OSHA Hazard Communication Standard

Reference Guide for Water Treatment Companies

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The Hazard Communication Standard (HCS or HAZCOM) is very complex and multi-faceted. The Occupational Safety and Health Administration (OSHA) recently issued a new and revised Instructional Directive on how businesses must comply with the rule. Basically this updated Directive consolidates all OSHA interpretations and revisions issued since its inception in November 1983. There are also some additional clarifications with respect to compliance requirements.

Water treatment companies are required to comply with this rule and new Instructional Directive.

The standard is broken out into three primary sections:

1. ***Hazard Evaluation and Review*** - required of all chemical manufacturers (including blenders) on the chemicals, mixtures and blends they are producing. This section cites specific sources and hazardous levels which must be evaluated.

2. ***Information*** - the most comprehensive section of the rule. This details requirements for such items as labels/hazard warnings, material safety data sheets (MSDSs), and employee training. Specific details are given for each category in this section, as well as very specific compliance regulations.

3. ***Written Hazard Communication Program*** - each company is required to have a written program detailing how each of the rule's requirements will be met at the facility. This also includes a comprehensive list of all hazardous chemicals at each work area.

The HCS is the OSHA rule most often cited during an audit and when issuing fines. Every water treatment company should be familiar with the standard and all its requirements. Additionally, it is important to be able to brief customers using the chemicals on these rules and regulations.

This guide provides guidance for water treatment companies on the many different aspects of the standard in an easy to understand format. It offers comprehensive information on complying with the rule and incorporates guidance from the revised OSHA Instructional Directive. Also attached are samples and checklists to assist water treatment companies in determining whether they are meeting all aspects of the rule. Finally, telephone numbers are provided of OSHA offices to be contacted with questions.

DISCLAIMER: This is only a reference guide offering general guidelines on how to comply with this OSHA rule. It is not an instructional directive detailing a company's specific compliance responsibilities. Nor does it address other regulatory agency requirements (i.e., Department of Transportation). All Environmental managers should contact state OSHA office and appropriate agencies for information on their states' regulations and to answer any questions they have on complying with the HCS.

BACKGROUND

BACKGROUND

The Occupational Safety and Health Administration (OSHA) issued a rule (29 CFR 1910.1200) on November 25, 1983 called the "Hazard Communication Standard" (HCS or HAZCOM). It was written to provide employers and workers with the right-to-know[1] the hazards and identities of the chemicals they are exposed to while working, as well as measures they can take to protect themselves. Transmittal of this information is to be accomplished through a comprehensive hazard communication program which includes: hazard evaluations; container labeling and other forms of warning; material safety data sheets (MSDSs); employee training; and a written hazard communication program.

The HAZCOM is different from most OSHA standards because it does not dictate specific compliance measures. Rather, it provides employers and employees with the information they need to create an effective chemical safety program. It is largely performance-oriented, giving employers the flexibility to tailor programs to their specific workplaces, rather than having to follow rigid requirements. It also means companies have to exercise more judgment to implement an appropriate and effective program.

The HCS, the most often cited OSHA rule, is a generic standard covering all types of hazardous chemicals and industries. The scope of coverage is over 650,000 chemical products to which over 32 million workers may be potentially exposed in about 3.5 million facilities. The original rule covered employees only in the manufacturing sector. That rule was modified on August 24, 1987 to expand coverage to <u>all</u> industries where employees are exposed to hazardous chemicals. In October 1990, OSHA issued an *Instructional Directive* on how to fully comply with this standard.

After receiving criticism, especially from small employers, that the HCS was unnecessarily burdensome, OSHA reopened the record and requested comments in several subject areas. A revised rule was issued on February 9, 1994 to clarify the requirements, and thereby help companies achieve full compliance. In particular, this modification added certain exemptions from labeling; clarified aspects of the written hazard communication program; modified the duties of distributors, manufacturers and importers providing MSDSs to employees; and clarified some provisions regarding these MSDSs.

On March 20, 1998 OSHA issued a new *Compliance and Instructional Directive* (CPL 2-2.38D), replacing the October 1990 one. This new directive basically consolidated all the OSHA interpretations issued since the rule's inception (including the above-mentioned technical amendments and clarifications to the standard adopted in February 1994) and addressed issues raised in a September 1996 report to OSHA on hazard communication submitted by the National Advisory Committee on Occupational Safety and Health.

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[1] The OSHA "right-to-know" law requires that workers be fully aware of the hazards of their workplace, with the responsibility to inform resting with the employer.

GENERAL

REQUIREMENTS

GENERAL REQUIREMENTS

The HCS established uniform requirements to ensure that the hazards of all chemicals imported into, produced or used in U.S. workplaces are evaluated, and that this hazard information is transmitted to affected employers and exposed employees. (In other words, even though the employer was not responsible for the manufacture of the hazardous chemical, the employer has the responsibility for conveying hazards to the employees.)

The standard covers both physical hazards (such as flammability or the potential for explosions), and health hazards (including both acute and chronic). Most chemicals used in the workplace have some hazard potential, and thus are covered by the rule.

The phrase "known to be present" is essential to the standard's scope. If a hazardous chemical is known to be present by the chemical manufacturer or employer, it is covered by the HCS. This includes chemicals to which employees may be exposed during normal operations or in a foreseeable emergency. By-products are also covered by the HCS. Chemical manufacturers and employers must anticipate the full range of downstream uses of their products and account for any hazardous by-products which may be formed.

If a company is operating in one of 23 OSHA-approved State Plan states, it must comply with the State's requirements, which may be more stringent than those of the federal rule.[2] Employers should contact their state OSHA office for more information regarding state HAZCOM requirements (refer to Appendix D for a list of offices having an OSHA-approved State Plan).

In broad outline, the HCS achieves its purpose using an integrated three-pronged system - **Evaluation, Information** and **Written Hazard Communication Program.** All three are detailed in the body of this manual.

1. *Evaluation:*

First, chemical manufacturers and importers must review and evaluate available scientific evidence concerning the physical and health hazards of the chemicals they produce or import to determine if they are hazardous.

2. *Information:*

Second, for every chemical found to be hazardous, the chemical manufacturer or importer must develop comprehensive MSDSs and warning labels for containers and send both downstream with the chemicals. The labels provide a brief synopsis of the chemical's hazards at the site where it is being used. The MSDSs provide comprehensive technical information and serve as a reference document for exposed workers, as well as health professionals providing emergency or first aid services to those workers.

[2] States' standards, by law, can be no less stringent than OSHA's.

Additionally, employers need to train employees about the hazardous chemicals in their workplace. Training ensures that workers understand the information on both MSDSs and labels, know how to access this information when needed, and are aware of the proper protective procedures to follow.

The three "information" components in this system - labels, MSDSs and worker training - are all essential to the effective functioning of the HAZCOM program. They are interdependent parts of the standard - no one is believed to be effective by itself.

3. *Written Hazard Communication Program:*

Third, all employers must develop a written hazard communication program outlining in detail the company's entire HAZCOM program. Overall it must describe how the requirements for hazard evaluation, labels, MSDSs and employee training are going to be met by the facility.

Rationale:

OSHA asserts that the hazard information provided under the HCS and protective measures it requires will reduce the incidence of chemical source illnesses and injuries by creating safer workplaces. An effective hazard communication program will accomplish this through the modification of both employer and employee behaviors.

Employers will be able to use the information to design better protective programs and engineering controls, reduce exposures, substitute less hazardous materials if possible, and select appropriate protective clothing/equipment. Improved understanding of chemical hazards by supervisory personnel results in safer day-to-day handling of hazardous substances, and proper storage and clean-up.

Employees provided the necessary hazard information will more fully participate in, and support, the protective measures instituted in their workplaces. Properly trained workers will know how to read and use labels/MSDSs, and be able to determine what actions are necessary if an emergency occurs. Information on effects of exposure to hazardous chemicals will help workers recognize such symptoms and seek early treatment of chronic disease. The information provided under the HCS will also enable health and safety professionals to provide better emergency or first aid services to exposed employees.

HAZARD EVALUATION

AND REVIEW

HAZARD EVALUATION AND REVIEW

Chemical producers have the primary responsibility for generating and disseminating information, whereas users of chemicals must obtain the information and transmit it to their own employees. In general, it works like this:

Chemical Manufacturers/Importers *(Generally, companies supplying the raw materials, but also includes water treatment companies which are blending, mixing or otherwise changing the composition of a chemical. Any company changing an MSDS is included as well.)*	● Determine the hazards of each product.
Chemical Manufacturers/Importers/ Distributors *(Water treatment companies which are selling the chemicals, solutions or blends.)*	● Communicate the hazard information and associated protective measures downstream to customers through labels and MSDSs.
Employers *(All companies handling or producing chemicals, solutions and blends; or providing guidance on using these chemicals or solutions.)*	● Identify and list hazardous chemicals in their workplaces. ● Obtain MSDSs and labels for each hazardous chemical. ● Develop and implement a written hazard communication program, including labels, MSDSs and employee training. ● Communicate hazard information to their employees through labels, MSDSs and formal training programs.

Chemical manufacturers and importers are required to review available scientific evidence concerning the physical and health hazards of the chemicals they produce or import, and to report the information they find to their employees and employers who distribute or use their products. Manufacturers and importers must also describe in writing the procedures they used to determine the hazards of the chemicals evaluated. The written materials must be available, upon request, to employees and OSHA officials. However, the company has up to five working days to produce the procedures.

Each chemical must be evaluated for its potential to cause adverse health effects and pose physical hazards, such as flammability. *(NOTE: Employers are not required to evaluate chemicals unless they choose not to rely on the evaluation performed by the chemical manufacturer or importer.)*

Of specific importance to water treatment companies are mixtures and solutions. OSHA defines mixtures as "any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction." OSHA does not define solutions, but a solution generally is a single-phase mixture of a solvent (eg. water) and a dissolved substance. Solutions which may be a hazardous chemical would be considered a single substance and would still require an MSDS.

Hazards of mixtures, per OSHA, must be determined either through testing the mixtures as a whole or by evaluating the hazards of the individual ingredients that go into the mixture. However, a blender still must create an MSDS for the mixture as a whole. In other words, a blender is not required to test the mixture as a whole, but is required to determine the hazards of the mixture through available data on the constituents and use that information in preparing an MSDS.

One other important note for water treatment companies: The U.S. Department of Transportation has different requirements with respect to hazard determinations and testing. **This publication is only addressing OSHA regulations**. However, once a chemical product is put on a truck, new requirements are introduced. Environmental managers should contact the Department of Transportation about their specific rules.

Evaluation Sources:
The chemical manufacturer, importer or employer evaluating chemicals should refer to the following sources when evaluating whether, or how, a chemical is hazardous:

- 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA); or

- "Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment", American Conference of Governmental Industrial Hygienists (ACGIH).

The chemical manufacturer, importer or employer evaluating chemicals should refer to the following sources when determining why, or how, a chemical is considered a carcinogen or potential carcinogen:

- National Toxicology Program (NTP), "Annual Report on Carcinogens" (latest edition);

- International Agency for Research on Cancer (IARC) "Monographs" (latest edition); or

➢ 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

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

Hazard Classifications:
A chemical is considered to be a "*carcinogen"* if:

1) It has been evaluated by the IARC and found to be a carcinogen or potential carcinogen; or

2) It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the NTP; or

3) It is regulated by OSHA as a carcinogen.

A "*corrosive*" chemical is one that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact following an exposure period of four hours.

A chemical is considered "*highly toxic*" if it falls under any of the following categories:

1) It has a median lethal dose of 50 milligrams or less, per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

2) It has a median lethal dose of 200 milligrams or less, per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

3) It has a median lethal concentration in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within on hour) to albino rats weighing between 200 and 300 grams each.

A chemical is an "*irritant"* if it causes reversible inflammatory effect on living tissue by chemical action at the site of contact.

A chemical is considered a "*sensitizer"* if it causes a substantial proportion of exposed people to develop an allergic reaction in normal tissue after repeated exposure.

A chemical is considered "*toxic*" if it falls under any of the following categories:

1) It has a median lethal dose of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight, when administered orally to albino rats weighing between 200 and 300 grams each.

2) It has a median lethal dose of more than 200 milligrams per kilogram, but not more than 1,000 milligrams per kilogram of body weight, when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

3) It has a median lethal concentration in air of more than 200 parts per million, but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter, but not more than 20 milligrams per liter of mist, fume or dust when administered by continuous inhalation for one hour (or less if death occurs within on hour) to albino rats weighing between 200 and 300 grams each.

Finally, possible *"target organ effects"* should be noted. the table below shows examples of signs and symptoms, as well as chemicals which have been found to cause such effects:

Chemical Type	***Description***	***Signs/Symptoms***	***Chemicals***
Hepatoxins	produces liver damage	jaundice, liver enlargement	carbon tetrachloride, nitrosamines
Nephrotoxins	produces kidney damage	edema, proteinuria	halogenated hydrocarbons, uranium
Neurotoxins	produces primary toxic effects on nervous system	narcosis, behavioral changes, decrease in motor functions	mercury, carbon disulfide
Agents which act on blood	decreases hemoglobin function; deprive body tissues of oxygen	cyanosis, loss of consciousness	carbon monoxide, cyanides
Agents which damage the lungs	irritates or damages pulmonary tissue	cough, tightness in chest, shortness of breath	silica, asbestos
Reproductive toxins	affects both reproductive capabilities, including chromosomal damage (mutations), and fetuses	birth defects, sterility	lead, DBCP
Cutaneous hazards	affects the dermal layer of the body	defatting of the skin, rashes, irritations	ketones, chlorinated compounds
Eye hazards	affects the eye or visual capacity	conjunctivitis, corneal damage	organic solvents, acids

Manufacturers evaluating chemicals are not required to follow any specific methods for determining hazards, but they must be able to demonstrate that they have adequately ascertained the hazards of the chemicals produced.

Below is general guidance on the Hazard Evaluation Procedure.

HAZARD EVALUATION PROCEDURES - GENERAL GUIDANCE[3]

The hazard evaluation process can be characterized as a "tiered" approach - the extent to which a chemical must be evaluated depends to a large degree upon the common knowledge regarding the chemical, whether its health effects are under review, and how prevalent it is in the workplace.

Steps to Follow:

1. The first step is to determine whether the chemical is part of the "floor" of chemicals to be considered hazardous in all situations.
   a. The floor of chemicals consists of three substance types:
      1. Any substance for which OSHA has a permissible exposure limit (PEL) in 1910.1000, or a comprehensive substance-specific standard in Subpart Z, including compounds of substances which OSHA would sample to determine PEL compliance.
      2. Any substance for which the American Conference of Governmental Industrial Hygienists (ACGIH) has a Threshold Limit Value (TLV) in the latest edition of their annual list, and any mixture or combination of these substances.
      3. Any substance which the National Toxicology Program (NTP) or International Agency for Research on Cancer (IARC) has found to be a suspect or confirmed carcinogen or which OSHA regulates as a carcinogen.
   b. Sources to establish the hazards of the "floor" of chemicals covered are:
      1. The OSHA Chemical Information Manual
      2. OSHA Instruction CPL 2-2.43A, October 20, 1987
      3. NIOSH/OSHA Occupational Guidelines
      4. Documentation for the TLVs
      5. NTP Summary of the Annual Report on Carcinogens
      6. IARC Monographs

2. The second step is to consult other generally available sources to see what has been published regarding the chemical. Patty's Industrial Hygiene and Toxicology is one such source.

3. The third step, for those chemicals where information is not readily available, is to perform searches of databases such as the National Library of Medicine (NLM) which includes the Toxicology Data Bank (TDB), TOXLINE and MEDLARS. To qualify as an acceptable study, it must be conducted according to scientific principles.

4. Internet addresses for the above-mentioned organizations are:
   a. ACGIH - http://www.acgih.org
   b. NTP - http://ntp-server.niehs.nih.gov
   c. IARC - http://www.iarc.fr
   d. OSHA - http://osha.gov

[3] Although specific procedures to follow and sources of consultation cannot be definitively provided, general guidance for companies is in this chart.

INFORMATION

INFORMATION

The "information" section of the HCS includes requirements for labels, MSDSs and employee training. All are detailed below.

Labels And Other Forms Of Warning:
In the workplace, each container of a hazardous chemical must be labeled, tagged or marked with: the identity[4] of hazardous chemicals contained therein; hazard warnings[5] appropriate for employee protection; and the name and address of the chemical manufacturer, importer or other responsible party. Labels must be legible, in English and prominently displayed. They also must be able to be cross-referenced with the MSDS and the list of hazardous chemicals.

Employers must ensure that labels on incoming containers of hazardous chemicals are not removed or defaced. All containers of hazardous chemicals - even very small ones - leaving the workplace must be labeled. Additionally, chemical manufacturers and employers who become aware of any new significant information regarding the hazards of a chemical must revise the labels for that chemical within three months of becoming aware of the new information.

Exemptions to the requirement for individual container labels are:

- Employers can post signs or placards that convey the hazard information if there are a number of stationary containers within a work area that have similar contents and hazards.

- Employers can substitute various types of standard operating procedures, process sheets, batch tickets, blend tickets and similar written materials for container labels on stationary process equipment if they contain the same information and the written materials are readily accessible to employees in the work area.

- Employers are not required to label portable containers into which hazardous chemicals are transferred from labeled containers and that are intended only for the immediate use of the employee who makes the transfer.

- Employers are not required to label pipes or piping systems.

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[4] The "identity" is an identical term which appears on the label, the MSDS, and the company's list of hazardous chemicals, thus linking these three sources of information. The identity can be either a common name, trade name or chemical name.

[5] The hazard warning can be any type of message, words, pictures or symbols that provide at least general information regarding the hazards of the chemical in the container and specific information regarding its physical and health hazards.

In situations where a tank truck, rail car or similar vehicle is the container for the hazardous chemical, the labeling information may either be posted on the outside of the vehicle or attached to the accompanying shipping papers or bill-of-lading. A label may not be shipped separately since to do so defeats the purpose of providing an immediate hazard warning.

With these requirements in mind, a compliance officer will be looking for the following types of information in the written program to ensure that labeling will be properly implemented at the facility:

1. Designation of person(s) responsible for ensuring labeling of in-plant containers;
2. Designation of person(s) responsible for ensuring labeling of shipped containers;
3. Description of labeling system(s) used;
4. Description of written alternatives to labeling on in-plant containers (if used); and
5. Procedures to review and update label information.

Material Safety Data Sheets (MSDS):

The rule requires that "Employers shall maintain copies of any MSDSs that are received with incoming shipments of the sealed containers of hazardous chemicals; shall obtain an MSDS as soon as possible for sealed containers of hazardous chemicals received without an MSDS; and shall ensure that the MSDSs are readily accessible during each work shift to employees when they are in their work areas."

As part of the written hazard communication program, employers must prepare a list of all hazardous chemicals in the workplace (see section below on "Written Hazard Communication Program"). If there are hazardous chemicals used for which no MSDS has been received, the employer must write to the supplier, manufacturer or importer to obtain the missing MSDS.[6] Employers should not allow employees to use any chemicals for which there is no MSDS.

Employers are not to be held responsible for inaccurate information on any MSDS or label which they did not prepare and have accepted in good faith from the chemical manufacturer, importer or distributor. (However, any party who changes the label or MSDS becomes the responsible party regardless of whether they are a chemical manufacturer, distributor or employer.) Citations shall be issued to the employer only when MSDSs or labels are missing, unless a good faith effort has been made to obtain the information. Citations to manufacturers or importers for incomplete or inaccurate MSDSs or labels shall include an "abatement" requirement for the transmittal of corrected ones to all customers with the next shipment of the chemical.

[6] It is a good idea to document these requests, either by copy of a letter or a note of a telephone conversation.

Copies of the MSDS for hazardous materials in a given worksite must be **readily accessible** to employees in that area. They must be located close to workers and available during each workshift. If an employer possesses an MSDS, but it is not readily accessible to employees while in their work area, then a violation shall be cited.

Each MSDS must be in English and include:

✓ the specific chemical identity of the hazardous chemical;
✓ its chemical and common names if it is a single substance;
✓ the physical and chemical characteristics of the hazardous chemical, including the potential for fire, explosion and reactivity;
✓ primary routes of entry;
✓ known acute and chronic health effects and related health and hazard[7] information, including signs and symptoms of exposure, and any medical conditions which can be aggravated by exposure to the chemical;
✓ the OSHA permissible exposure limits, ACGIH Threshold Limit Value, and any other exposure limit used or recommended by the facility preparing the MSDS;
✓ whether the chemical is considered to be a carcinogen by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC) or OSHA;
✓ precautionary measures, such as engineering controls, work practices or personal protective equipment;
✓ emergency and first-aid procedures;
✓ date of preparation of the MSDS or the last change to it; and
✓ the name, address, and telephone number of the organization responsible for preparing the sheet who can provide additional information on the hazardous chemical and appropriate emergency procedures.

(Refer to Appendix A for a Guide to Reviewing MSDS Completeness for assistance in preparing these forms.)

The updated Directive does allow "electronic access to MSDSs" (i.e., through computers, microfiche machines, the Internet, CD-ROM and fax machines), with these caveats:

✓ Employees must be trained to operate the data retrieval devices, including the specific software involved.

✓ An adequate back-up access procedure must be provided in the event of power outages, equipment failures, or delays in, or loss of, on-line access.

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[7] The preparer of the MSDS is required to consider all available scientific evidence concerning the hazards of a chemical. Where at least one positive scientific study exists which is statistically significant and demonstrates adverse health effects, the MSDS must include the adverse health effects found. One important note: No testing of chemicals to determine hazards is required; the evaluation may be based on information currently available in chemical/scientific literature.

✓ The electronic MSDS retrieval system must be integrated into the overall hazard communication plan.

✓ Hard copies must be available on demand so that they can be provided to employees and medical personnel in the event of emergencies.

✓ Employers with remote work sites must have a written procedure as part of their HAZCOM plan for transmitting data to those work sites.

Note for water treatment companies: Where complex mixtures have similar hazards and contents (i.e., the chemical ingredients are essentially the same, but the composition varies from mixture to mixture), the manufacturer can prepare one MSDS to apply to all of these similar mixtures.

MSDSs have no prescribed format. The non-mandatory MSDS form (OSHA 174) may be used as a guide (see Appendix B). ANSI standard no Z400.1 - *Material Safety Data Sheet Preparation* - may also be used. (This format is the most recognized and acceptable one in existence today.) The ANSI standard is divided into 16 sections by type of information and intended audiences. Each section was developed to ensure that the data provided in it is tailored to, and understood by, the audience that requires it. If no relevant information is found for any given category on the MSDS, the preparer should mark it to indicate that no applicable information was found.

The two groups whose information needs are most critical are emergency responders and employees who handle the material. The information these groups most require are:

- identification of the material;
- hazard information - physical and health;
- first aid in case of exposure; and
- emergency procedures, especially in fire situations.

Therefore, the first five sections of ANSI Z400.1 contain this information so that it is easily located by these two groups when needed.

The fact that Sections 12-15 relate to information topics regulated by the U.S. Department of Transportation (DOT) and/or the U.S. Environmental Protection Agency (EPA) has prevented full OSHA endorsement of this ANSI Z400.1 format. This jurisdictional dilemma must be resolved between OSHA, DOT and EPA to allow for endorsement of the full 16-section MSDS as both a U.S. and international standard.

SUMMARY OF DETAILED SECTIONS OF ANSI Z400.1

Section 1	**Chemical Product and Company Identification**	● Manufacturer or responsible company ● Alternative names/synonyms/company codes ● Name/address of manufacturer ● Emergency phone number
Section 2	**Composition, Information on Ingredients**	● All ingredients that contribute to the hazard
Section 3	**Hazards Identification** **Emergency Overview** **Potential Health Effects**	● Appearance, physical state and odor ● Health, physical, and environmental hazards that require immediate attention in an emergency ● Information on potential adverse health effects and symptoms associated with exposure, including route and lengths, severity of effect, signs & symptoms, and medical conditions aggravated by exposure ● References to chronic health effects (NTP, IARC or OSHA) ● Information must be in easily understood language
Section 4	**First Aid Measures** **Note to Physicians**	● Instructions by route of exposure (i.e., inhalation, skin, eye, etc.) ● Simple remedial measures ● Information on first aid associated with specific handling methods ● Antidotes that can be administered ● Indicate if immediate attention is required or if delayed effects could be expected ● Provide specific treatment procedures, if available ● For mixtures, the symptoms/treatments of components could be described ● Aggravated medical conditions
Section 5	**Fire Fighting Measures**	● Flash point and method ● Upper and lower flammable limits ● Autoignition temperature ● Flammability classification ● Flame propagation or burn rate ● Hazardous products of combustion ● Properties that initiate/contribute to fire intensity ● Proper media to extinguish fire ● Instructions for protecting lives in the area noting unusual impact on the environment and property loss
Section 6	**Accidental Release Measures**	● Containment techniques, clean-up procedures related to spills and releases ● Distinguish between large and small spills ● Evacuation procedures ● Advice to protect the responders and environment ● Specific reporting requirements can be placed here or in Section 15

SUMMARY OF DETAILED SECTIONS OF ANSI Z400.1 (cont.)

Section 7	**Handling**	● List handling practices that: ▸ minimize contact, fire risk and release to the environment ▸ include general warnings on practices to avoid ▸ include practices to prevent vapor releases, use of non-sparking tools, explosion-proof equipment, inert blanketing, precautions for handling molten or hot materials, etc.
	Storage	● Information for appropriate storage or transport ● Any unusual conditions that could injure workers or damage the product, its container or storage area ● Any specific storage condition to avoid a hazard or damage to the integrity of the material
Section 8	**Exposure/Engineering Controls**	● Generally applicable control measures ● Ventilation needs ● Special process conditions
	Personal Protective Equipment (PPE)	● Recommended PPE for each route of exposure to minimize or prevent contact ● Specific regulatory PPE requirements ● Subdivide into section sub-headings for: ▸ eye/face protection ▸ skin protection ▸ respiratory protection
	Exposure Guidelines	● Identify established exposure guidelines for the product, its components, or both ● List OSHA, PELs, ACGIH, TLVs, and any other appropriate exposure guidelines ● Describe both the concentration and the time frame (i.e., 100 ppm, 15 minutes) ● Include "skin notation" qualifier where applicable ● List mandatory guidelines first, followed by any optional guidelines
Section 9	**Physical and Chemical Properties**	● The following characteristics should appear for all chemicals: odor, physical state, pH, vapor pressure, vapor density, boiling point, freezing/melting point, solubility in water, and specific gravity or density ● The following characteristics should be listed for all applicable chemicals: heat value, particle size, OC content, softening point, evaporation rate, viscosity, bulk density, percent volatile, molecular weight, molecular formula, octanol/water partition coefficient, and saturated vapor concentration ● Identify units of measurement and/or reference conditions

SUMMARY OF DETAILED SECTIONS OF ANSI Z400.1 (cont.)

Section 10	**Stability and Reactivity**	● The following elements should be addressed: ‣ *chemical stability* - indicate stability under normal storage/handling conditions ‣ *conditions to avoid* - list conditions that may result in a hazardous situation (i.e., heat, pressure, shock, etc.) ‣ *incompatibility with other materials* - list chemicals or other materials that the product could react with to produce a hazardous situation ‣ *hazardous decomposition products* - list known and reasonably anticipated hazardous materials produced as a result of oxidation heating or reaction with another material ‣ *hazardous polymerization* - state if the material will polymerize, releasing excess pressure, heat or other hazardous conditions. State the conditions that could make this occur.
Section 11	**Toxicological Information**	● Supporting data for health hazard determination presented in Section 3 ● Acute toxicological data ● Chronic/sub-chronic studies ● Special studies (i.e., epidemiology, carcinogenicity, reproductive toxicology, etc.) ● Present data either by route of exposure or end-point of test
Section 12	**Ecological Information**	● Ecotoxicity data (fish, avian, plants) ● Environmental fate (persistence, degradation, bioaccumulation) ● Certain physical/chemical characteristics (hydrolytic and photolytic stability, water solubility, vapor pressure) ● Data results must indicate species, media, units, test duration, and conditions ● Include statements of relevance to the data
Section 13	**Disposal Considerations**	● Information relevant to determining the proper waste management options for a given material and/or container. May include: ‣ classification under RCRA ‣ EPA Hazardous Waste No. description ‣ physical/chemical properties related to disposal options (i.e., BTU value for incineration, bioconcentration factor for landfilling) ‣ specific disposal recommendations or limitations ‣ advice that information pertains only to unused, uncontaminated material ‣ advice that specific state or local regulations may impact available disposal options

SUMMARY OF DETAILED SECTIONS OF ANSI Z400.1 (cont.)

Section 14	**Transport Information**	● Basic DOT description including: proper shipping name; hazard class; UN/NA identification number; and international transportation classification (i.e., IMO, ICAO, Transport Canada, etc.)
Section 15	**Regulatory Information**	● Information on the regulatory status of materials (including individual components) ● May include: ▸ U.S. Federal Regulations (OSHA, TSCA, FIFRA, FDA, CERCLA, SARA Title III, etc.) ▸ International Regulations (WHMIS, CEPA, EC) ▸ U.S. State Regulations
Section 16	**Other Information**	● Other information unrelated to other 15 sections ● May include: ▸ Label text ▸ Hazard ratings (i.e., NFPA, HMIS) ▸ Preparation/revision indicator

Compliance officers will be looking for the following types of information in the written program with respect to MSDSs:

1. Designation of person(s) responsible for obtaining and maintaining the MSDSs;
2. How such sheets are to be maintained in the workplace (i.e., in notebooks in the work area(s) or in a computer with terminal access); procedures on how to retrieve MSDSs electronically, including back-up systems to be used in the event of electronic equipment failure; and how employees can obtain access to them when they are in their work area during the work shift;
3. Procedures to follow when the MSDS is not received with the first shipment;
4. For producers, procedures to update the MSDS when new and significant health information is found; and
5. Description of alternatives to data sheets in the workplace, if applicable.

<u>Trade Secrets:</u>
The chemical manufacturer or employer may withhold specific chemical identities, including the chemical name and other specific identification of a hazardous chemical, from the MSDS provided that:

➔ The claim can be supported that the information withheld is a trade secret;
➔ Information contained in the MSDS concerning the properties and effects of the hazardous chemical is disclosed;
➔ The MSDS states the specific chemical identity is being withheld as a trade secret; and
➔ The specific chemical identity is made available when a treating physician or nurse determines that a medical emergency exists and the chemical identity is needed for appropriate first-aid treatment.

Employee Information and Training Programs:
The HCS includes the following provision: "Employers shall provide employees with information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area." In general, the most important aspects of training under the HCS are to ensure that employees are aware that they are exposed to hazardous chemicals; that they know how to read and use labels and MSDSs; and that, as a consequence of learning this information, they are following the appropriate protective measures established by the employer.

At a minimum, the **information** topics must include the following:
✓ An overview of the HCS and its requirements.
✓ The components of the hazard communication program in the employees' workplaces.
✓ Work areas where hazardous chemicals are present.
✓ Where the employer keeps the written hazard evaluations, hazard communication program, lists of hazardous chemicals and required MSDS forms.

The employee **training** plan must consist of the following elements:
✓ How the hazard communication program is implemented.
✓ How to read and interpret information on labels.
✓ How employees can obtain and use available hazard information.
✓ Location, use and interpretation of MSDSs (including the use of software if an electronic form is used).
✓ The hazards of the chemicals in the work area and risks of exposure to them. (The hazards may be discussed by individual chemical or by hazard category.) This includes the chemical and physical properties of the hazardous materials (i.e., flash points, vapor pressures), as well as methods of detecting the presence of hazardous substances, including detection of chemicals in unlabeled pipes.
✓ Measures employees can take to protect themselves from the hazards.
✓ Specific procedures put into effect by the employer to provide protection, such as engineering controls, work practices and the use, care and maintenance of personal protective equipment (PPE).[8]
✓ Methods and observations - such as visual appearance or smell - workers can use to detect the presence of a hazardous chemical to which they may be exposed.
✓ Physical signs and symptoms of exposure and which preexisting medical conditions might be aggravated by exposure.

[8] OSHA's PPE law requires that employees must be protected from hazards and have the right type of equipment available for use in each work area. This equipment includes hard-hats, ear protection, eye protection and fall protection. All employees must be trained in the use of the equipment, and this must be documented in the written safety program. After that, training must be updated annually. It is the responsibility of the employer to enforce the use of the equipment.

✓ Work practices and procedures not only in continual use, but to address spills and leaks.

OSHA compliance officers will talk to employees to determine if they have received training, if they know they are exposed to hazardous chemicals, and if they know where to obtain substance-specific information on labels and MSDSs. If no form of employee training has been provided, citations will be issued.

Initial training, regular refresher training and additional training whenever work practices change or new materials are introduced into the workplace are also required. *(NOTE: The re-training required by the rule is only when a new hazard is brought into the workplace, not a new chemical.)* The rule does not require employers to maintain records of employee training, but many employers choose to do so. It helps monitor the program to ensure that all employees are appropriately trained.

One important fact: The information and training requirements are flexible. The rule does not specify how the training is to be accomplished. If an employer only has a few chemicals, it may be most useful to individually review each one in the workplace. However, where there are many chemicals and/or they change frequently, it would be more appropriate to train workers regarding all types of hazards by categories, rather than addressing each individual substance.

Overall, the training should be performance-based, creative, interactive, job-specific and tailored to the language and education level of the worker. Training must involve seeing, hearing and performing the actual steps required to provide adequate protection. For employees who handle sealed containers, training is dependent upon the type of chemicals involved, the potential size of any spills or leaks, the type of work performed, and what actions employees are expected to take when a spill or leak occurs.

Common training deficiencies:

a. ***Training the wrong employees***. Many companies have found it effective to give "awareness" training to ALL employees.

b. ***Not covering the right subject matter***. Far too many HAZMAT training programs are focused exclusively on domestic ground transportation. Even if that is the most common mode by which a company distributes hazardous materials, it is a mistake not to include at least warnings about shipments via vessel, aircraft or internationally.

c. ***Training too infrequently***. The government generally allows retraining as infrequently as 36 months. However, most employees need to see this information far more often. The less daily experience they have using the regulations, the more often they need the training.

d. ***Training materials are ineffective***. Training that simply reiterates what is in the regulations will not only bore employees, but it will not teach them much. Training should be designed by professional educators to use techniques that work in assuring both initial comprehension of complex materials, and retention over time. The more interactive the course of instruction, the better.

Other helpful hints for training:

● Keep reminding workers of the importance of safe work practices using department safety meetings, a top-level safety committee and constant vigilance.

● The most effective programs are ones where employees and their representatives participate in all aspects of the program's design and implementation. In addition, employees need to know the identities and hazards of workplace chemicals so they can ensure the program is effective. None of this can be accomplished without the information provided through the HCS.

● Safety and health information and instruction is more effective when incorporated into other training about performance requirements and job practices, such as: management training on performance evaluation, problem solving or managing change; supervisors' training on the reinforcement of good work practices and correction of poor ones; and employee training on the operation of a particular machine.

● Some means of verifying comprehension is essential, such as formal testing, oral questioning, observation and other means.

The best way to minimize hazardous accidents is to use proper identification, packaging and hazard communication. And that takes effective employee training. In combination, the increased knowledge of employers and employees will lead to actions that reduce hazardous chemical exposures, and therefore the potential for chemically-related illnesses and injuries.

In reviewing the written program with regard to employee information and training, compliance officers will look for the following:

1. Designation of person(s) responsible for conducting training;
2. Format of the program to be used;
3. Elements of the training program;
4. Procedure to train new employees at the time of their initial assignment to work with a hazardous chemical, and to train employees when a new hazard is introduced into the workplace; and
5. Procedures to train new employees regarding new hazards to which they may be exposed when working on or near another employer's worksite.

WRITTEN HAZARD COMMUNICATION PROGRAM

WRITTEN HAZARD COMMUNICATION PROGRAM

Employers must develop, implement and maintain at the workplace a written, comprehensive hazard communication program which fully describes how the requirements for labels and other forms of warning, MSDSs and employee information and training are going to be met in the facility. Preparation of a plan is not just a paper exercise - all of its elements must also be implemented in the workplace in order to be in compliance with the rule.

The plan does not have to be lengthy or complicated. It is intended to be a blueprint for implementation of the program - an assurance that all aspects of the requirements have been addressed (refer to Appendix C for a sample).

Included in the written plan should be detailed information on:

- ☐ Provisions for container labeling;
- ☐ Location and availability of MSDSs;
- ☐ The company's employee training program;
- ☐ A list of the hazardous chemicals in each work area;
- ☐ The means the employer will use to inform employees of the hazards;
- ☐ The hazards associated with chemicals in unlabeled pipes;
- ☐ What employees are actually doing in a particular workplace;
- ☐ Who is responsible for the various aspects of the HAZCOM program in that facility;
- ☐ Where all written materials will be located and made available to employees;
- ☐ Identification of the person responsible for obtaining and maintaining the MSDSs;
- ☐ The procedures to update the MSDS and the label when new and significant health information is found; and
- ☐ Program addressing the OSHA "right-to-know" and "personal protective equipment" regulations.

The first step in writing the program is to prepare a list of all hazardous chemicals in the workplace. The best way to draft a comprehensive list is to survey the workplace completely using the broadest perspective. ***Remember - the HCS covers chemicals in all physical forms - liquids, solids, gases, vapors, fumes and mists.*** After completing the list, make sure there are MSDSs for every chemical listed.

What OSHA Wants to See in the Written Program:

OSHA typically performs three types of audits: 1) a random audit; 2) an audit stemming from a complaint; or 3) an audit triggered by the death of a worker or a serious and/or life threatening injury. When OSHA performs an audit, it verifies first that written safety programs exist and are followed, and that the employees understand them.

Non-compliance with the written hazard communication program is always more costly than the implementation of one. For the absence of a written program, fines in excess of

$10,000 have been levied. Once a fine has been issued, a company's public image may also suffer irreparable damage.

Typically when OSHA visits a site on an audit, it begins its investigation with an "opening" - an initial meeting between OSHA and the company. This is followed by an investigation of the paper trail. "Does a written safety program for all potential or real hazards exists?" "Are the employees trained in the implementation of the program?" "Do the employees understand and follow the written program?" OSHA will most likely ask three or more employees these and other related questions. Chances are that if the answers to the preceding questions are "yes", further investigations inside the plant may be avoided. If the answers are "no" and the company lacks safety programs, it is then showing "willful intent", and has opened itself up to the most serious of OSHA fines.

The only way to truly protect your company from these fines is to implement a written safety program following the OSHA guidelines.

CONCLUSIONS

SUCCESSFUL SAFETY AND HEALTH PROGRAM

Water treatment facilities are advised and encouraged to institute and maintain in their establishments a program which provides systematic policies, procedures and practices that are adequate to recognize and protect their employees from occupational safety and health hazards. **An effective program includes provisions for the identification, evaluation and prevention or control of general workplace hazards, specific job hazards and potential hazards which may arise from foreseeable conditions** (refer to Appendix F - *Hazard Communication Checklist* - for a useful tool in determining whether your safety and health programs cover all parts of the rule)**.**

The guidelines identify four general elements that are critical to the development of a successful safety and health management program:

1. Management commitment and employee involvement are complementary:
Management commitment provides the motivating force and resources for organizing and controlling activities within an organization. In an effective program, management regards worker safety and health as a fundamental organization value and applies its commitment to safety and health protection with as much vigor as to other values. Employee involvement provides the means through which workers develop and express their own commitment to safety and health protection for themselves and fellow workers.

Recommended actions:
◆ Clearly state a worksite policy on safe and healthful work and working conditions, so that all personnel at the site understand the priority of safety and health protection in relation to other organizational values.
◆ Establish and communicate a clear goal for the safety and health program, as well as objectives for meeting that goal, so that all members of the organization understand the results desired and the measures planned for achieving them.
◆ Provide visible top management involvement in implementing the program, so that all will understand that management's commitment is serious.
◆ Encourage employee involvement in the program's structure and operation and in decisions affecting their safety and health, so that they will commit their energy to achieving the safety and health program's goal and objectives.
◆ Clearly assign and communicate responsibility for all aspects of the program, so that all managers, supervisors and employees know what performance is expected of them.
◆ Provide adequate authority and resources to responsible parties, so that assigned responsibilities can be met.
◆ Hold managers, supervisors and employees accountable for meeting their responsibilities, so that essential tasks will be performed.
◆ Review program operations at least annually to evaluate their success in meeting the goal and objectives, so that deficiencies can be identified and the program revised when they do not meet the goal of effective safety and health protection.

2. Worksite analysis:

Worksite analysis involves a variety of examinations to identify not only existing hazards, but also conditions and operations in which changes might occur to create ones. Unawareness of a hazard which stems from failure to examine the worksite is a sure sign that safety and health policies and/or practices are ineffective. Effective management actively analyzes the work and worksite to anticipate and prevent harmful occurrences.

To ensure that all hazards are identified:

◆ Conduct comprehensive worksite surveys for safety and health, as well as periodic update ones.
◆ Analyze planned and new facilities, processes, materials and equipment.
◆ Perform routine job hazard analyses.
◆ Provide for regular site safety and health inspection, so that new or previously missed hazards and failures in hazard controls are identified.
◆ Provide a reliable system for employees to notify management personnel, without fear of reprisal, about conditions that appear hazardous. Employees should receive timely and appropriate responses to their concerns, and be encouraged to use the system.
◆ Provide for investigation of accidents and "near misses".
◆ Analyze injury and illness trends over time, so that patterns with common causes can be identified and prevented.

3. Hazard prevention and control:

Where feasible, hazards are prevented by effective design of the jobsite or job. Where it is not feasible to eliminate them, they are controlled to prevent unsafe and unhealthful exposure. Elimination or controls should be accomplished in a timely manner once a hazard or potential hazard is recognized.

To ensure that all current and potential hazards are corrected or controlled in a timely manner, do, or establish, the following:

◆ Engineering techniques where feasible and appropriate.
◆ Procedures for safe work which are understood and followed by all affected parties as a result of training, positive reinforcement, correction of unsafe performance, and, if necessary, enforcement through a clearly communicated disciplinary system.
◆ Provision of personal protective equipment.
◆ Administrative controls, such as reducing the duration of exposure.
◆ Provide for facility and equipment maintenance, so that hazardous breakdown is prevented.
◆ Plan and prepare for emergencies by conducting training and drills, so that the response of all parties to emergencies will be "second nature".
◆ Establish a medical program which includes the availability of first aid on site and physician and emergency medical care nearby, so that harm will be minimized if any injury or illness does occur.

4. Safety and health training:

Safety and health training addresses the safety and health responsibilities of all personnel concerned with the site. It is often most effective when incorporated into other training about performance requirements and job practices. Its complexity depends on the size and nature of the worksite's hazards and potential hazards.

Recommended actions:

◆ Ensure that all employees understand the hazards to which they may be exposed and how to prevent harm to themselves and others from exposure to these hazards, so that employees accept and follow established safety and health protections.

◆ Ensure that supervisors and managers understand their safety and health responsibilities effectively and the reasons for them, including: analyzing the work under their supervision to identify unrecognized potential hazards; maintaining physical protections in their work areas; and reinforcing employee training on the nature of potential hazards at the site and on needed protective measures through continual performance feedback and, if necessary, through enforcement of safe work practices.

The criterion for determining what is needed in a safety and health program at a particular site is: Whatever feasible action it takes to protect the workers from the safety and health hazards at that specific site.

Consultation Assistance:

Consultation assistance is available on request to employers who want help in establishing and maintaining a safety and healthful workplace. Largely funded by OSHA, the service is provided at no cost to employers. Primarily developed for smaller companies with more hazardous operations, the consultation service is provided by state government agencies or universities employing professional safety and health consultants. Comprehensive assistance includes an appraisal of all mechanical, physical work practices and environmental hazards of the workplace and all aspects of the employer's present job safety and health program.

This program is separate from OSHA's inspection efforts. No penalties are posed or citations issued for any safety or health problems identified by the consultant. **The service is confidential**. For more information on this consultation assistance, see the list of consultation projects under Appendix E.

FINAL NOTE

An employer's obligation boils down to monitoring the workplace vigilantly for hazardous substances, training employees adequately and being absolutely, no-hold-barred insistent on obtaining MSDSs from manufacturers or wholesalers.

The key to compliance is vigilance. Safety managers should make it a point to regularly observe how chemicals are being used in the workplace; review MSDSs for completeness and accuracy, and get rid of old ones or ones that cover substances no longer in use; and review and update training programs if necessary.

Hazard communication is intended to be a dynamic process, not a one-time shot in the workplace. Awareness of the hazards of chemicals in the workplace, and of appropriate precautionary measures, should be a continuing way of business for all employers.

Checklist for Initial Program Development/Compliance

Obtain a copy of the rule	❑	
Read and understand requirements	❑	
Assign responsibility for tasks	❑	
Prepare an inventory of chemicals	❑	
Obtain MSDSs for each chemical	❑	
Prepare written program	❑	
Make MSDSs available to workers		❑
Conduct worker training	❑	
Establish procedures to maintain program	❑	
Establish procedures to evaluate program effectiveness	❑	

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Acute effects - usually occur rapidly as a result of short-term exposures and are of short duration. Those most often in this category: irritation, corrosivity, sensitization and lethal dose.

Article - a manufactured item, other than a fluid or particle, which: 1) is formed to a specific shape or design during manufacture; (2) has end use function(s) dependent in whole or in part upon its shape or design during end use; and 3) under normal conditions of use does not release more than very small quantities (i.e., minute or trace amounts) and does not pose a physical hazard or health risk to employees.

Chemical - any element, chemical compound or mixture of elements and/or compounds.

Chemical Manufacturer - an employer that manufactures, processes, formulates or repackages a hazardous chemical. This includes companies which blend or mix chemicals.

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

Chronic effects - generally occur as a result of long-term exposure, and are of long duration. Usually covers carcinogenicity, teratogenicity and mutagenicity.

Common name - any designation or identification such as code name, code number, trade name or generic name used to identify a chemical, other than by its chemical name.

Container - any bag, barrel, bottle, box, can, cylinder, drum, rail car, reaction vessel, storage tank, tank truck, or the like that contains a hazardous chemical. Pipes or piping systems, engines, fuel tanks or other operating systems in a vehicle are not considered to be containers.

Distributor - a business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to distributors or employers. However, a distributor who blends, mixes, or otherwise changes the composition of a chemical is considered to be a chemical manufacturer under the HCS.

Employee - a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies.

Employer - a person engaged in a business where chemicals are either used, distributed or produced for use or distribution, including a contractor or subcontractor.

GLOSSARY OF TERMS (cont.)

Exposure or exposed - means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential exposure (exposure that could result in the event of a foreseeable emergency). "Subjected" in terms of health hazards includes any route of entry (i.e., inhalation, ingestion, skin contact or absorption).

Foreseeable emergency - any potential occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace. It does not include accidental fires.

Hazardous chemical - any chemical which is a physical or health hazard.

Hazard warning - any words, pictures, symbols or combination thereof appearing on a label or other appropriate form of warning which convey the specific physical and health hazard(s).

Health hazard - a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eye or mucous membranes.

Identity - any chemical or common name which is indicated on the MSDS for the chemical. The identity used shall permit cross-references to be made among the required list of hazardous chemicals, label and MSDS.

Immediate use - means that the hazardous chemical will be under the control of, and used only by, the person who transfers it from a labeled container and only within the work shift in which it is transferred.

Importer - the first business with employees within the Customs Territory of the U.S. which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the U.S.

Label - any written, printed or graphic material displayed on or affixed to containers of hazardous chemicals.

Material Safety Data Sheet (MSDS) - written or detailed information concerning a hazardous chemical which is prepared in accordance with HCS requirements.

GLOSSARY OF TERMS (cont.)

Mixture - any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.

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

Oxidizer - a chemical, other than a blasting agent or explosive, that initiates or promotes combustions in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

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

Produce - to manufacture, process, formulate, blend, extract, generate, emit or repackage.

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

Responsible party - someone who can provide additional information on the hazardous chemical and appropriate emergency procedures.

Trade secret - any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it.

Use - to package, handle, react, emit, extract or generate as a byproduct or transfer.

Work area - a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

Workplace - an establishment, job site or project at one geographical location containing one or more work areas.

APPENDIX A

GUIDE FOR REVIEWING MSDS COMPLETENESS

(NOTE: This guide has been developed for use as an optional aid. When preparing an MSDS, the following questions may be helpful.)

Does it contain:

1. Information in English? ❑
2. Same identity as used on the label? ❑
3. Chemical and common name(s) of single chemical, or ingredients in mixture? (NOTE: It must be stated if identity is being withheld as a trade secret.) ❑
4. Physical and chemical characteristics of the chemical (i.e., vapor pressure, flash point, etc.) ❑
5. Physical hazards, including potential for fire, explosion and reactivity? ❑
6. Health hazards, including signs and symptoms and medical conditions which could be aggravated by exposure? ❑
7. Primary routes of entry? ❑
8. OSHA permissible exposure limit (PEL)? The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV)? Other exposure limit(s), including ceiling and short term limits? ❑
9. Information on carcinogen listings (reference OSHA regulated carcinogens, those indicated in the National Toxicology Program Annual Report on Carcinogens and/or those listed by the International Agency for Research on Carcinogens? ❑
10. Generally applicable procedures and precautions for safe handling and use of the chemical (hygienic practices, maintenance and spill procedures)? ❑
11. Generally applicable control measures (engineering controls, work practices and personal protective equipment)? ❑
12. Pertinent emergency and first aid procedures? ❑
13. Date that the MSDS was prepared or the date of the last change? ❑
14. Name, address and telephone number of the responsible party? ❑

APPENDIX B

APPENDIX C

SAMPLE WRITTEN HAZARD COMMUNICATION PROGRAM

(NOTE: The following model program is provided only as a guideline to assist in complying with the HCS ana. is not intended to supersede the requirements. Employers should use this only as a guide when drafting their own specific program.)

General Company Policy:

The purpose of this notice is to inform you that our company is complying with the OSHA Hazard Communication Standard, Title 29 Code of Federal Regulations 1910.1200, by compiling a hazardous chemicals list; using MSDSs, by ensuring that containers are labeled; and providing you with training. This program applies to all work operations in our company where you may be exposed to hazardous chemicals under normal working conditions or during an emergency situation.

The safety and health manager, ***[state person],*** is the program coordinator, acting as the representative of the plant manager, who has overall responsibility for the program. ***[state person]*** will review and update the program, as necessary. Copies of the written program may be obtained from ***[state person]*** in Room ***[indicate where].***

Under this program, you will be informed about the Hazard Communication Standard, the hazardous properties of chemicals with which you work, safe handling procedures, and measures to take to protect yourselves from these chemicals. You will also be informed of the hazards associated with non-routine tasks, such as the cleaning of vessels, and the hazards associated with chemicals in unlabeled pipes.

List of Hazardous Chemicals:

The safety and health manager will make a list of all hazardous chemicals and related work practices used in the facility, and will update the list as necessary. Our list of chemicals identifies all of the chemicals used in our ***[state how many]*** work process areas. A separate list is available for each work area and is posted there. Each list also identifies the corresponding MSDS for each chemical. A master list of these chemicals will be maintained by, and is available from, ***[state person]*** in Room ***[indicate where].***

The following is a list of all known hazardous chemicals used by our employees. This list includes the name of the chemical manufacturer, the work area the chemicals are used in, the dates of use, and the quantity used. Further information on each chemical may be obtained from the MSDSs which are located ***[state location].***

HAZARDOUS CHEMICAL INVENTORY

Chemical	Manufacturer	Work Area	Start Date	Finish Date	Quantity

(Include here the chemical list developed during the inventory. Arrange this list so that you are able to cross-reference it with your MSDS file and the labels on your containers. Additional information such as the manufacturer's telephone number, an emergency number, scientific name, CAS number, etc., could be included and might be found useful to employees and employer.)

When new chemicals are received, this list will be updated (including date the chemicals were introduced) within 30 days of introduction into the workplace. To ensure that the chemicals are added in a timely manner, the following procedure will be followed: ***[describe procedure]***

Material Safety Data Sheets (MSDSs):

MSDSs provide you with specific information on the chemicals you use. The safety and health manager, ***[state person],*** will maintain a binder in his/her office with an MSDS for every substance on the list of hazardous chemicals. The plant manager, ***[state person],*** will ensure that each work site maintains MSDSs for the hazardous chemicals in each work area. MSDSs will be made readily available at your work stations during your shifts.

The following procedure will be followed when an MSDS is not received at the time of shipment: ***[detail procedure]***

The safety and health manager, **[state person],** is responsible for acquiring, updating and reviewing MSDSs for new or significant health and safety information. He/she will contact the chemical manufacturer or vendor if additional research is necessary or if an MSDS has not been supplied with an initial shipment. All new procurements for the company must be cleared by the safety and health manager. A master list of MSDSs is available from ***[state person]*** in Room ***[indicate where].***

(NOTE: If alternatives to paper copies of MSDSs are used, describe the format used and how to access them.)

When revised MSDS are received, the following procedures will be followed to replace old MSDSs: ***[describe procedure]***

Labels and Other Forms of Warning:

The safety and health manager will ensure that all hazardous chemicals in the plant are properly labeled and updated as necessary. Labels will list at minimum the chemical identity, appropriate hazard warnings, and the name and address of the manufacturer, importer or other responsible party. ***[state person]*** will refer to the corresponding MSDS to assist you in verifying label information. Containers shipped from the plant will be checked by the supervisor of shipping and receiving to make sure all containers are properly labeled.

If there are a number of stationary containers within a work area that have similar contents and hazards, signs will be posted on them to convey hazard information. On stationary process equipment, regular process sheets, batch tickets, blend tickets, and similar written materials will be substituted for container labels when these documents contain the same information as labels. These written materials will be made readily available to you during your work shift.

If you transfer chemicals from a labeled container to a portable container that is intended for your immediate use, no labels are required on the portable container. Pipes or piping systems will not be labeled, but their contents will be described in training sessions.

[state person] will review the company labeling procedures every ***[provide time period]*** and will update labels as required.

Non-Routine Tasks:

When you are required to perform hazardous non-routine tasks (i.e., cleaning tanks, entering confined spaces, etc.), a special training session, prior to starting work on such projects, will be conducted to inform you of the hazardous chemicals to which you might be exposed and the precautions you must take to reduce or avoid exposure.

Employee Training:

Everyone who works with, or is potentially exposed to, hazardous chemicals will receive initial training on the Hazard Communication Standard and the safe use of those chemicals. The safety and health manager will conduct these training sessions using audiovisuals and handout materials. Foremen and other supervisors will be extensively trained regarding hazards and appropriate protective measures so they will be available to answer questions from employees and provide daily monitoring of safe work practices.

The training program will emphasize these items:

- A summary of the standard and company's written program.
- The chemical and physical properties of hazardous materials (i.e., flash point, vapor pressure, reactivity) and methods that can be used to detect the presence or release of chemicals (including chemicals in unlabeled pipes).
- The physical hazards of the chemicals in your work area (i.e., potential for fire, explosion, etc.).
- The health hazards, including signs and symptoms of exposure, of the chemicals in your work area and any medical condition known to be aggravated by exposure to these chemicals.
- Procedures to protect against chemical hazards (i.e., required personal protective equipment, and its proper use and maintenance; work practices to ensure appropriate use and handling of chemicals; and emergency response procedures).
- Work procedures to follow to assure protection when cleaning hazardous chemical spills and leaks.
- The location of the MSDSs, how to read and interpret the information on labels and MSDSs, and how employees may obtain additional hazard information.

The safety and health manager or his/her designee will review the employee training program and advise the plant manager on training or retraining needs. Retraining is required when the hazard changes or when a new hazard is introduced into the workplace. It will be company policy to provide training regularly in safety meetings to ensure the effectiveness of the program. As part of the training program assessment, the safety and health manager will obtain input from employees regarding the training they have received, and their suggestions for improvement.

Contractor Employers:

The safety and health manager, ***[state person],*** upon notification by the responsible supervisor, will advise outside contractors, in person, of any chemical hazards that may be encountered in the normal course of their work on the premises, the labeling system in use, the protective measures to be taken, and the safe handling procedures to be used. In addition, ***[state person]*** will brief these individuals on the location and availability of MSDSs. Each contractor bringing chemicals on-site must provide ***[state person]*** with the appropriate hazard information for these substances, including MSDSs, labels and precautionary measures to be taken when working with or around these chemicals.

Additional Information:

All employees, or their designated representatives, can obtain further information on this written program, the hazard communication standard, applicable MSDSs, and chemical information lists at the safety and health office in Room ***[cite location].***

Notes for Chemical Manufacturers, Importers and Distributors

1. *Hazard Determination* - Chemical manufacturers and importers are to detail the methods they will use to conduct a hazard determination for the chemicals produced or imported in their work places. The procedures should identify the system in place to conduct hazard determinations. The system should identify the person or department responsible for conducting the hazard determination and the research strategy involved. Chemical manufacturers which rely on information from upstream suppliers should state this in their written program.

2. *Transmittal of MSDSs* - Chemical manufacturers, importers and distributors should develop a system to ensure that MSDSs are transmitted to customers. The system should identify the person or department responsible for ensuring the transmittal of MSDSs and should include a method to ensure that transmittal is accomplished as required by 29 CFR 1910.1200.

3. *Labels* - Chemical manufacturers, importers and distributors should have a system for ensuring appropriate labeling of hazardous chemicals.

4. *Updating Labels/MSDSs* - A system should be detailed assigning responsibility and periodic review of scientific information required to update MSDSs and labels, as required by 29 CFR 1910.1200.

APPENDIX D

States with Approved Plans

Commissioner
Alaska Department of Labor
1111 West 8th Street, Room 306
Juneau, AK 99801
(907) 465-2700

Director
Industrial Commission of Arizona
800 W. Washington
Phoenix, AZ 85007
(602) 542-5795

Director
California Department
of Industrial Relations
455 Golden Gate Avenue, 4th Floor
S. San Francisco, CA 94102
(415) 703-4590

Commissioner
Connecticut Department of Labor
200 Folly Brook Boulevard
Wethersfield, CT 06109
(203) 566-5123

Director
Hawaii Department of Labor
and Industrial Relations
830 Punchbowl Street
Honolulu, HI 96813
(808) 586-8844

Commissioner
Indiana Department of Labor
State Office Building
402 West Washington Street, Room W195
Indianapolis, IN 46204
(317) 232-2378

Commissioner
Iowa Division of Labor
Services
1000 E. Grand Avenue
Des Moines, IA 50319
(515) 281-3447

Secretary
Kentucky Labor Cabinet
1049 U.S. Highway, 127 South
Frankfort, KY 40601
(502) 564-3070

Commissioner
Maryland Division of Labor
and Industry
Department of Licensing
and Regulation
501 St. Paul Place, 2nd Floor
Baltimore, MD 21202-2272
(410) 333-4179

Director
Michigan Department of Labor
Victor Office Center
201 N. Washington Square
P.O. Box 30015
Lansing, MI 48933
(517) 373-9600

Director
Michigan Department
of Public Health
3423 North Logan Street
Box 30195
Lansing, MI 48909
(517) 335-8022

Commissioner
Minnesota Department of Labor
and Industry
443 Lafayette Road
St. Paul, MN 55155
(612) 296-2342

Director
Division of Industrial Relations
400 West King Street
Carson City, NV 89710
(702) 687-3032

Secretary
New Mexico Environmental
Department
Occupational Health
and Safety Bureau
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502
(505) 827-2850

Commissioner
New York Department of Labor
State Office Building - Campus 12
Room 457
Albany, NY 12240
(518) 457-2741

Commissioner
North Carolina Department of Labor
319 Chapanoke Road
Raleigh, NC 27603
(919) 662-4585

Administrator
Oregon Occupational Safety and Health
Department of Consumer
and Business Services,
Room 430
Labor and Industries Building
350 Winter Street, NE
Salem, OR 97310
(503) 378-3272

Secretary
Puerto Rico Department
of Labor and Human Resources
Prudencio Rivera Martinez Building
505 Munoz Rivera Avenue
Hato Rey, PR 00918
(809) 754-2119

Commissioner
South Carolina Department of Labor
3600 Forest Drive
P.O. Box 11329
Columbia, SC 29211-1329
(803) 734-9594

Commissioner
Tennessee Department of Labor
Attention: Robert Taylor
710 James Robertson Parkway
Gateway Plaza
Suite "A" - 2nd Floor
Nashville, TN 37243-0655
(615) 741-2582

Commissioner
Industrial Commission of Utah
160 East 300 South, 3rd Floor
P.O. Box 146600
Salt Lake City, UT 84114-6600
(801) 530-6880

Commissioner
Vermont Department of Labor
and Industry
120 State Street
Montpelier, VT 05620
(802) 828-2288

Commissioner
Virgin Islands Department
of Labor
2131 Hospital Street, Box 890
Christiansted
St. Croix, VI 00840-4666
(809) 773-1994

Commissioner
Virginia Department of Labor
and Industry
Powers-Taylor Building
13 South 13th Street
Richmond, VA 23219
(804) 786-9873

Director
Washington Department
of Labor and Industries
P.O. Box 44000
Olympia, WA 98504-4000
(206) 956-4200

Administrator
Occupational Safety and Health
Administration
Herschler Building,
2nd Floor East
0122 West 25th Street
Cheyenne, WY 82002
(307) 777-7786

APPENDIX E

OSHA Consultation Project Directory

State	Telephone
Alabama	(205) 348-3033
Alaska	(907) 269-4939
Arizona	(602) 542-5795
Arkansas	(501) 682-4522
California	(415) 703-4441
Colorado	(303) 491-6151
Connecticut	(203) 566-4550
Delaware	(302) 577-3908
District of Columbia	(202) 576-6339
Florida	(904) 488-3044
Georgia	(404) 894-2646
Guam	(671) 647-4202
Hawaii	(808) 586-9116
Idaho	(208) 385-3283
Illinois	(312) 814-2337
Indiana	(317) 232-2688
Iowa	(515) 281-5352
Kansas	(913) 296-4386
Kentucky	(502) 564-6895
Louisiana	(504) 342-9601
Maine	(207) 624-6460
Maryland	(410) 333-4218
Massachusetts	(617) 969-7177
Michigan ….	(517) 332-8250(H)
	(517) 322-1809(S)
Minnesota	(612) 297-2393
Mississippi	(601) 987-3981
Missouri	(314) 751-3403
Montana	(406) 444-6418
Nebraska	(402) 471-4717
Nevada	(702) 486-5016
New Hampshire	(603) 271-2024
New Jersey	(609) 292-3923
New Mexico	(505) 827-2877
New York	(518) 457-2481
North Carolina	(919) 662-4651
North Dakota	(701) 328-5188
Ohio	(614) 644-2631
Oklahoma	(405) 528-1500
Oregon	(503) 378-3272
Pennsylvania	(412) 357-2396
Puerto Rico	(809) 754-2171
Rhode Island	(401) 277-2438
South Carolina	(803) 734-9599
South Dakota	(605) 688-4101

(H) - Health
(S) – Safety

Tennessee	(615) 741-7036

Texas..... (512) 440-3834
Utah ..... (801) 530-6868
Vermont ..... (802) 828-2765
Virginia ..... (804) 786-8707
Virgin Islands ..... (809) 772-1315
Washington ..... (206) 956-5443
West Virginia ..... (304) 558-7890
Wisconsin ..... (608) 266-8579(H)
..... (414) 521-5188(S)
Wyoming ..... (307) 777-7786

(H) - Health
(S) – Safety

OSHA Area Offices

Area	Telephone
Albany, NY	(518) 464-6742
Albuquerque, NM	(505) 766-3411
Allentown, PA	(610) 776-0592
Anchorage, AK	(907) 271-5152
Appleton, WI	(414) 734-4521
Austin, TX	(512) 482-5783
Avenel, NJ	(908) 750-3270
Baltimore, MD	(410) 962-2840
Bangor, ME	(207) 941-8177
Baton Rouge, LA	(504) 389-0474
Bayside, NY	(718) 279-9060
Bellevue, WA	(206) 553-7520
Billings, MT	(406) 657-6649
Birmingham, AL	(205) 731-1534
Bismarck, ND	(701) 250-4521
Boise, ID	(208) 334-1867
Bowmansville, NY	(716) 684-3891
Braintree, MA	(617) 565-6924
Bridgeport, CT	(203) 579-5581
Calumet City, IL	(708) 891-3800
Carson City, NV	(702) 885-6963
Charleston, WV	(304) 347-5937
Cincinnati, OH	(513) 841-4132
Cleveland, OH	(216) 522-3818
Columbia, SC	(803) 765-5904
Columbus, OH	(614) 469-5582
Concord, NH	(603) 225-1629
Corpus Christi, TX	(512) 888-3420
Dallas, TX	(214) 320-2400
Denver, CO	(303) 844-5285
Des Plaines, IL	(708) 803-4800
Des Moines, IA	(515) 284-4794
Englewood, CO	(303) 843-4500
Erie, PA	(814) 833-5758
Fort Lauderdale, FL	(305) 424-0242
Fort Worth, TX	(817) 885-7025
Frankfort, KY	(502) 227-7024
Harrisburg, PA	(717) 782-3902
Hartford, CT	(203) 240-3152
Hasbrouck Heights, NJ	(201) 288-1700
Hato Rey, PR	(809) 766-5457
Honolulu, HI	(808) 541-2685
Houston, TX	(713) 286-0583
Houston, TX	(713) 591-2438
Indianapolis, IN	(317) 226-7290
Jackson, MS	(601) 965-4606
Jacksonville, FL	(904) 232-2895
Kansas City, MO	(816) 426-2756
Lansing, MI	(517) 377-1892

Little Rock, AR ..... (501) 324-6291
Lubbock, TX..... (806) 743-7681
Madison, WI ..... (608) 264-5388
Marlton, NJ ..... (609) 757-5181
Methuen, MA ..... (617) 565-8110
Milwaukee, WI ..... (414) 297-3315
Minneapolis, MN ..... (612) 348-1994
Mobile, AL ..... (334) 441-6131
Nashville, TN ..... (615) 781-5423
New York, NY ..... (212) 264-9840
Norfolk, VA ..... (804) 441-3820
North Aurora, IL ..... (708) 896-8700
Oklahoma City, OK ..... (405) 231-5351
Omaha, NE ..... (402) 221-3182
Parsippany, NJ ..... (201) 263-1003
Peoria, IL ..... (309) 671-7033
Philadelphia, PA ..... (215) 597-4955
Phoenix, AZ ..... (602) 640-2007
Pittsburgh, PA ..... (412) 644-2903
Portland, OR ..... (503) 326-2251
Providence, RI ..... (401) 528-4669
Raleigh, NC ..... (919) 856-4770
Salt Lake City, UT ..... (801) 524-5080
San Francisco, CA ..... (415) 744-7120
Savannah, GA ..... (912) 652-4393
Smyrna, GA ..... (404) 984-8700
Springfield, MA ..... (413) 785-0123
St. Louis, MO ..... (314) 425-4249
Syracuse, NY ..... (315) 451-0808
Tampa, FL ..... (813) 626-1177
Tarrytown, NY ..... (914) 524-7510
Toledo, OH ..... (419) 259-7542
Tucker, GA ..... (404) 493-6644
Westbury, NY ..... (516) 334-3344
Wichita, KS ..... (316) 269-6644
Wilkes-Barre, PA ..... (717) 826-6538

APPENDIX F

Hazard Communication Checklist

- ❑ 1. Has a list of all hazardous chemicals in the workplace been prepared?
- ❑ 2. Does the company have a method for updating the hazardous chemical list?
- ❑ 3. Does the company have an MSDS for each hazardous chemical used?
- ❑ 4. Has a system been developed to ensure that all incoming hazardous chemicals have labels and data sheets?
- ❑ 5. Are procedures in place to ensure labeling for containers?
- ❑ 6. Are employees aware of the requirements of the Hazard Communication Standard and information specific to their workplace?
- ❑ 7. Are employees familiar with the chemical hazards in the workplace?
- ❑ 8. Have employees been informed of the hazards associated with performing non-routine tasks?
- ❑ 9. Do employees understand how to detect the presence or release of hazardous chemicals in their workplace?
- ❑ 10. Are employees trained about proper work practices and personal protective equipment in relation to hazardous chemicals in the work area?
- ❑ 11. Does the training program include an explanation of labels, warnings and MSDSs that are used in each work area?
- ❑ 12. Does the training program provide information on appropriate first aid, emergency procedures, and the likely symptoms of overexposure?
- ❑ 13. Does the training describe where employees obtain MSDSs and how employees use them?
- ❑ 14. Is a system in place to ensure that new employees are trained before beginning work?
- ❑ 15. Is a system in place to identify new hazardous chemicals before they are introduced into a work area?
- ❑ 16. Is a system in place to inform employees of the hazards associated with newly introduced chemicals?

APPENDIX G