequate ventilation use suitable respirator. Chemical respirator with acid gas cartridge.
- Hygiene measures:** Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.



**Section 9: Physical and chemical properties** lists the product's physical and chemical characteristics. A chemical's properties can help you identify it and determine the degree of the hazard it presents. Odor may help you identify a chemical; however, odor is generally a poor means of identifying a chemical and even worse method of determining the concentration of the substance in the air. Many substances can reach hazardous levels with no noticeable odor. Others cause olfactory fatigue and you become unable to smell the chemical. The SDS must include the following properties or indicate that the information is not available.

- Appearance (physical state, color, etc.)
- Odor
- Odor threshold
- pH
- melting point/freezing point
- initial boiling point and boiling range
- flash point:
- evaporation rate
- flammability (solid, gas)
- upper/lower flammability or explosive limits
- vapor pressure
- vapor density
- relative density:
- solubility(ies)
- partition coefficient: n-octanol/water
- auto-ignition temperature
- decomposition temperature



<b>9. Physical and chemical properties</b>
--

**Appearance**

Physical state:	Liquid
Form:	Liquid
Color:	Colorless
Odor:	Odorless
Odor threshold:	No data available.
pH:	0.3 (1 N aqueous solution)
Melting point/freezing point:	3 °C
Initial boiling point and boiling range:	337 °C
Flash Point:	Not applicable
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
<b>Upper/lower limit on flammability or explosive limits</b>	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Relative density:	1.84 (20 °C)
<b>Solubility(ies)</b>	
Solubility in water:	Miscible with water.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.



**Section 10: Stability and reactivity** refers to the chemical's stability and the possibility of hazardous reactions. The section lists conditions to avoid (e.g., shock or vibration), incompatible chemicals that react dangerously with the substance, and decomposition products that might result from a reaction. Information on stability and reactivity is important for proper handling and storage of the product.

<b>10. Stability and reactivity</b>	
-------------------------------------	--

<b>Reactivity:</b>	Reacts violently with strong alkaline substances.
<b>Chemical stability:</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions:</b>	Hazardous polymerization does not occur. Material reacts with water.
<b>Conditions to avoid:</b>	Moisture. Heat. Contact with incompatible materials.
<b>Incompatible materials:</b>	Water. Cyanides. Strong oxidizing agents. Strong reducing agents. Metals. Halogens. Organic compounds. Potassium.
<b>Hazardous decomposition products:</b>	Oxides of sulfur.



**Section 11: Toxicological information** includes the ways the chemical can enter the body and the health effects it can cause. This section lists the routes of exposure, signs and symptoms of exposure, acute and chronic health effects, and quantitative measures of toxicity. This information is often inadequate or incomplete. A SDS must list a chemical as a carcinogen (cancer causing) if it is listed as such by the International Agency for Research on Cancer (IARC), the U.S. National Toxicology Program (NTP), or OSHA.

**11. Toxicological information**

**Information on likely routes of exposure**

<b>Ingestion:</b>	May cause burns of the gastrointestinal tract if swallowed.
<b>Inhalation:</b>	May cause damage to mucous membranes in nose, throat, lungs and bronchial system.
<b>Skin contact:</b>	Causes severe skin burns.
<b>Eye contact:</b>	Causes serious eye damage.

**Information on toxicological effects**

**Acute toxicity (list all possible routes of exposure)**

<b>Oral</b>	
<b>Product:</b>	No data available.
<b>Dermal</b>	
<b>Product:</b>	No data available.
<b>Inhalation</b>	
<b>Product:</b>	No data available.
<b>Specified substance(s):</b>	
SULFURIC ACID	LC 50 (Guinea pig, 8 h): 0.03 mg/l LC 50 (Rat, 1 h): 347 mg/l

<b>Repeated dose toxicity</b>	
<b>Product:</b>	No data available.

<b>Skin corrosion/irritation</b>	
<b>Product:</b>	Causes severe skin burns.

<b>Serious eye damage/eye irritation</b>	
<b>Product:</b>	Causes serious eye damage.

<b>Respiratory or skin sensitization</b>	
<b>Product:</b>	Not a skin sensitizer.

<b>Carcinogenicity</b>	
<b>Product:</b>	May cause cancer.

**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**

SULFURIC ACID	Overall evaluation: 1. Carcinogenic to humans.
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**Section 12: Ecological information** refers to damage the chemical can cause to the environment. This section includes information on the chemical's ecotoxicity (aquatic and terrestrial), persistence and degradability, potential for bioaccumulation, and mobility in soil. OSHA does not enforce the content of this section because it is within other agencies' jurisdictions.

#### 12. Ecological information

**Ecotoxicity:**

**Acute hazards to the aquatic environment:**

**Fish**

**Product:** No data available.

**Specified substance(s):**

SULFURIC ACID LC 50 (Starry, european flounder (*Platichthys flesus*), 48 h): 100 - 330 mg/l Mortality  
LC 50 (Western mosquitofish (*Gambusia affinis*), 96 h): 42 mg/l Mortality

**Aquatic invertebrates**

**Product:** No data available.

**Specified substance(s):**

SULFURIC ACID LC 50 (Common shrimp, sand shrimp (*Crangon crangon*), 48 h): 70 - 80 mg/l Mortality  
LC 50 (Aesop shrimp (*Pandalus montagui*), 48 h): 42.5 mg/l Mortality

**Chronic hazards to the aquatic environment:**

**Fish**

**Product:** No data available.

**Aquatic invertebrates**

**Product:** No data available.

**Toxicity to Aquatic Plants**

**Product:** No data available.

**Section 13: Disposal considerations** describes proper disposal and recycling practices and covers possible dangers when disposing of the chemical. OSHA does not enforce the content of this section because it is within other agencies' jurisdictions.

#### 13. Disposal considerations

**Disposal instructions:** Discharge, treatment, or disposal may be subject to national, state, or local laws.

**Contaminated packaging:** Since emptied containers retain product residue, follow label warnings even after container is emptied.



**Section 14: Transport information** contains guidance on classification for shipping and transport (UN number, hazard classes, packing group, etc.) and provides precautions in connection with transporting the chemical. OSHA does not enforce the content of this section because it is within other agencies' jurisdictions.

#### 14. Transport information

##### DOT

UN number:	UN 1830
UN proper shipping name:	Sulfuric acid
Transport hazard class(es)	
Class(es):	8
Label(s):	8
Packing group:	II
Marine Pollutant:	No

##### IMDG

UN number:	UN 1830
UN proper shipping name:	SULPHURIC ACID (with more than 51% acid)
Transport hazard class(es)	
Class(es):	8
Label(s):	8
EmS No.:	F-A, S-B
Packing group:	II
Marine Pollutant:	No

##### IATA

UN number:	UN 1830
Proper Shipping Name:	Sulphuric acid
Transport hazard class(es):	
Class(es):	8
Label(s):	8
Marine Pollutant:	No
Packing group:	II



**Section 15: Regulatory information** identifies safety, health and environmental regulations (e.g., TSCA, CERCLA, SARA, CAA, Prop. 65) specific to the product in question. OSHA does not enforce the content of this section because it is within other agencies' jurisdictions.

**15. Regulatory information**

**US federal regulations**

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

**US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**  
None present or none present in regulated quantities.

**CERCLA Hazardous Substance List (40 CFR 302.4):**

SULFURIC ACID Reportable quantity: 1000 lbs.

**Superfund amendments and reauthorization act of 1986 (SARA)**

**Hazard categories**

Acute (Immediate)  Chronic (Delayed)  Fire  Reactive  Pressure Generating

**SARA 302 Extremely hazardous substance**

Chemical identity	RQ	Threshold Planning Quantity
SULFURIC ACID	1000 lbs.	1000 lbs.

**SARA 304 Emergency release notification**

Chemical identity	RQ
SULFURIC ACID	1000 lbs.

**SARA 311/312 Hazardous chemical**

Chemical identity	Threshold Planning Quantity
SULFURIC ACID	500lbs

**SARA 313 (TRI reporting)**

Chemical identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
SULFURIC ACID	10000 lbs	25000 lbs.

**Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)**

SULFURIC ACID Reportable quantity: 1000 lbs.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):**

SULFURIC ACID Threshold quantity: 10000 lbs

**US state regulations**

**US. California Proposition 65**

SULFURIC ACID Carcinogenic.

**US. New Jersey Worker and Community Right-to-Know Act**

SULFURIC ACID Listed





**US. Massachusetts RTK - Substance List**

SULFURIC ACID Listed

**US. Pennsylvania RTK - Hazardous Substances**

SULFURIC ACID Listed

**US. Rhode Island RTK**

SULFURIC ACID Listed

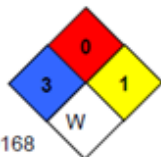
**Inventory Status:**

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EU EINECS List:	On or in compliance with the inventory
EU ELINCS List:	Not in compliance with the inventory.
Japan (ENCS) List:	On or in compliance with the inventory
EU No Longer Polymers List:	Not in compliance with the inventory.
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Switzerland Consolidated Inventory:	Not in compliance with the inventory.
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

**Section 16: Other information** includes the date the SDS was prepared or the last revision. Other useful information, such as NFPA ratings, may be included here.

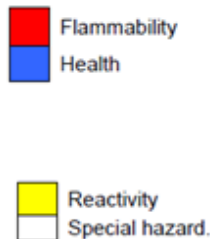
16. Other information, including date of preparation or last revision

**NFPA Hazard ID**



SDS\_US - SDSMIX000168

9/10



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe  
W: Water-reactive



**Issue date:** 06-11-2014  
**Revision date:** No data available.  
**Version #:** 1.1  
**Further information:** No data available.

**Disclaimer:** THE INFORMATION PRESENTED IN THIS MATERIAL SAFETY DATA SHEET (MSDS/SDS) WAS PREPARED BY TECHNICAL PERSONNEL BASED ON DATA THAT THEY BELIEVE IN THEIR GOOD FAITH JUDGMENT IS ACCURATE. HOWEVER, THE INFORMATION PROVIDED HEREIN IS PROVIDED "AS IS," AND AVANTOR PERFORMANCE MATERIALS MAKES AND GIVES NO REPRESENTATIONS OR WARRANTIES WHATSOEVER, AND EXPRESSLY DISCLAIMS ALL WARRANTIES REGARDING SUCH INFORMATION AND THE PRODUCT TO WHICH IT RELATES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING WITHOUT LIMITATION<(>,<)> WARRANTIES OF ACCURACY, COMPLETENESS, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY, STABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE, OR USAGE OF TRADE. THIS MSDS/SDS IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PROPERLY TRAINED PERSON USING THIS PRODUCT, AND IS NOT INTENDED TO BE COMPREHENSIVE AS TO THE MANNER AND CONDITIONS OF USE, HANDLING, STORAGE, OR DISPOSAL OF THE PRODUCT. INDIVIDUALS RECEIVING THIS MSDS/SDS MUST ALWAYS EXERCISE THEIR OWN INDEPENDENT JUDGMENT IN DETERMINING THE APPROPRIATENESS OF SUCH ISSUES. ACCORDINGLY, AVANTOR PERFORMANCE MATERIALS ASSUMES NO LIABILITY WHATSOEVER FOR THE USE OF OR RELIANCE UPON THIS INFORMATION. NO SUGGESTIONS FOR USE ARE INTENDED AS, AND NOTHING HEREIN SHALL BE CONSTRUED AS, A RECOMMENDATION TO INFRINGE ANY EXISTING PATENTS OR TO VIOLATE ANY FEDERAL, STATE, LOCAL, OR FOREIGN LAWS. AVANTOR PERFORMANCE MATERIALS REMINDS YOU THAT IT IS YOUR LEGAL DUTY TO MAKE ALL INFORMATION IN THIS MSDS/SDS AVAILABLE TO YOUR EMPLOYEES.



### ***Case Study***

On a worksite in southwest Ohio, welders continually received chemical burns around their mouths, wrists, and ankles. A study of SDSs by company and union industrial hygienists did not identify the cause. The union hygienist requested more information on a new flux being used by the welders. It was soon determined that the flux, in combination with the coating on the steel, created boron gas. Ineffective local exhaust ventilation left most of the boron gas in the work area. When combined with water, or saliva and perspiration in this case, boron gas becomes boric acid, which led to welders' chemical burns.



## Other Forms of Hazardous Materials Documentation

The EPA requires that hazardous wastes be labeled during transit. An example of a hazardous waste label is shown below.

Information on the label must include:

- Generator's name and address.
- DOT proper shipping name.
- EPA identification number.
- Accumulation start date

**HAZARDOUS  
WASTE**

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL  
IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY  
AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY.

ACCUMULATION START DATE \_\_\_\_\_ E.P.A. WASTE NO. \_\_\_\_\_

D.O.T. PROPER SHIPPING NAME \_\_\_\_\_ U.N. OR N.A. NO. \_\_\_\_\_

GENERATOR NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

E.P.A. I.D. NO. \_\_\_\_\_ MANIFEST DOCUMENT NO. \_\_\_\_\_

**HAZARDOUS WASTE  
HANDLE WITH CARE**



**The DOT requires that truck drivers carry a bill of lading (shipping papers) containing the following information for all hazardous materials:**

- Shipper's name and address;
- Receiver's name and address;
- Description of hazardous material (identification number, proper shipping name, hazard class, and packing group);
- Emergency response information;
- DOT hazard classification information; and
- Quantity of material shipped to the location.

An example of shipping papers is provided on page 3-60.

**The EPA requires that hazardous waste be accompanied by a manifest to track it from the cradle-to-grave.** The manifest has a number of copies which are given to the generator, the transporter, and site characterization workers. Hazardous waste manifests must include:

- the identification number, name, and address of the generator;
- the identification number, name, and address of the permitted work site;
- the identification number and name of the hazardous waste hauler; and
- a description of the contents.

An example of a hazardous waste manifest form is provided on page 5-53.

**A waste profile sheet is provided by the laboratory that conducts the analysis of the hazardous waste.** The profile sheet describes the physical and chemical properties of the waste sample. Information from waste profile sheets is important for site characterization.



**Although the SDS, shipping papers, manifest forms, and waste profile sheets contain important information, they have a number of limitations.**

1. Information may be incomplete or inaccurate.
2. Information may not apply to the site or specific use.
3. Information may be too general.
4. SDS may not be current.

It is important that you read these documents before there is an emergency. It is a good practice to call the emergency number on the SDS to get clean-up response and emergency information before there is an emergency.

# HAZWOPER 40-Hour Hazardous Waste Worker Training

## Chapter 3: Information Sources



This document provides clarification from the U.S. EPA on the custom imprinting of information on the manifest by registered printers. It identifies blocks of the manifest in which information may be custom imprinted (e.g., at a customer's request).

Key	
<input type="checkbox"/>	Information must not be custom imprinted in the block.
<input type="checkbox"/>	Information may be custom imprinted in the block.
<input type="checkbox"/>	A unique manifest tracking number must be pre-printed in this block.
<input type="checkbox"/>	"On behalf of" may be pre-printed in this block.

Please print or type. (Form designed for use on elite (12-pit/h) typewriter)

Form Approved OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number					
GENERATOR	5. Generator's Name and Mailing Address		Generator's Site Address (if different than mailing address)							
	Generator's Phone:									
	6. Transporter 1 Company Name		U.S. EPA ID Number							
	7. Transporter 2 Company Name		U.S. EPA ID Number							
	8. Designated Facility Name and Site Address		U.S. EPA ID Number							
Facility's Phone:										
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes			
			No.	Type						
	1.									
	2.									
	3.									
4.										
14. Special Handling Instructions and Additional Information										
15. <b>GENERATOR'S/OFFEROR'S CERTIFICATION:</b> I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.										
Generator's/Offeror's Printed/Typed Name		Signature		Month		Day		Year		
INT'L	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____									
	Transporter signature (for exports only): _____ Date leaving U.S.: _____									
TRANSPORTER	17. Transporter Acknowledgment of Receipt of Materials									
	Transporter 1 Printed/Typed Name		Signature		Month		Day		Year	
	Transporter 2 Printed/Typed Name		Signature		Month		Day		Year	
DESIGNATED FACILITY	18. Discrepancy									
	18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection									
	Manifest Reference Number: _____									
	18b. Alternate Facility (or Generator)		U.S. EPA ID Number							
	Facility's Phone:									
18c. Signature of Alternate Facility (or Generator)		Month		Day		Year				
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)										
1.		2.		3.		4.				
20. Designated Facility Owner or Operator. Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a										
Printed/Typed Name		Signature		Month		Day		Year		

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)



**Unions, employers, trade groups, state governments, and other organizations may also provide sources of information.**

**New Jersey has prepared Hazardous Substance Fact Sheets for more than 1,600 pure substances.** These Fact Sheets are primarily prepared for workers and emergency responders who handle a specific substance.

**CPWR provides many publications and resources for workers. On [cpwr.com](http://cpwr.com) you'll find:**

1. Monthly e-news (<http://www.cpwr.com/publications/cpwr-updates> )
2. Key Findings from Research (<http://www.cpwr.com/publications/key-findings-from-research> )
3. Hazard Alert cards (<http://www.cpwr.com/publications/hazard-alert-cards> )

**Free information from CPWR is also on:**

1. Work Safely with Silica ([www.silica-safe.org](http://www.silica-safe.org)) - This website is designed specifically for contractors and workers.
2. Construction Solutions is a database of practical control measures to reduce health hazards ([www.CPWRConstructionSolutions.org](http://www.CPWRConstructionSolutions.org)) - organized by trade, task, hazard and controls.
3. CPWR's website for the campaign to prevent falls in construction also provides training and other resources ([www.stopconstructionfalls.com](http://www.stopconstructionfalls.com))
4. CPWR maintains the Electronic Library of Construction Occupational Safety and Health ([www.elcosh.org](http://www.elcosh.org)) - Types of information on eLCOSH include:
  - Videos
  - Images/photos
  - PowerPoints
  - Toolbox talks
  - Training guides
  - Handouts
  - Research reports
  - News articles
  - Recalls
  - Reference materials
  - Abstracts & summaries
  - eLCOSH Nano - a web-based construction nanomaterial inventory with 400+ products.





**Nanoparticles exist in nature and can be created and used for their unique properties.**

Materials engineered to be nano-scale are often referred to as engineered nanomaterials (ENMs) and can take on unique optical, magnetic, electrical, and other properties. These emergent properties have the potential for great impacts in electronics, medicine, and other fields but there is concern for potential health effect. (NIEHS)

**Nanoparticles must have at least one dimension that is less than 100 nanometers. Carbon nanotubes are 100,000 times smaller than a human hair. Little is known about the health effects of nanoparticles.**

1. Nanoparticles can enter the body through inhalation, ingestion, and dermal exposure.
2. They are small enough to pass from the blood to the brain.
3. The health effects of nanoparticles can be different than the health effects of larger particles of the same material.

**NIOSH, CPWR, and others are evaluating the potential for exposure to nanoparticles.**



## Summary: Labels, Signs, Placards, and SDS

Containers and trucks may have different kinds of labels that tell you about the chemicals inside. Containers must have hazard labels that are compliant with the Hazard Communication standard. Shipping containers must also have colored DOT labels (small). Trucks and railroad cars must have colored placards. The main colors specified by the DOT are:

Color	Hazard
orange	explosive
red	flammable
white with black letters	poisonous
yellow	oxidizer (reactive)
blue	water reactive
green	non-flammable gas (high pressure)
black and white	corrosive or other

Some localities use the NFPA diamond, which shows health (blue), fire (red), instability (yellow), and special (white) hazards.

Safety Data Sheets (SDS) may be on site for some wastes and must be on site for all products used to in cleanup. The SDS tells you what chemicals are in the product, chemical information, health and physical hazards, exposure limits, personal protective equipment, first aid, and spill precautions.

Every shipment of hazardous waste that leaves the cleanup site must have a form called a manifest that tells what the wastes are and where they come from.

Before you start work on a cleanup site, your employer should have received Waste Profile Sheets, information about waste, from a laboratory. These are a source of information about the chemical and physical properties of the waste.

Labels, SDSs, manifests, shipping papers, and waste profile sheets can be valuable sources of information for the contractor and the worker.



## Background Reading Material: Hazard Recognition

*NIOSH Pocket Guide to Chemical Hazards.* U.S. Department of HHS, PHS, CDC, NIOSH. <http://www.cdc.gov/niosh/npg/>

*Hawley's Condensed Chemical Dictionary.* Sax and Lewis. (1987). Van Nostrand Reinhold & Co., 115 Fifth Ave, N.Y. 10003 (11th ed.)

*Chemical Hazards of the Workplace* Fischman, M.L., Hughes, J.P., & Proctor, N.H. (1988).(2nd ed.). J.B. Lippincott Company, Philadelphia, PA.

*Hazardous Substance Fact Sheets.* New Jersey Department of Health. Trenton, NJ 08625. <http://web.doh.state.nj.us/rtkhsfs/indexfs.aspx>

*Occupational Health Guidelines for Individual Chemicals.* U.S. Department of Labor. Occupational Safety and Health Administration.

*Hazardous Waste Operations and Emergency Response; Final Rule* (29 CFR 1926.65) [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=standards&p\\_id=10651](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=10651)

*Hazard Communication Final Rule* (29 CFR 1910.1200) [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=standards&p\\_id=10099](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=10099)

*Occupational Safety and Health Guidance Manual for Hazardous Waste Sites*, 1985. (NIOSH #85-115)

*EPA's Standard Operating Safety Guides*, July, 1988.

*Emergency Response Guidebook 2012*, U.S. Department of Transportation. <http://phmsa.dot.gov/hazmat/library/erg>



## Shipping Paper

<b>CONTAINS HAZARDOUS MATERIALS</b>								
FOR HELP IN CHEMICAL EMERGENCIES INVOLVING SPILL, LEAK, FIRE OR EXPOSURE, CALL TOLL FREE 1-800-424-9300 DAY OR NIGHT								
<b>STRAIGHT BILL OF LADING ORIGINAL—NOT NEGOTIABLE</b>				Shipper's No. Carrier's No.				
SCAC				Date				
(NAME OF CARRIER)								
<b>TO:</b> Consignee				<b>FROM:</b> Shipper				
Street				Street				
Destination                      Zip				Origin                                      Zip				
Route						Vehicle #		
No. Shipping Units	H M	Kind of Packages, Description of Articles (IF HAZARDOUS MATERIALS— PROPER SHIPPING NAME)	Hazard Class	I.D. Num.	Weight	RATE	LABELS REQUIRED (or exemption)	
Remit C.O.D. to: Address: City                                      St                      ZIP				<u>C.O.D.</u> <u>Amt:</u> \$			COD FEE: Prepaid Collect	
NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding \$ _____ per _____				Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.			FREIGHT CHARGES  Prepaid  Collect	
				Signature of consignor				
RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment. Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.								
This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.				PLACARDS REQUIRED                                      yes ___ no ___ PLACARDS SUPPLIED                                      yes ___ no ___				
SHIPPER PER DATE				CARRIER PER DATE				
EMERGENCY RESPONSE TELEPHONE NUMBER: (_____) _____				Manned 24 hrs/day by a person with knowledge of the hazards of the material and emergency response information or who has access to a person with that knowledge.				



Notes:

A large rectangular area with rounded corners, containing 25 horizontal lines for writing notes.

