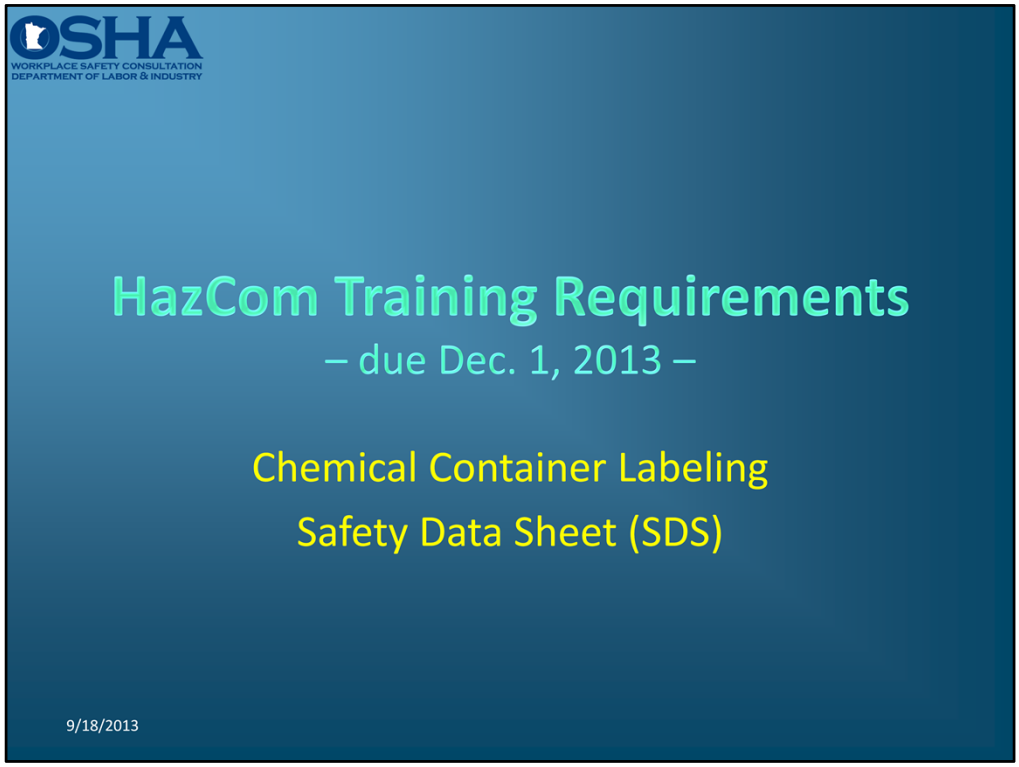
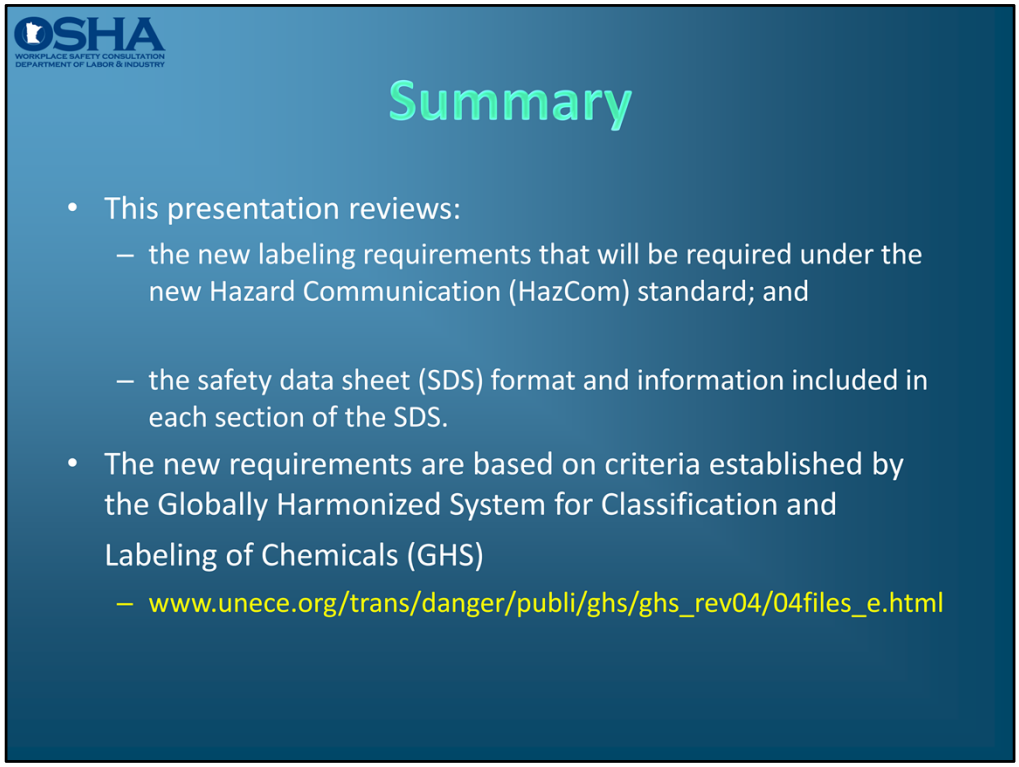


This presentation reviews the new chemical container labeling and safety data sheet requirements under the new Hazard Communication standard.

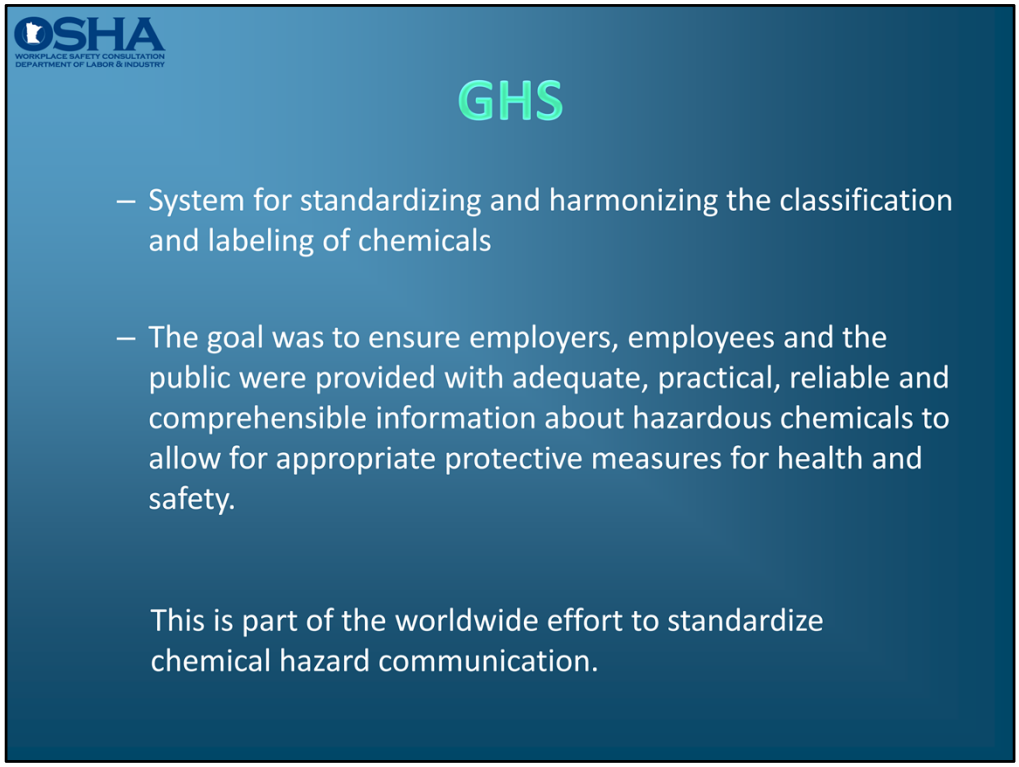
Reference information about the labeling and safety data sheet format can be found on www.osha.gov; specifically on the hazard communication Web page at www.osha.gov/dsg/hazcom.



(Read slide)

The GHS manual that is accessed from the website provides additional detail about the system for chemical classifications and hazard communication.

The purpose of the new HazCom standard is to ensure the hazards of all chemicals produced or imported are classified and information concerning the classified hazards is transmitted to employers and employees in a more informative and consistent manner based on the criteria established in the GHS.



The globally harmonized system is a…(read 1st two paragraphs on slide)

The GHS is the culmination of more than a decade of work. There were many individuals involved from a multitude of countries, international organizations, and stakeholder organizations. There work spanned a wide range of expertise, from toxicology to fire protection, and ultimately required extensive good will and the willingness to compromise, in order to achieve a system that provides a single, globally harmonized system, to address classification of hazardous substances and mixtures, and the communication of these hazards through revised labeling and SDS's.

The new system is being implemented throughout the world by countries including Canada, the European Union, China, Australia, and Japan.

Other U.S. Agencies including the Department of Transportation (DOT), Environmental Protection Agency, and the Consumer Product Safety Commission actively participated in developing the GHS. DOT has already modified its requirements for classification and labeling to make them consistent with United Nations transport requirements and the new globally harmonized system.

The GHS is part of the worldwide effort to standardize chemical hazard communication.

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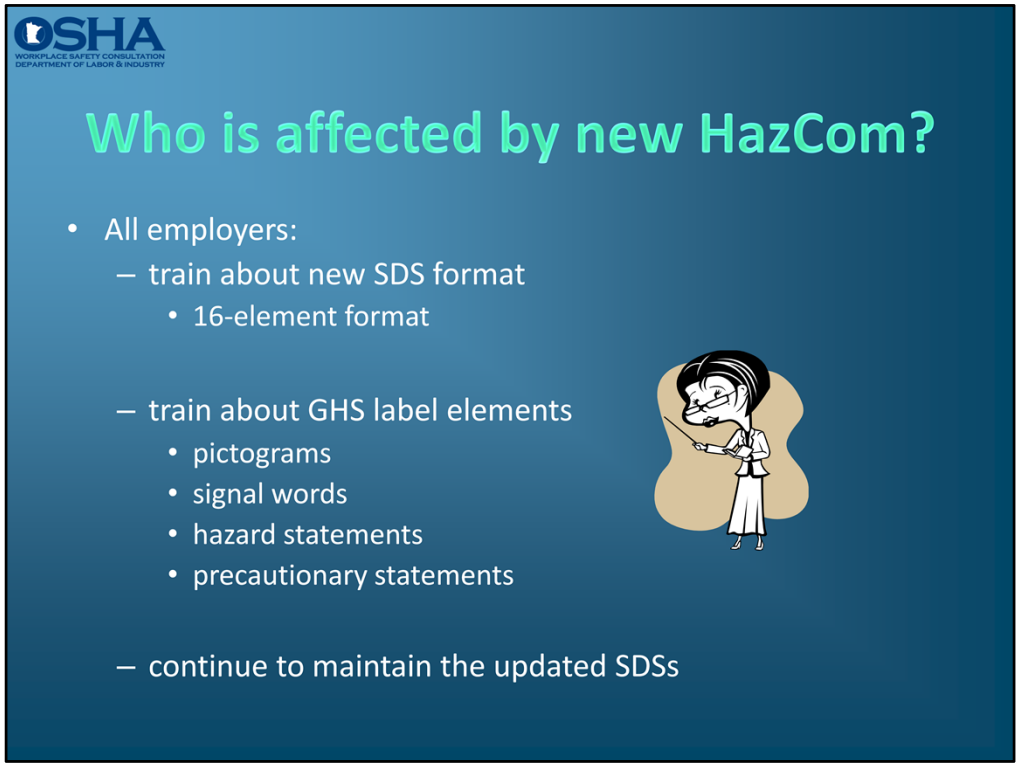
Who is affected by new HazCom?

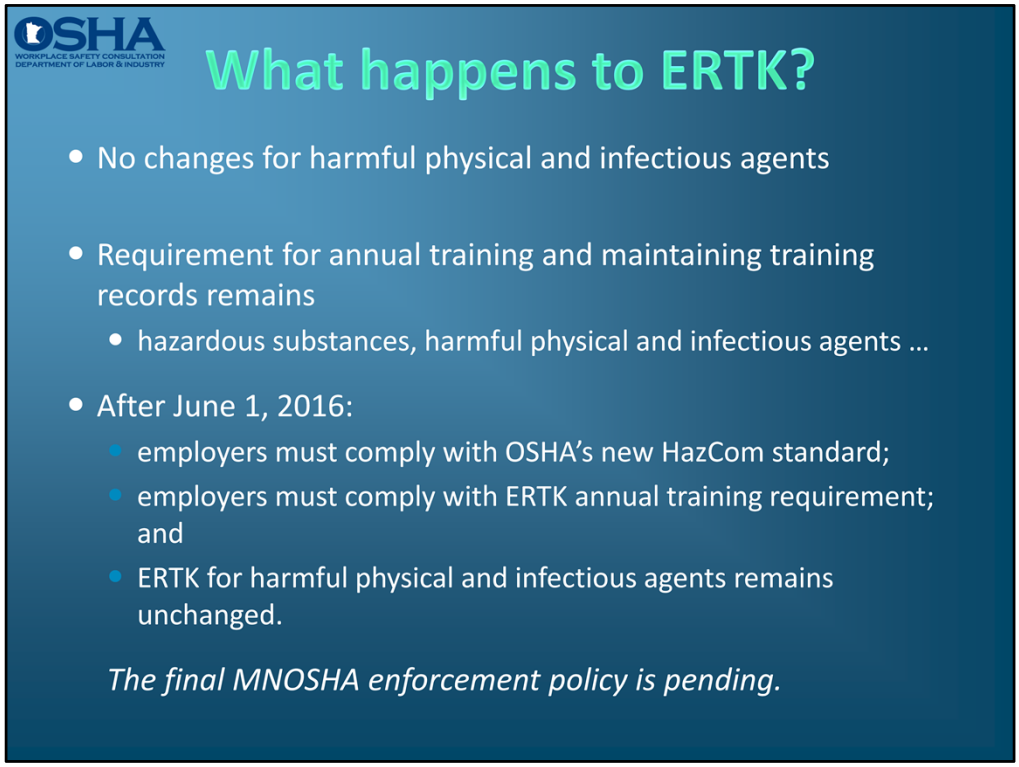
- Chemical manufacturers and distributors:
  - reclassification
  - labeling
  - SDS
  - training

The new HazCom standard requires chemical manufacturers or importers to classify the hazards of chemicals they produce or import. In addition, the new HazCom standard requires distributors to transmit the required information to employers.



Employers must provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, safety data sheets, and information and training. Employers that do not produce or import chemicals need only focus on those parts of this rule that deal with establishing a workplace program and communicating information to their workers.

The initial requirements toward final implementation of the standard are to provide training to affected workers about the new labeling system and SDS format.



What happens to Employee Right-to-Know? There will be no changes to the harmful physical and infectious agents requirements. The requirement for annual training and maintaining training records will remain.

After June 1, 2016, employers must comply with OSHA's new Hazard Communication standard, the annual training requirement under employee right-to-know and employee right-to-know requirements for harmful physical and infectious agents remains unchanged. The final MNOSHA enforcement policy is pending.

Some potential questions after June 1, 2016

- Will ERTK retain the lists for hazardous substances, physical agents and infectious agents (5206.0400 thru 600)? The current thought is the hazardous substance list will be gone, but lists for hazardous physical and infectious agents will remain.
- Will ERTK retain the Technically Qualified Individual (TQI) exemption? MNOSHA is not expecting to keep this exemption for chemicals, because it is not included in the new HazCom standard; this will have big ramifications because there will be a whole new (and large) group of people who would need to be included in the training about the new GHS/HazCom standard and the new labeling system (by Dec. 1, 2013). TQI for harmful physical and infectious agents may remain.
- Will 5206.1300 and associated rules be rewritten or removed? If the HazCom standard will also apply to farms, then this rule will probably not be retained – more clarification is needed.

The final decisions about the above will need to be made by June 2016.

ERTK – employee right-to-know
HazCom – hazard communication

The new HazCom timeline for implementation of the standard's requirements are as follows:

employees must be trained about the new labeling requirements and safety data sheet (SDS) format by Dec. 1, 2013;

by June 1, 2015, all chemical manufacturers, importers, distributors and employers shall be in compliance with all modified provisions of HazCom; and

distributors will have until Dec. 1, 2015, to ship remaining product containers that may not follow the new labeling requirements.

The timeline does not restrict manufacturers, importers and distributors from using the new labeling system in the revised HazCom before the June 1, 2015, effective date if they so choose.

After Dec. 1, 2015, the distributor shall not ship containers labeled by the chemical manufacturer or importer unless the label has been modified to comply with the new requirements.

By June 1, 2016, employers will either develop/implement a HazCom program or update their existing ERTK program to meet the requirements of the new HazCom standard.

The next slides discuss the new labeling requirements of the HazCom standard. OSHA has adopted new hazardous chemical labeling requirements as a part of its recent revision of the Hazard Communication standard, 29 CFR 1910.1200, bringing it into alignment with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS). These changes will help ensure improved quality and consistency in the classification and labeling of all chemicals and will also enhance worker comprehension. As a result, workers will have better information available about the safe handling and use of hazardous chemicals, thereby allowing them to avoid injuries and illnesses related to exposures to hazardous chemicals.

The revised HazCom standard changes the existing Hazard Communication standard from a performance-based standard to one that has more structured requirements for the labeling of chemicals. The revised standard requires information about chemical hazards be conveyed on labels using quick visual notations to alert the user, providing immediate recognition of the hazards. Labels must also provide instructions about how to handle the chemical, so chemical users are informed about how to protect themselves.

The label provides information to the workers about the specific hazardous chemical. While labels provide important information for anyone who handles,

uses, stores and transports hazardous chemicals, they are limited by design for the amount of information they can provide. Safety data sheets (SDSs), which must accompany hazardous chemicals, are the more complete resource for details regarding hazardous chemicals. Chemical manufacturers, importers or distributors are to ensure each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with information required by the GHS labeling criteria. This will include the following items.

The product identifier: This indicates how the hazardous chemical is identified. It can be (but is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier. The same product identifier must be both on the label and in Section 1 of the SDS (identification).

Signal word: This is used on the label to indicate the relative level of severity of hazard and alert the reader to a potential hazard. There are only two signal words: "Danger" and "Warning." Within a specific hazard class, "Danger" is used for the more severe hazards and "Warning" is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have.

There can only be one signal work per label: if one of the hazards warrants a "Danger" signal word and another warrants the "Warning" signal word, then only "Danger" should appear on the label.

Name, address and telephone number: These items for the chemical manufacturer, importer or other responsible party must also be included on the label. This is not a change from previous labeling requirements.

Above are some examples of signal words and their use. The appropriate signal word is based on the chemical's hazard classification, following the criteria established under the GHS.

Note: When comparing with a labeling system such as HMIS, under the GHS requirements the most severe hazard is classified as "1" and least severe as "4" or "5," whereas with HMIS the most severe was classified as "4" and least severe as "1."

Hazard statement(s): This describes the nature of the hazard(s) of a chemical, including – where appropriate – the degree of hazard. For example: "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin." All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability. **The hazard statements are specific to the GHS hazard classification categories for each type of chemical hazard and chemical users should always see the same statement for the same hazards, no matter what the chemical is or who produces it.**

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New label elements

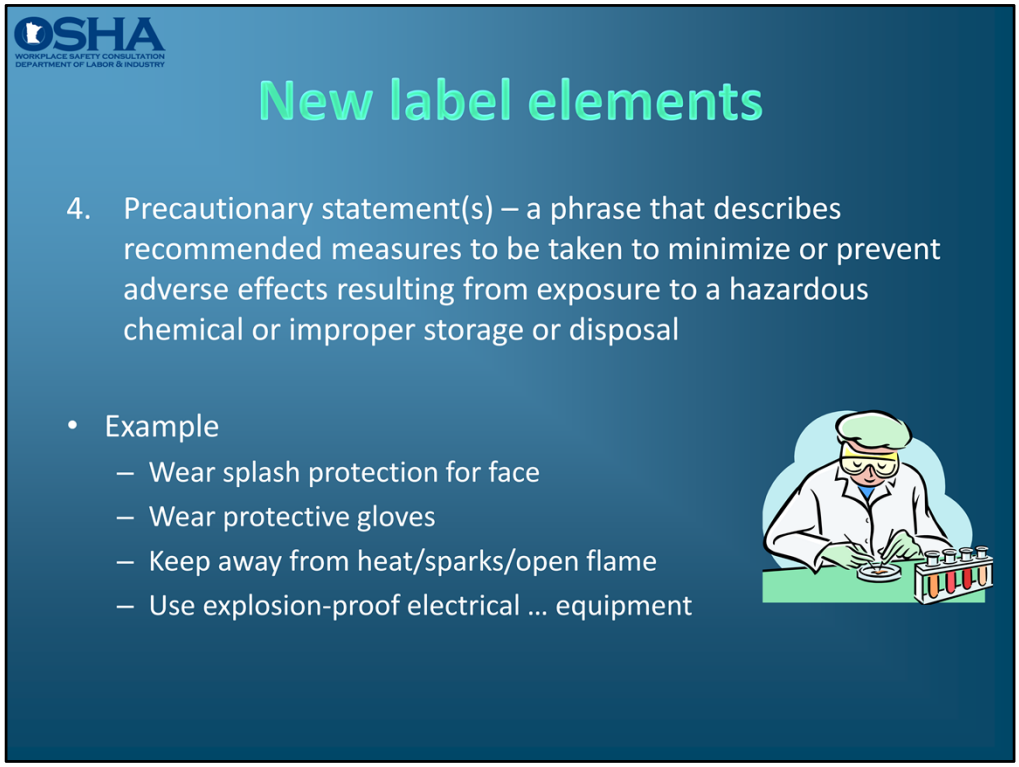
Hazard statement examples

- Acute toxicity
  - Category 1: Fatal if inhaled (gas, vapor, dust, mist)
  - Category 2: Fatal if inhaled
  - Category 3: Toxic if inhaled
  - Category 4: Harmful if inhaled
  - Category 5: May be harmful

- Flammable liquids
  - Category 1: Extremely flammable liquid and vapor
  - Category 2: Highly flammable liquid and vapor
  - Category 3: Flammable liquid and vapor
  - Category 4: Combustible liquid

The above are examples of hazard statements.

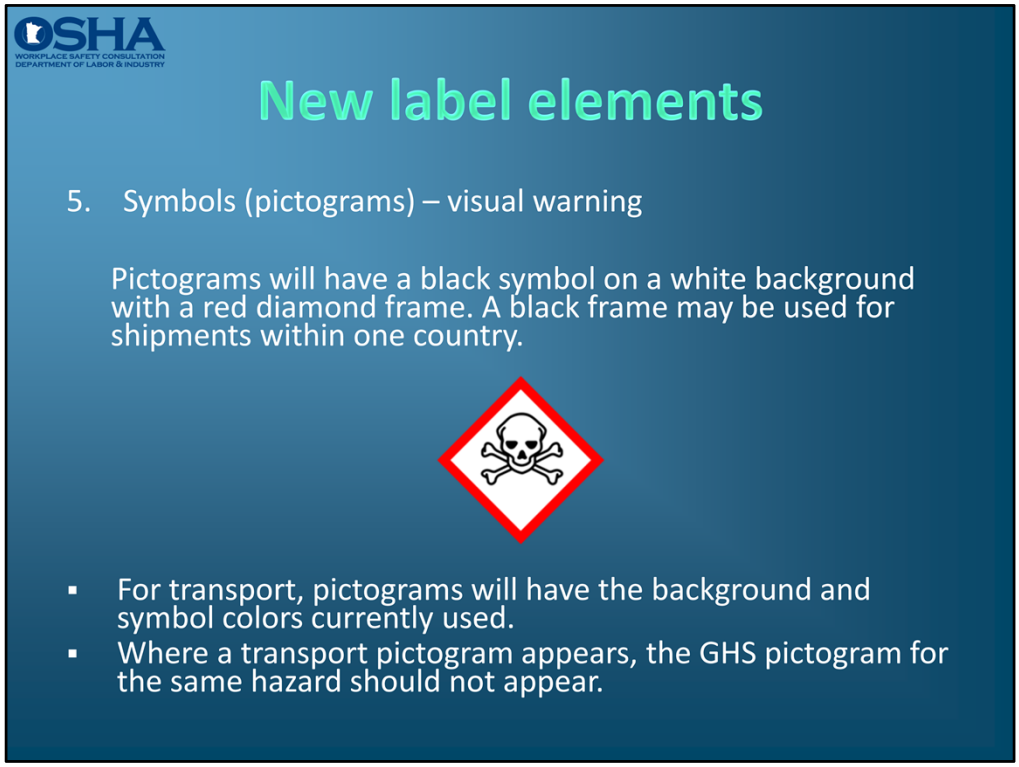
The statements are based on the GHS hazard classification criteria and are consistent for each classification.



Precautionary statement(s): This means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical or improper storage or handling. There are four types of precautionary statements: prevention, to minimize exposure; response, in case of accidental spillage or exposure, the emergency response and first-aid; storage; and disposal. For example, a chemical presenting a specific target organ toxicity (repeated exposure) hazard would include the following on the label: "Do not breathe dust/fume/gas/mist/vapors/spray. Get medical advice/attention if you feel unwell. Dispose of contents/container in accordance with local/regional/ national and international regulations."

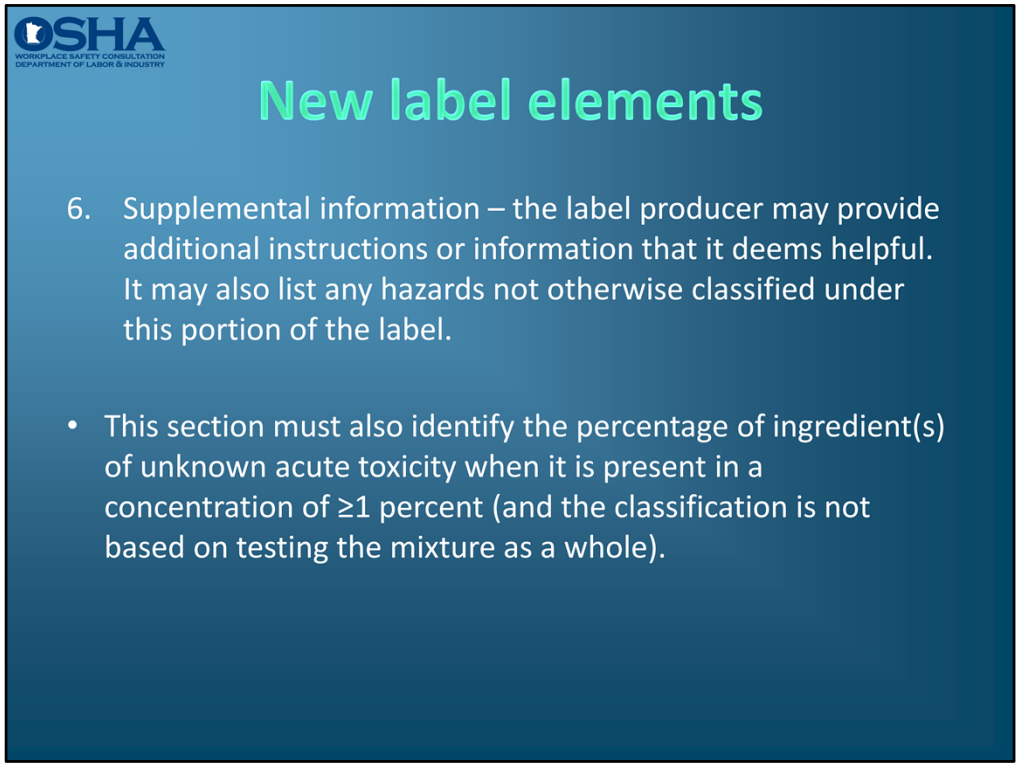
If there are similar precautionary statements, the one providing the most protective information will be included on the label.

Precautionary statements on the label will be the same as in the safety data sheet (i.e. sections 4 through 8).



Pictogram: OSHA's required pictograms must be in the shape of a square set at a point and include a black hazard symbol on a white background with a red frame sufficiently wide enough to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label. OSHA has designated eight pictograms under this standard for application to a hazard category.

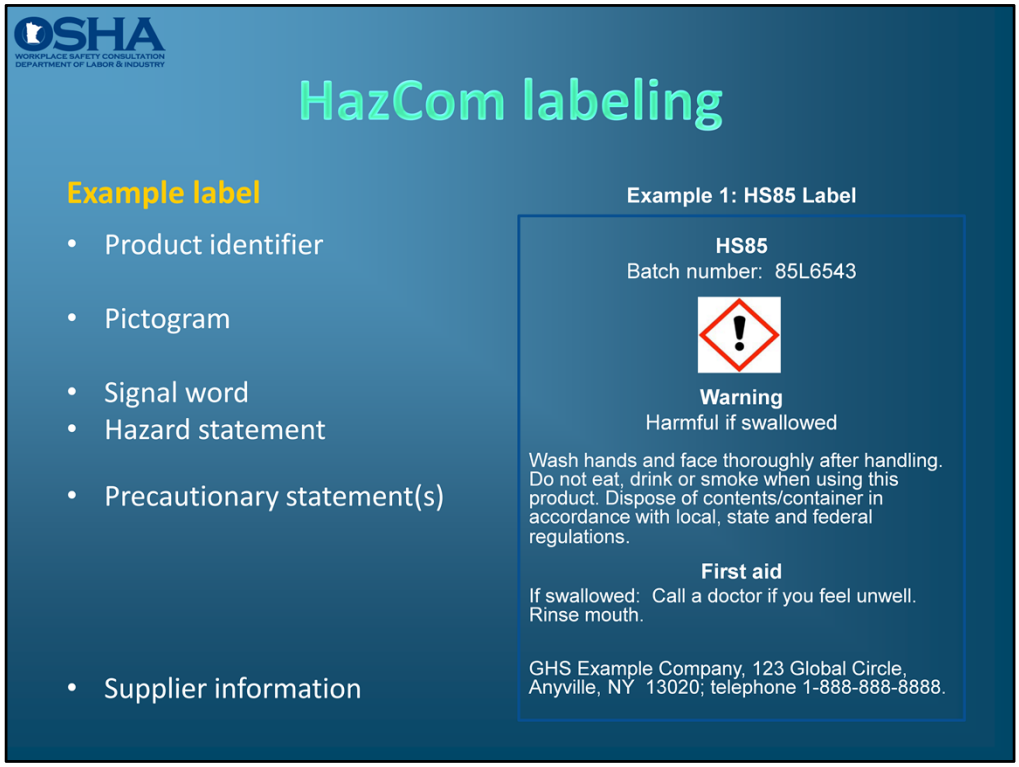
Pictograms are graphic symbols used to communicate specific information about the hazards of a chemical. On hazardous chemicals being shipped or transported from a manufacturer, importer or distributor the required pictograms consist of a red square frame set at a point with a black hazard symbol on a white background, sufficiently wide enough to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label. The pictograms OSHA has adopted improve worker safety and health, conform with the GHS and are used worldwide.



Supplementary information: This is additional instructions or information the label producer may provide that it deems helpful. It may also list any hazards not otherwise classified under this portion of the label.

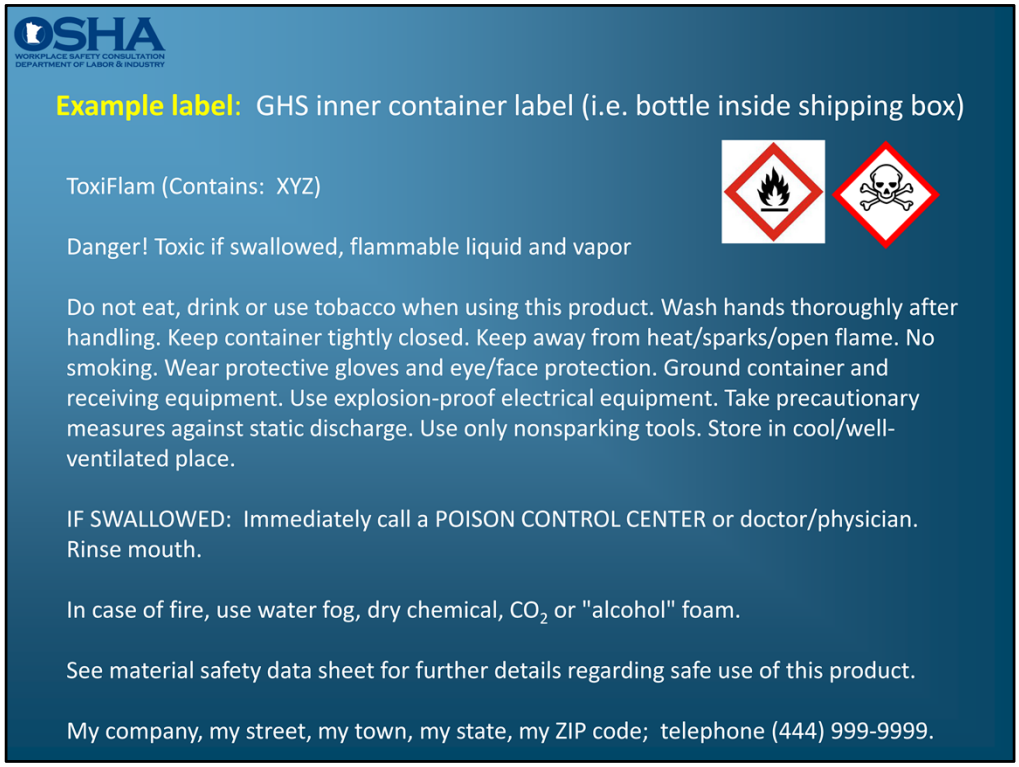
This section must also identify the percentage of ingredient(s) of unknown acute toxicity when it is present in a concentration of ≥1 percent (and the classification is not based on testing the mixture as a whole). If an employer decides to include additional information regarding the chemical that is above and beyond what the standard requires, it may list this information under what is considered "supplementary information." There is also no required format for how a workplace label must look and no particular format an employer has to use; however, it cannot contradict or detract from the required information.

An example of an item that may be considered supplementary is the personal protective equipment (PPE) pictogram indicating what workers handling the chemical may need to wear to protect themselves. For example, the Hazardous Materials Information System (HMIS) pictogram of a person wearing goggles may be listed. Other supplementary information may include directions of use, expiration date or fill date, all of which may provide additional information specific to the process in which the chemical is used.



Above is an example label.

- Product identifier: HS85
- Signal word: Warning
- Hazard statement: Harmful if swallowed
- Precautionary statements: Wash hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Dispose of contents/container in accordance with local, state and federal regulations. First aid: If swallowed: Call a doctor if you feel unwell. Rinse mouth.
- Supplier information: GHS Example Company, 123 Global Circle, Anyville, NY 13020; telephone 1-888-888-8888.



Above is another label example for an inner container label, such as a bottle in a shipping box.

- Product identifier: ToxiFlam
- Signal word: Danger
- Hazard statement: Do not eat, drink or use tobacco when using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat/sparks/open flame. No smoking. Wear protective gloves and eye/face protection. Ground container and receiving equipment. Use explosion-proof electrical equipment. Take precautionary measures against static discharge. Use only nonsparking tools. Store in cool/well-ventilated place.
- Precautionary statements: IF SWALLOWED: Immediately call a POISON CONTROL CENTER or doctor/physician. Rinse mouth. In case of fire, use water fog, dry chemical, CO_2 or "alcohol" foam.
- Supplier information: My company, my street, my town, my state, my ZIP code; telephone (444) 999-9999.

Above is an example for an outer container label, such as a 55-gallon drum.

- Product identifier: ToxiFlam
- Signal word: Danger
- Hazard statement: Toxic if swallowed. Flammable liquid and vapor. Do not eat, drink or use tobacco when using this product. Wash hands thoroughly after handling. Keep container tightly closed. Keep away from heat/sparks/open flame. No smoking. Wear protective gloves and eye/face protection. Ground container and receiving equipment. Use explosion-proof electrical equipment. Take precautionary measures against static discharge. Use only nonsparking tools. Store in cool/well-ventilated place.
- Precautionary statements: IF SWALLOWED: Immediately call a POISON CONTROL CENTER or doctor/physician. Rinse mouth. In case of fire, use water fog, dry chemical, CO_2 or "alcohol" foam.
- Supplier information: My company, my street, my town, my state, my ZIP code; telephone (444) 999-9999.

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Secondary labeling (Not a change)

Secondary labels

- Need all the information from the original shipping label

- Or …

Requirements for secondary labeling will remain the same under the new HazCom standard as is currently required under Employee Right-to-Know (ERTK). Secondary labels will either have the information from the original shipping label or …

The product identifier and words, pictures and symbols that provide at least the general information regarding the hazards and that will provide specific information regarding physical and health hazards; or …

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Secondary labels, continued …

- Signs, placards, process sheets, batch tickets, operating procedures, etc. for **stationary containers**, as long as they identify the containers to which it is applicable and conveys the information required

For individual stationary process containers, employers may use signs, placards, process sheets, batch tickets, operating procedures or other written materials in lieu of affixing labels to the container as long as the alternative method identifies the container to which it applies and includes at least the identity of the substance in the container and the appropriate hazard warning.

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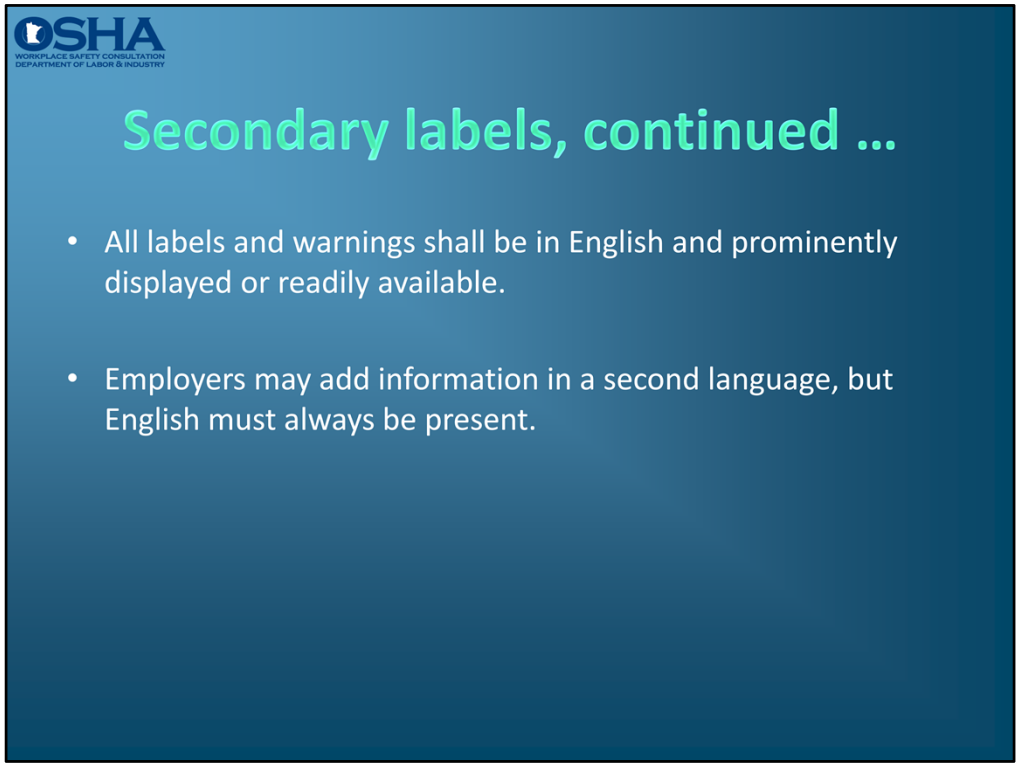
Secondary labels, continued …

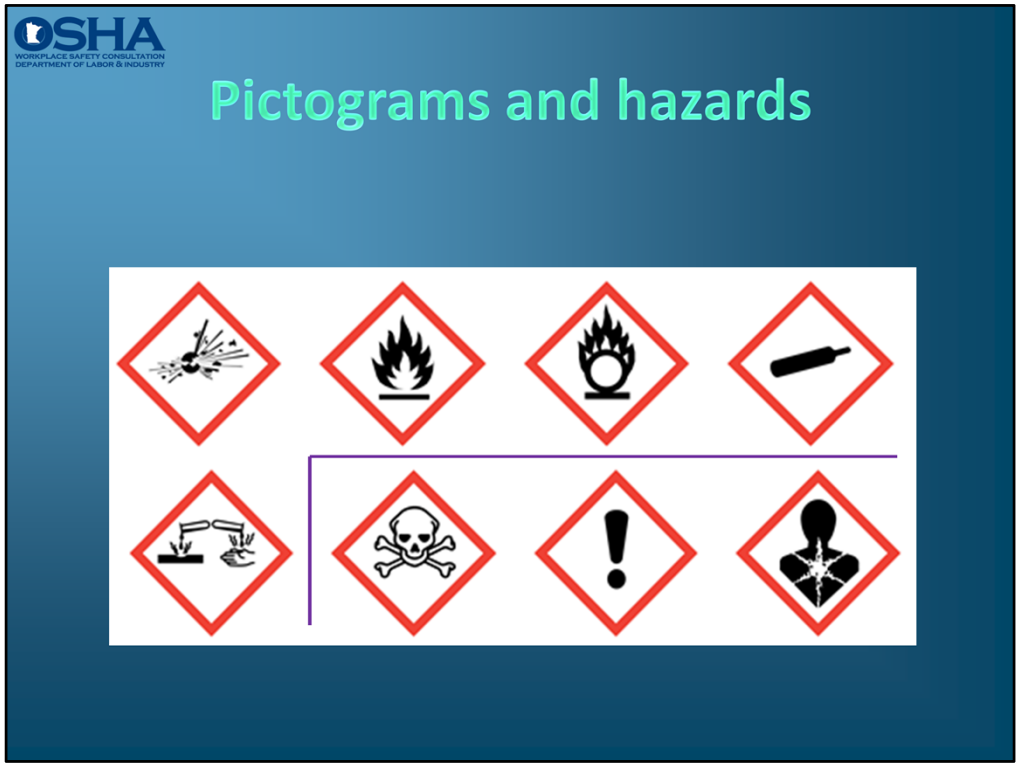
Labeling exception

- Portable, immediate-use containers used by the employee who transferred the chemicals do not have to be labeled.

There is a labeling exception for immediate-use containers. Immediate-use containers, such as test tubes, beakers, graduates, vials, pitchers, pails, roofer's melt pot, cauldron, buggy or similar containers, that are routinely used and reused are not required to be labeled. However, to qualify as an "immediate-use container" and, therefore, not be subject to the labeling requirements, the container must be used only to transfer a hazardous substance from a labeled container, remain under the control of the person who transferred the substance and only be used during the work shift in which the transfer takes place.



Labels must be legible, in English and prominently displayed. Other languages may be displayed in addition to English. Chemical manufacturers, importers and distributors that become newly aware of any significant information regarding the hazards of a chemical must revise the label within six months.

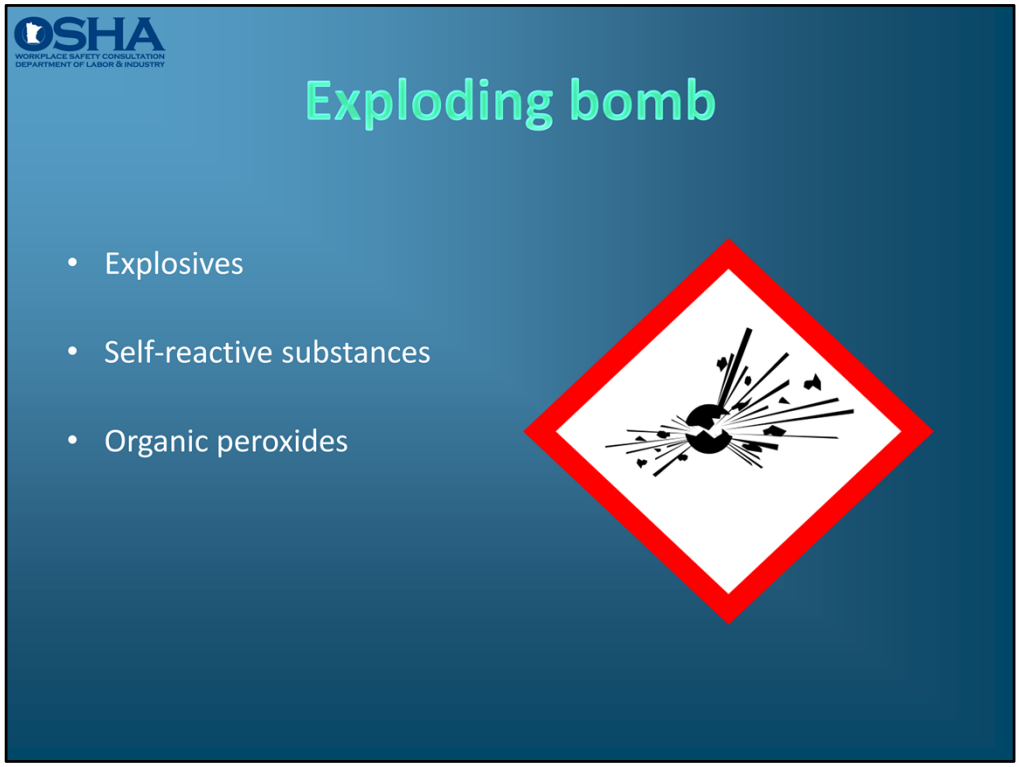


Pictograms are the graphic symbols used to communicate specific information about the hazards of a chemical. On hazardous chemicals being shipped or transported from a manufacturer, importer or distributor, the required pictograms consist of a red square frame set at a point with a black hazard symbol on a white background, sufficiently wide enough to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label. The pictograms OSHA has adopted improve worker safety and health, conform with the GHS and are used worldwide.

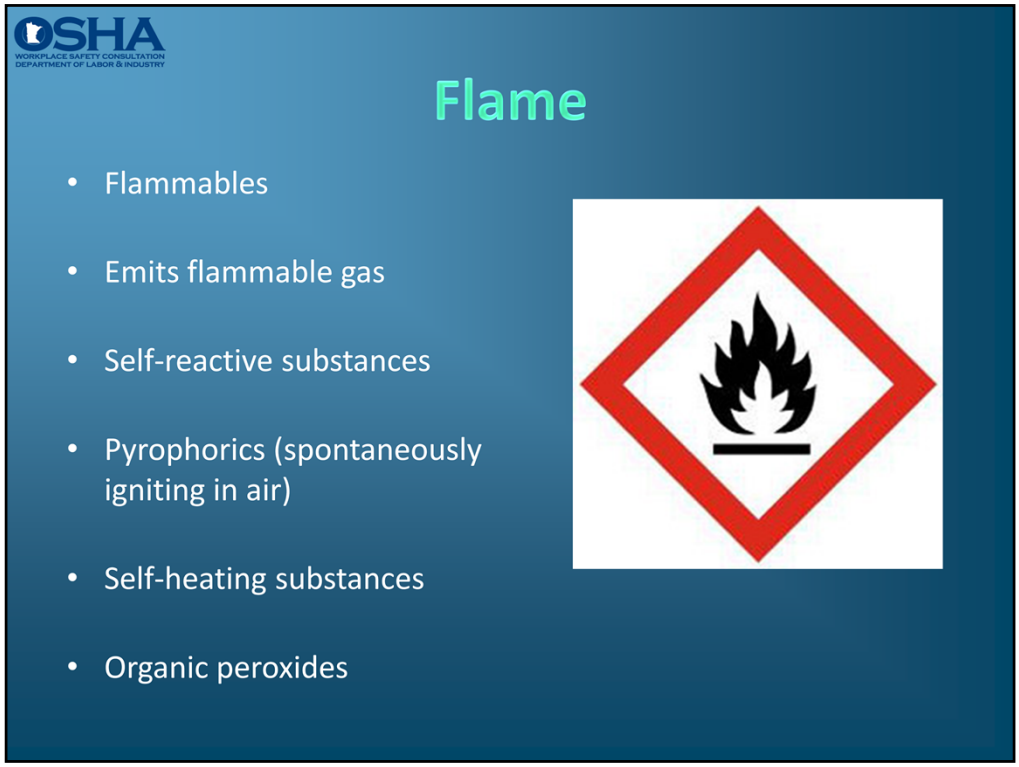
While the GHS uses a total of nine pictograms, OSHA will only enforce the use of eight. The environmental pictogram is not mandatory but may be used to provide additional information. Workers may see the ninth symbol on a label because label preparers may choose to add the environmental pictogram as supplementary information. The following slides show the symbol for each pictogram, the written name for each pictogram and the hazards associated with each of the pictograms. Most of the symbols are already used for transportation and many chemical users may be familiar with them. Those pictograms under the blue border designate health hazards. Note: GHS does not include combustible-dust hazards of chemicals; there is no pictogram for this type of hazard. The pictograms depicted within the purple line symbolize health hazards.

It is important to note the OSHA pictograms do not replace the diamond-shaped labels that the U.S. Department of Transportation (DOT) requires for the transport of chemicals, including chemical drums, chemical totes, tanks or other containers. Those labels must be on the external part of a shipped container and must meet the DOT requirements set forth in 49 CFR 172, subpart E. Currently, if a label has a DOT transport pictogram, the corresponding HazCom pictogram shall not appear. However, DOT does not view the HazCom pictogram as a conflict and for some international trade both pictograms may need to be present on the label. Therefore, OSHA intends to revise its standard. In the meantime, the agency will allow both DOT and HazCom pictograms for the same hazard on a label. While the DOT diamond label is required for all hazardous chemicals on the outside of shipping containers, chemicals in smaller containers inside the larger shipped container do not require the DOT diamond but do require the OSHA pictograms.

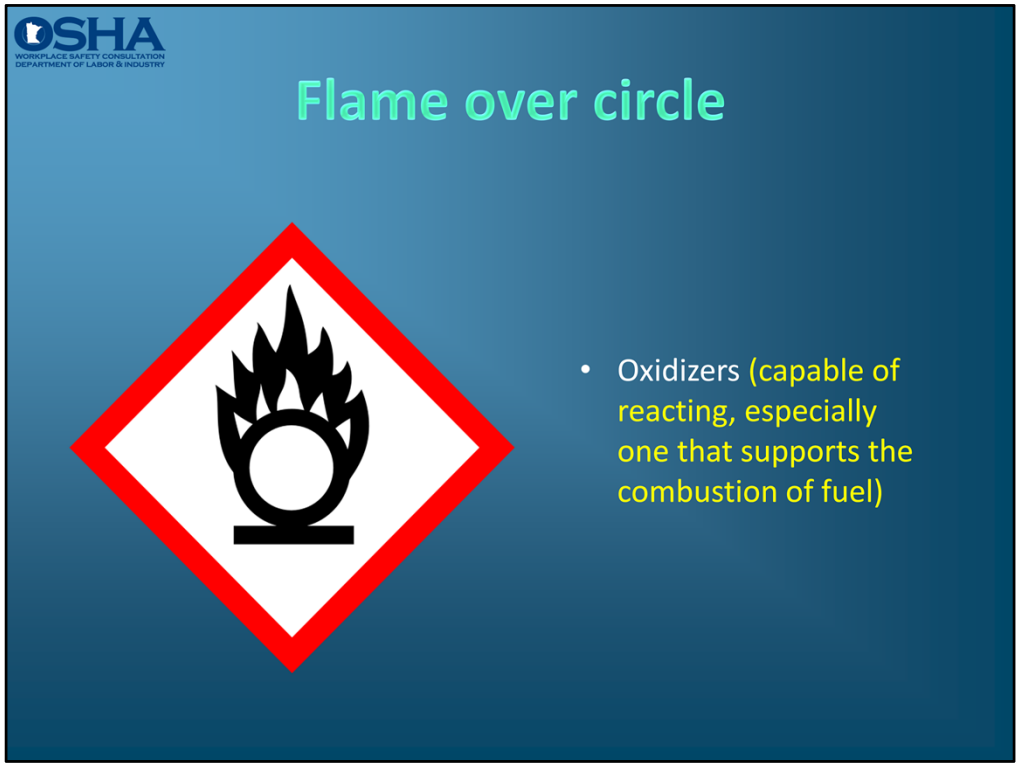
Let's review the pictograms that will be used in chemical labeling as required under the new HazCom standard.



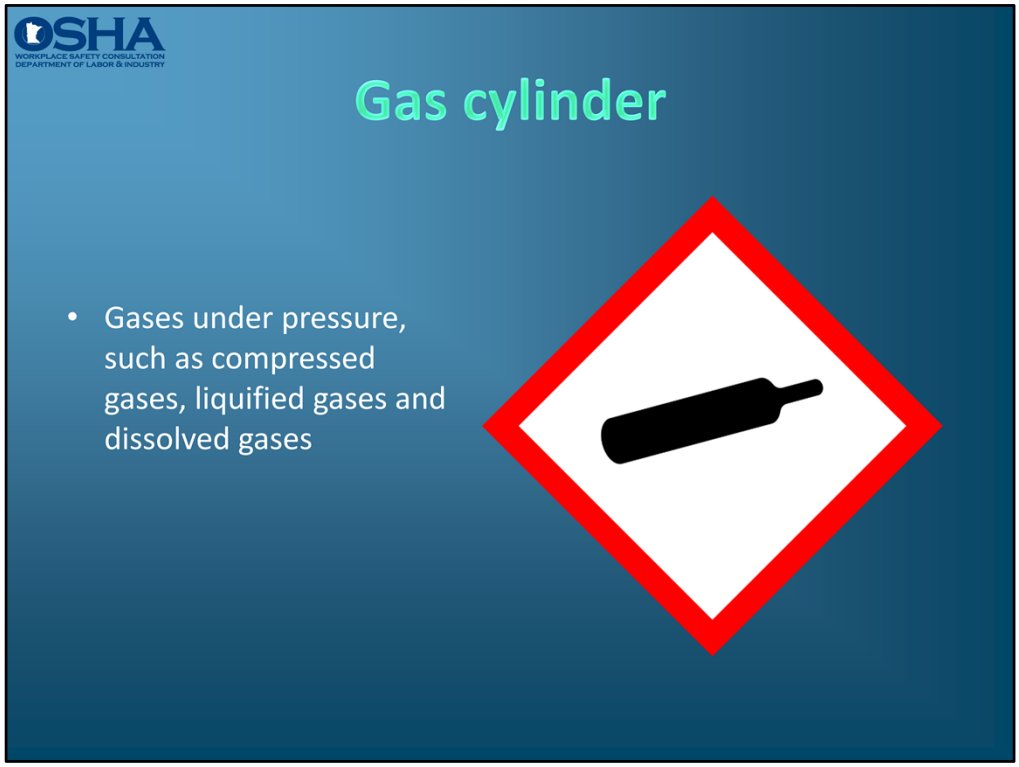
The exploding bomb pictogram symbolizes explosives, self-reactive substances and organic peroxides.



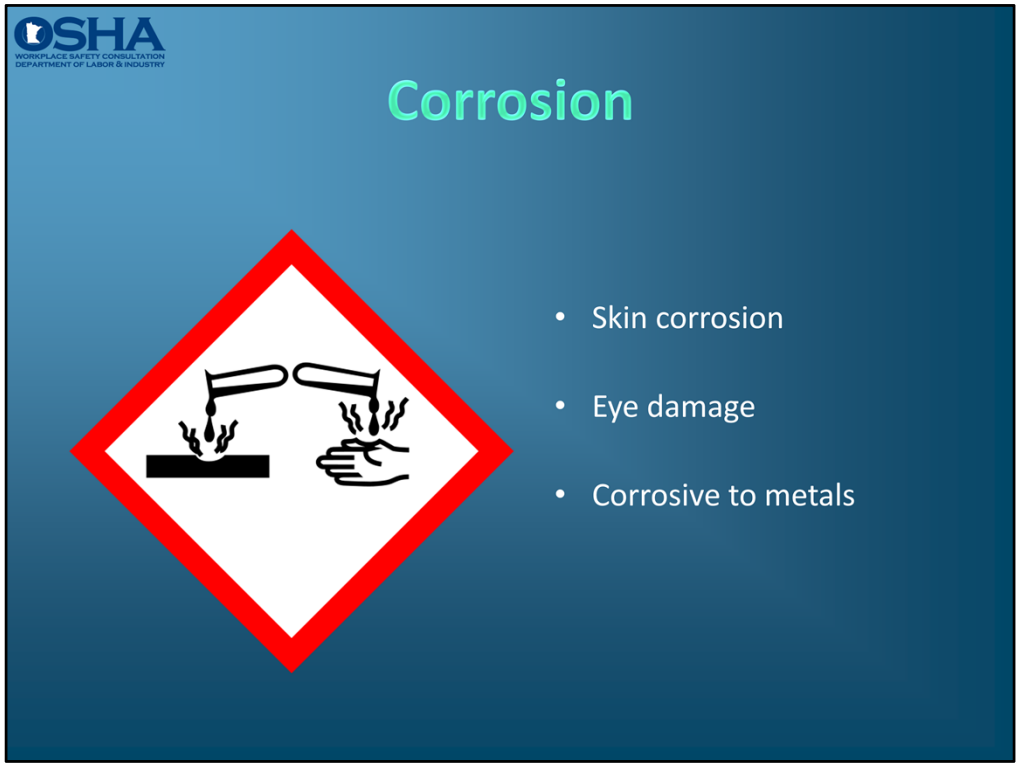
The flame pictogram symbolizes chemicals that are flammables, emit flammable gas, are self-reactive substances, are pyrophorics (spontaneously igniting in air), are self-heating and/or are organic peroxides.



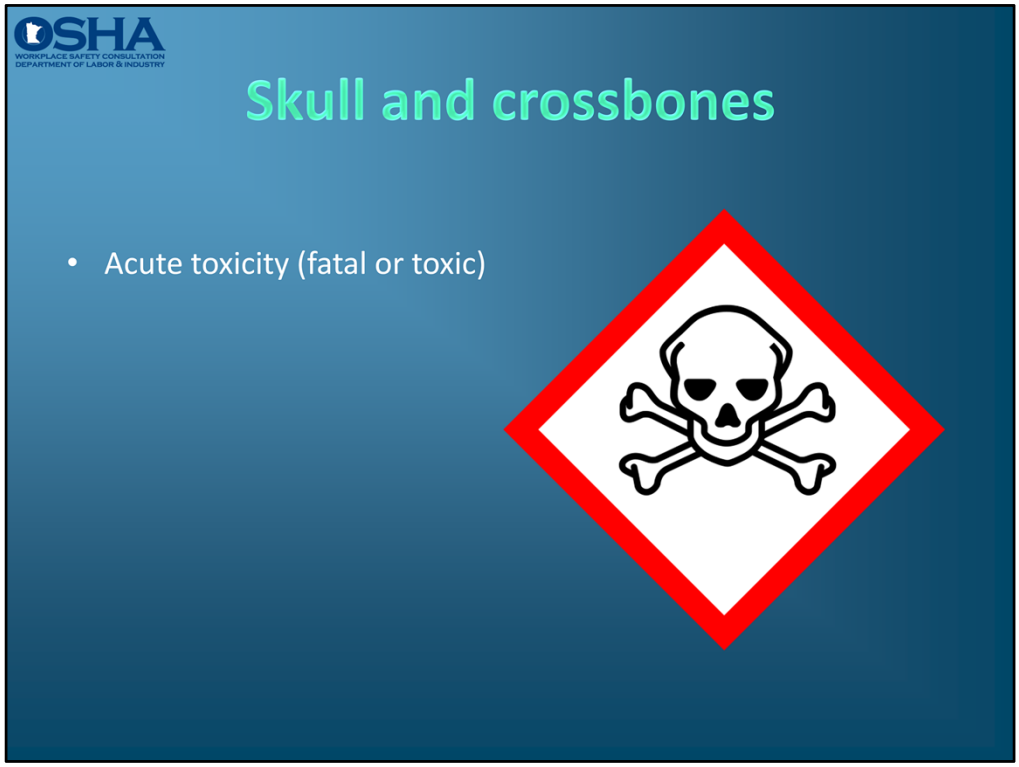
The flame-over-circle pictogram indicates the chemical is an oxidizer.



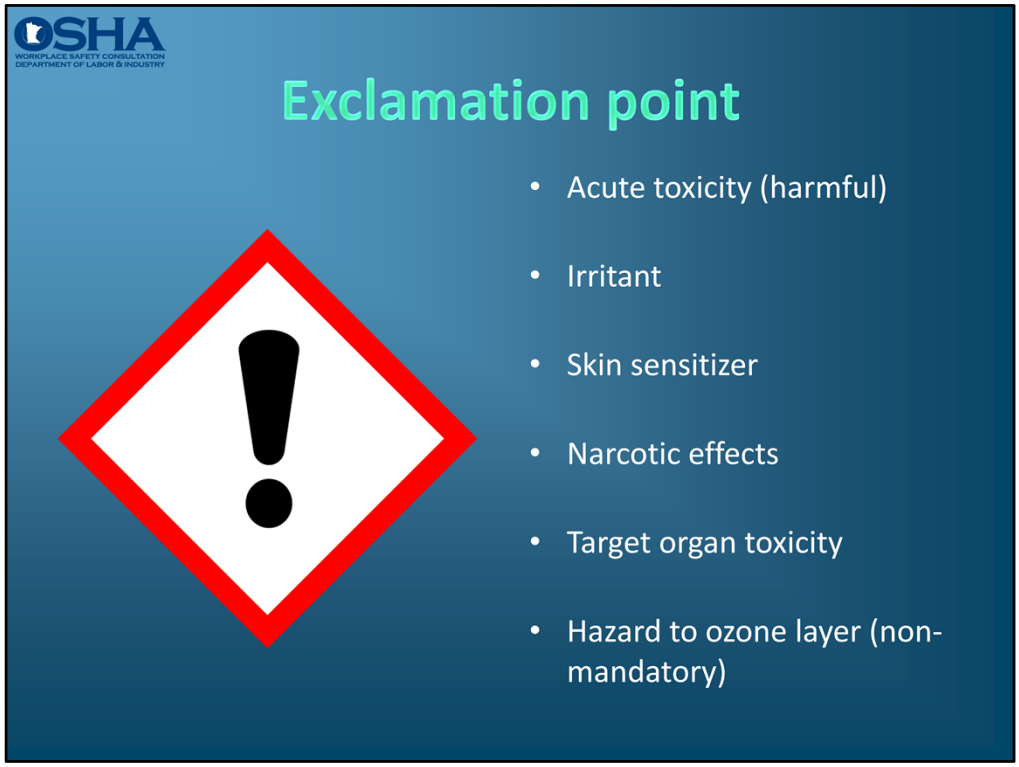
The gas cylinder pictogram symbolizing gases under pressure.



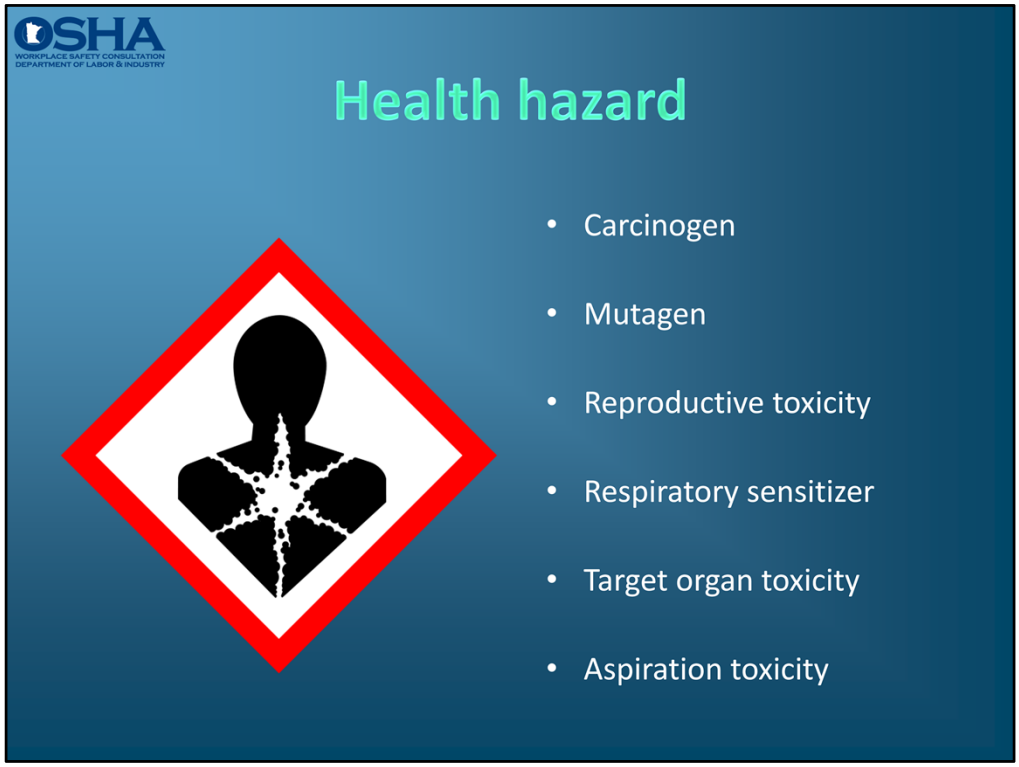
The corrosion pictogram warns of chemicals that cause skin corrosion or burns, eye damage or are corrosive to metals.



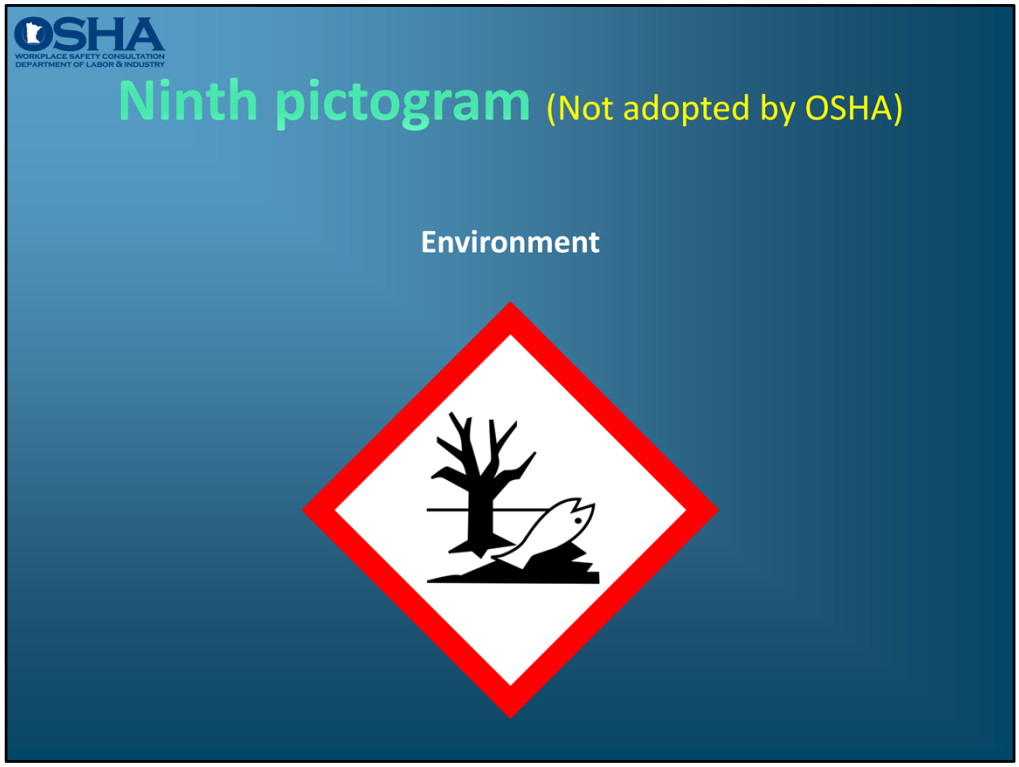
The skull and crossbones pictogram symbolizes acute toxicity.



The exclamation point pictogram warns of chemicals with acute toxicity that are irritants to skin and eyes, are a skin sensitizer, have narcotic effects, area a respiratory tract irritant and are hazardous to the ozone layer – a nonmandatory warning under the HazCom standard.



The health hazard pictogram warns of chemicals that are carcinogens, mutagens, reproductive toxins, respiratory sensitizers, toxic to a specific target organ and toxic through aspiration (or exhaling of breath).



This pictogram warns of aquatic toxicity and is not mandatory under the HazCom standard.

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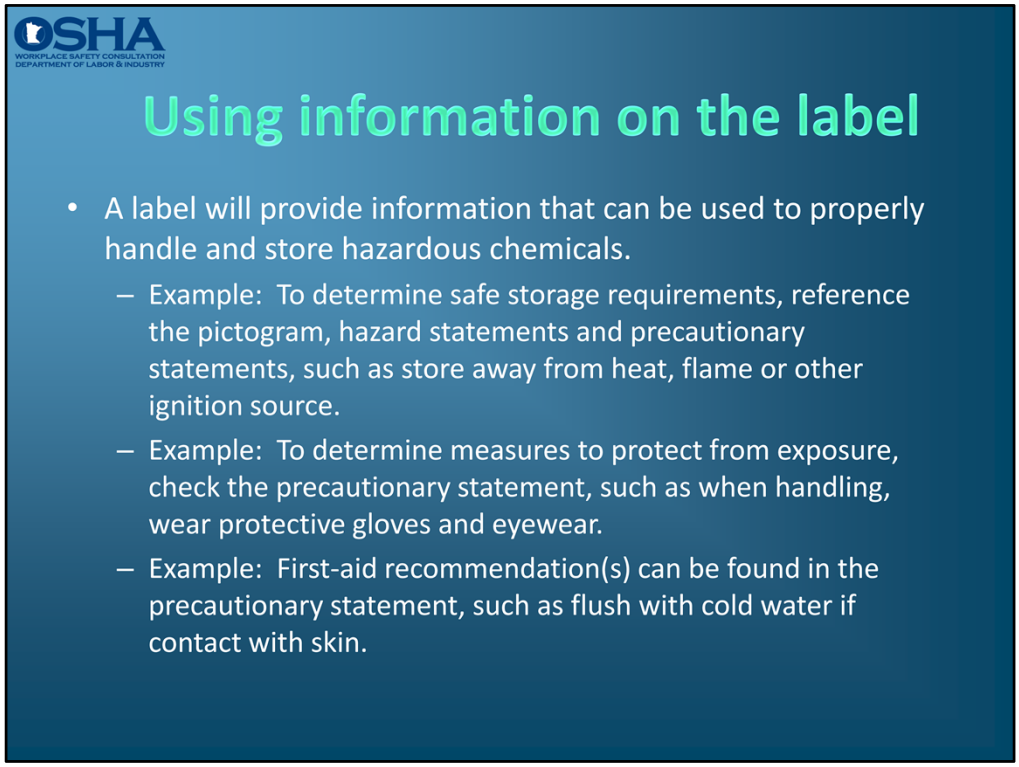
Multiple pictograms on label

- If the label contains multiple pictograms it is an indication of multiple hazards associated with the chemical.
- A corresponding pictogram must be included for each associated hazard.

Chemical is flammable and a known or suspect human carcinogen

Labels may contain more than one pictogram if multiple hazards are associated with the chemical. Therefore, a pictogram must be included for each associated hazard that corresponds to the chemical.



Use the information on the label to help determine proper use and storage of chemicals.

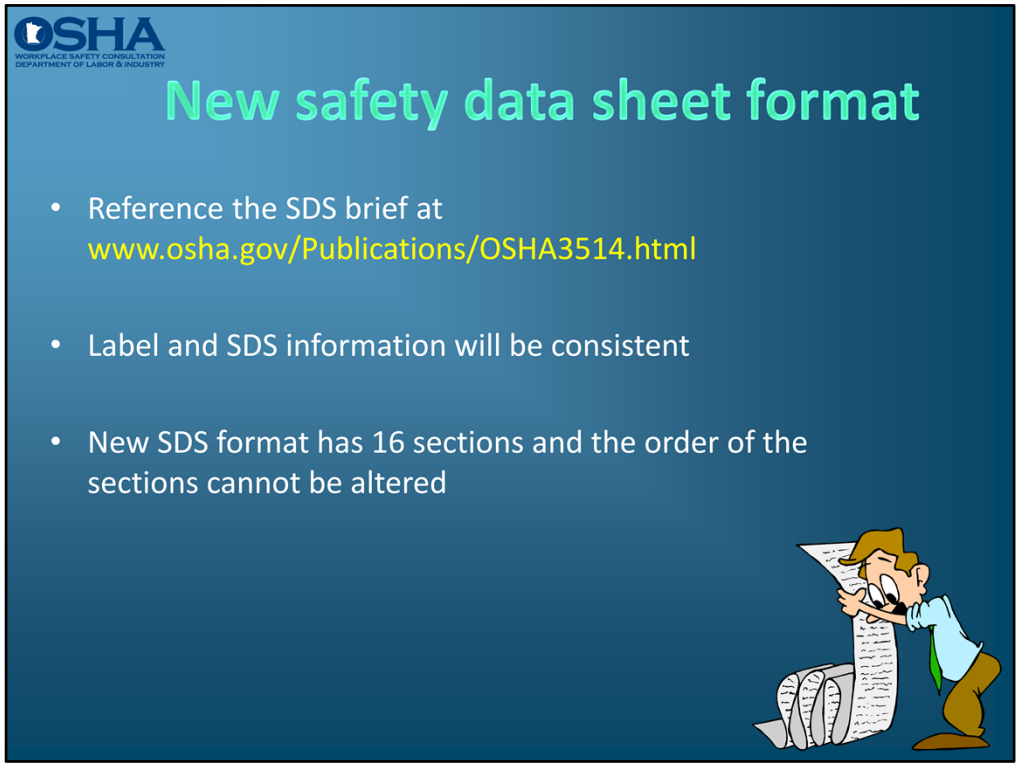
For example: To determine safe storage requirements, reference the pictogram, hazard statements and precautionary statements, such as store away from heat, flame or other ignition source, to determine how and where the chemical must be stored.

To determine measures to protect from exposure, check the precautionary statement, such as when handling, wear protective gloves and eyewear.

For first-aid recommendations, check the precautionary statement. For example: Flush with cold water if contact with skin.

Keep in mind information on a label will coincide with information on the corresponding safety data sheet. For example: the precautionary statements will be the same on the label as on the SDS. While labels provide important information for anyone who handles, uses, stores and transports hazardous chemicals, they are limited by design in the amount of information they can provide. Safety data sheets (SDSs), which must accompany hazardous chemicals, are the more complete resource for details regarding hazardous chemicals.

Employers are responsible for maintaining the labels on the containers, including tanks, totes and drums. This means labels must be maintained on chemicals in a manner that continues to be legible and the pertinent information (such as the hazards and directions for use) does not get defaced (such as fade or get washed off) or removed in any way. The employer is not responsible for updating labels on shipped containers, even if the shipped containers are labeled under ERTK requirements. The employer must re-label items if the labels are removed or defaced. However, if the employer is aware of newly identified hazards that are not disclosed on the label, the employer must ensure the workers are aware of the hazards.



The next slides will cover the new safety data sheet (SDS) required format. The Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)), revised in 2012, requires that the chemical manufacturer, distributor, or importer provide Safety Data Sheets (SDSs) (formerly MSDSs or Material Safety Data Sheets) for each hazardous chemical to downstream users to communicate information on these hazards. The information contained in the SDS is largely the same as the MSDS, except now the SDSs are required to be presented in a consistent user-friendly, 16-section format. This brief provides guidance to help workers who handle hazardous chemicals to become familiar with the format and understand the contents of the SDSs.

The SDS includes information such as the properties of each chemical; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting the chemical. The information contained in the SDS must be in English (although it may be in other languages as well). In addition, OSHA requires that SDS preparers provide specific minimum information as detailed in Appendix D of 29 CFR 1910.1200. The SDS preparers may also include additional information in various section(s).

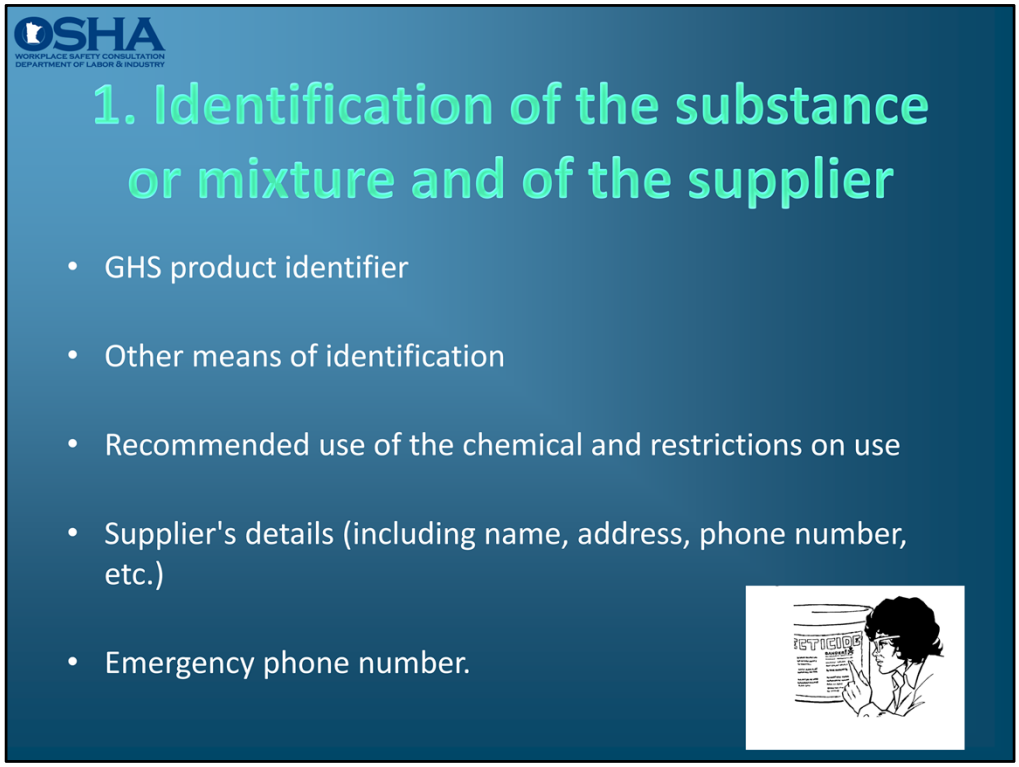
Sections 1 through 8 contain general information about the chemical, identification, hazards, composition, safe handling practices, and emergency control measures (e.g., fire fighting). This information should be helpful to those that need to get the information quickly. Sections 9 through 11 and 16 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.

The SDS must also contain Sections 12 through 15, to be consistent with the UN Globally Harmonized System of Classification and Labeling of Chemicals (GHS), but OSHA will not enforce the content of these sections because they concern matters handled by other agencies.

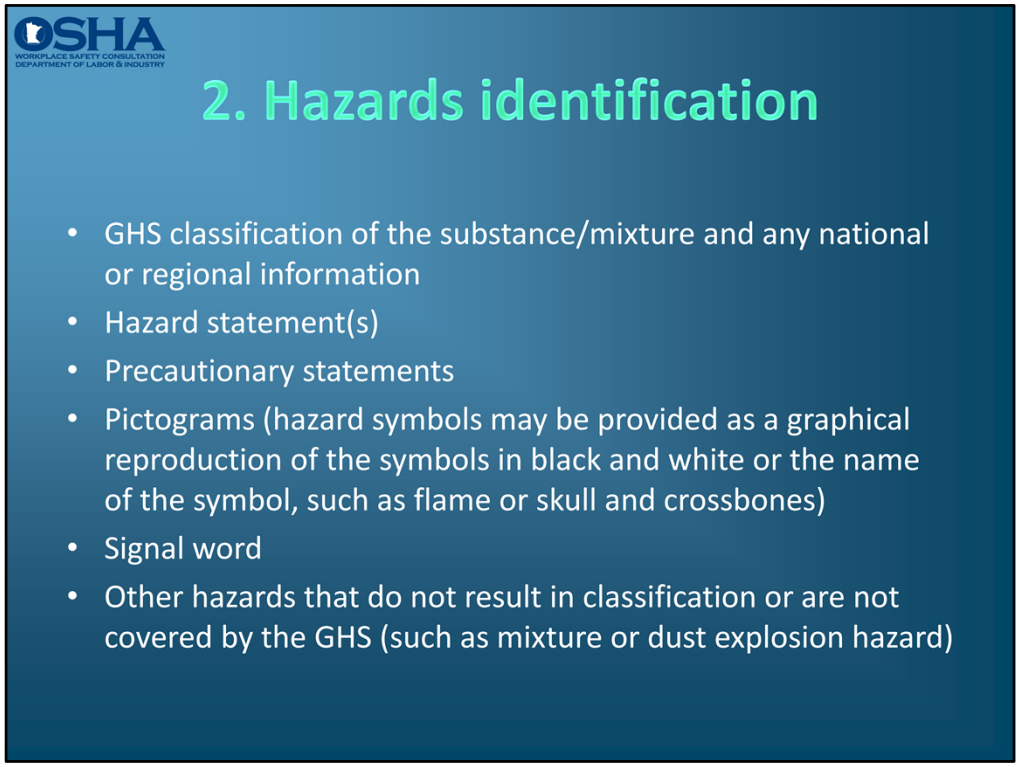
A description of all 16 sections of the SDS, along with their contents, is presented in the following slides.

Note: Chemical container labels will use the same product identifier, supplier info, hazard and precautionary information as in the SDS. Information such as recommended 1st aid, storage, handling, and accidental release procedures will be consistent between label and SDS.



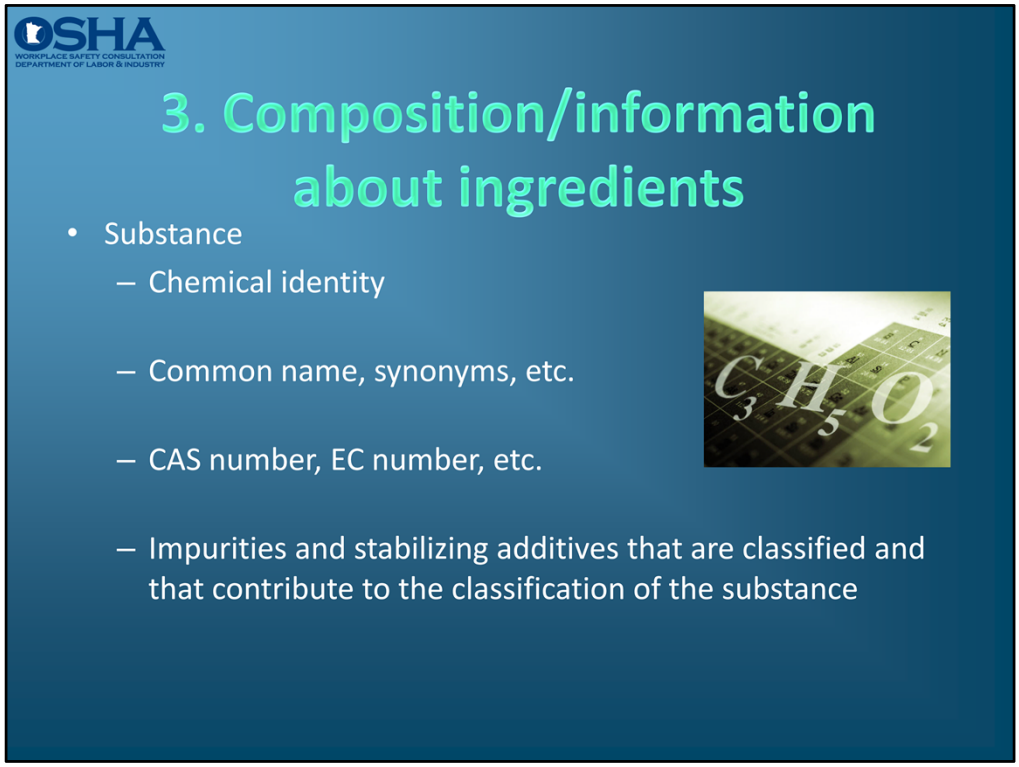
Section one identifies the chemical on the SDS, as well as the recommended uses. It also provides the essential contact information of the supplier. The required information consists of:

- product identifier used on the label and any other common names or synonyms by which the substance is known;
- name, address, phone number of the manufacturer, importer or other responsible party and an emergency phone number; and
- recommended use of the chemical (for example a brief description of what it actually does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).



Section two identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards. The required information consists of:

- the hazard classification of the chemical (such as flammable liquid category);
- the signal word;
- the hazard statement(s);
- pictograms (the pictograms or hazard symbols may be presented as graphical reproductions of the symbols in black and white or be a description of the name of the symbol (such as flame or skull and crossbones);
- the precautionary statement(s);
- a description of any hazards not otherwise classified; and
- for a mixture that contains an ingredient(s) with unknown toxicity, a statement describing how much (percentage) of the mixture consists of ingredient(s) with unknown acute toxicity. Note: This is a total percentage of the mixture and not tied to the individual ingredient(s).



Section three identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives. This section includes information about substances, mixtures and all chemicals where a trade secret is claimed. The required information consists of:

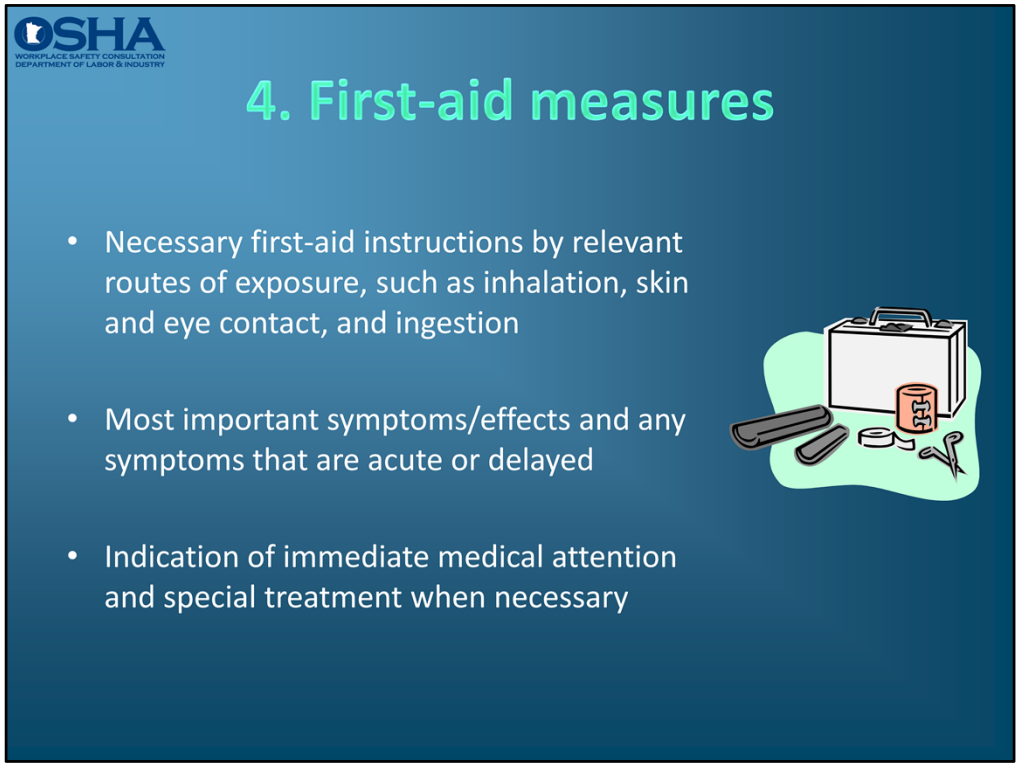
- substances;
- chemical name;
- common name and synonyms;
- the Chemical Abstracts Service (CAS) number and other unique identifiers; and
- impurities and stabilizing additives that are classified and that contribute to the classification of the chemical.

Mixtures require the same information as is required for substances. This includes the chemical name and concentration (the exact percentage) of all ingredients that are classified as health hazards and are:

- present above their cut-off/concentration limits; or
- present a health risk below the cut-off/concentration limits.

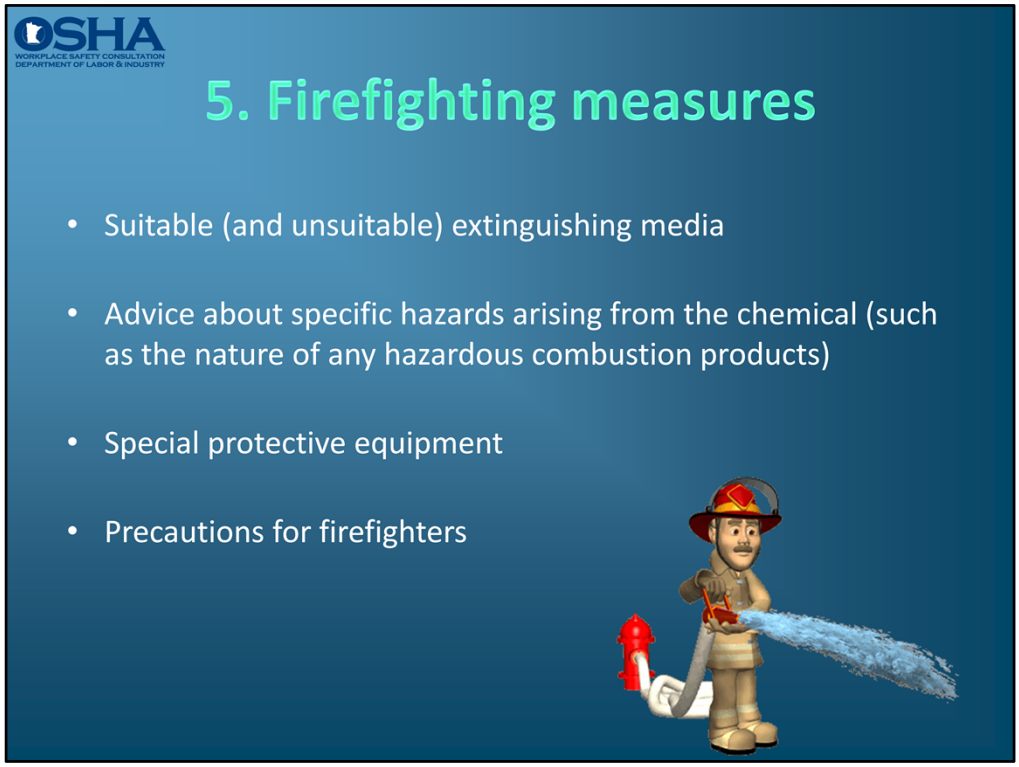
- The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used in the following situations:
  - a trade secret claim is made;
  - there is batch-to-batch variation; or
  - the SDS is used for a group of substantially similar mixtures.

For chemicals where a trade secret is claimed, a statement that the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret is required.



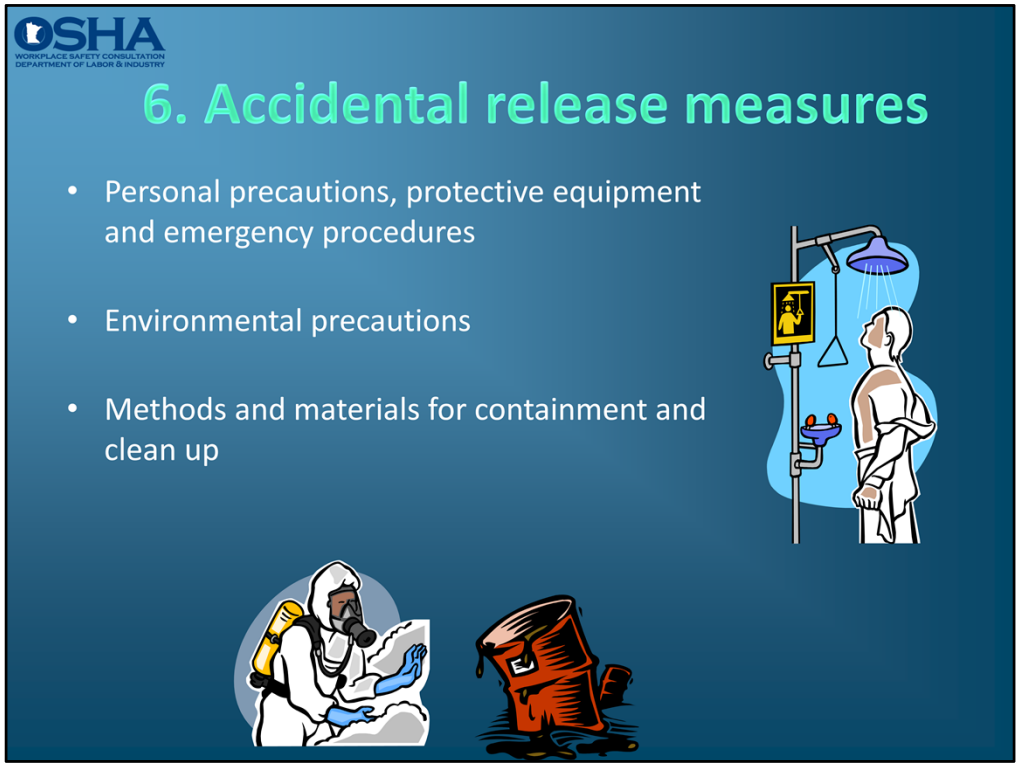
Section four describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical. The required information consists of:

- necessary first-aid instructions by relevant routes of exposure (inhalation, skin and eye contact, and ingestion);
- description of the most important symptoms or effects and any symptoms that are acute or delayed; and
- recommendations for immediate medical care and special treatment needed, when necessary.



Section five provides recommendations for fighting a fire caused by the chemical. The required information consists of:

- recommendations of suitable extinguishing equipment and information about extinguishing equipment that is not appropriate for a particular situation;
- advice about specific hazards that develop from the chemical during the fire, such as any hazardous combustion products created when the chemical burns; and
- recommendations about special protective equipment or precautions for firefighters.



Section six provides recommendations about the appropriate response to spills, leaks or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties or the environment. It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard. The required information may consist of recommendations for:

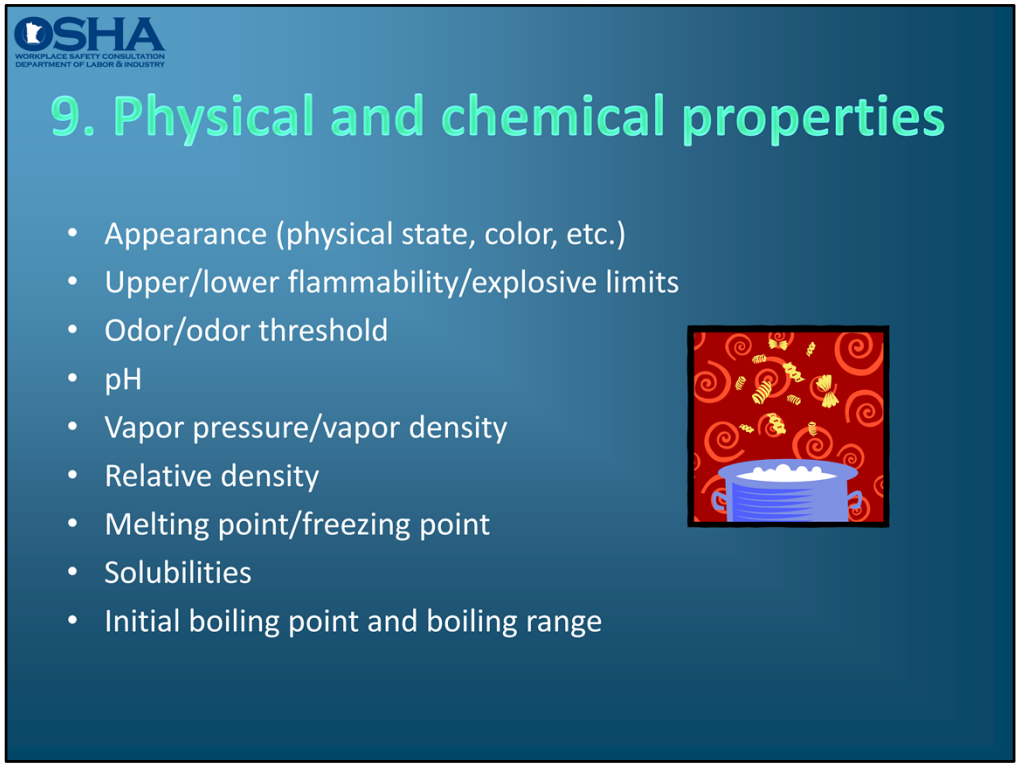
- use of personal precautions (such as removal of ignition sources or providing sufficient ventilation) and protective equipment to prevent the contamination of skin, eyes and clothing;
- emergency procedures, including instructions for evacuations, consulting experts when needed and appropriate protective clothing;
- methods and materials used for containment (for example, covering the drains and capping procedures); and
- cleanup procedures (such as appropriate techniques for neutralization, decontamination, cleaning or vacuuming; absorbent materials; and/or equipment required for containment/clean up).

Section seven provides guidance about the safe handling practices and conditions for safe storage of chemicals. The required information consists of:

- precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment and providing advice about general hygiene practices (such as eating, drinking and smoking in work areas is prohibited); and
- recommendations about the conditions for safe storage, including any incompatibilities, with advice provided about specific storage requirements (such as ventilation requirements).

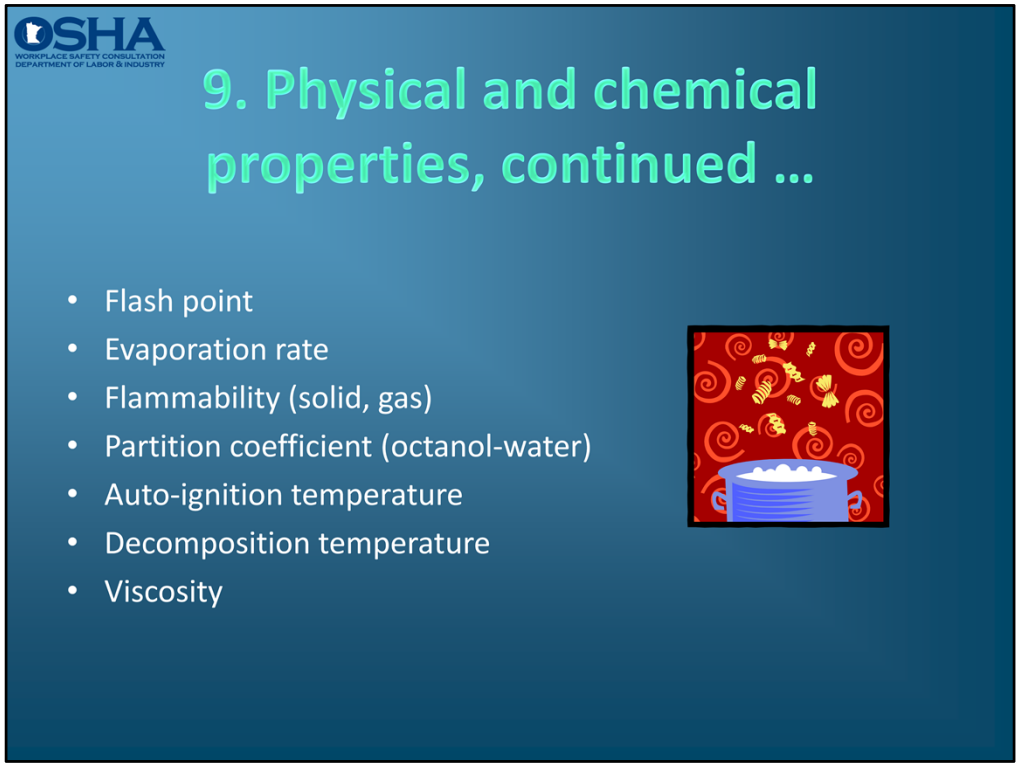
Section eight contains the exposure limits, engineering controls and personal protective measures that can be used to minimize worker exposure. The required information consists of:

- OSHA permissible exposure limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs) and any other exposure limit used or recommended by the chemical manufacturer, importer or employer preparing the safety data sheet, where available;
- appropriate engineering controls (such as use local exhaust ventilation or use only in an enclosed system);
- recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (for example appropriate types of eye, face, skin or respiratory protection needed based on hazards and potential exposure); and
- any special requirements for PPE, protective clothing or respirators (for example the type of glove material, such as PVC or nitrile rubber gloves, and breakthrough time of the glove material).



Section nine identifies physical and chemical properties associated with the substance or mixture. The minimum required information consists of:

- appearance (physical state, color, etc.);
- upper/lower flammability or explosive limits;
- odor;
- Odor threshold;
- vapor pressure;
- vapor density;
- pH;
- relative density;
- melting point/freezing point;
- solubilities; and
- initial boiling point and boiling range.



Section nine also requires the following information where applicable:

- flash point;
- evaporation rate;
- flammability (solid, gas);
- upper/lower flammability or explosive limits;
- vapor pressure;
- vapor density;
- relative density;
- solubilities;
- partition coefficient: n-octanol/water;
- auto-ignition temperature;
- decomposition temperature; and
- viscosity.

The SDS may not contain every item on the above list because information may not be relevant or is not available. When this occurs, a notation to that effect must be made for that chemical property. Manufacturers may also add other relevant properties, such as the dust deflagration index (Kst) for combustible dust, used to evaluate a dust's explosive potential.

Section 10 describes the reactivity hazards of the chemical and the chemical stability information. This section is broken into three parts: reactivity, chemical stability and other. The required information consists of the following.

Reactivity:

- description of the specific test data for the chemical(s), data can be for a class or family of the chemical if such data adequately represent the anticipated hazard of the chemical(s), where available.

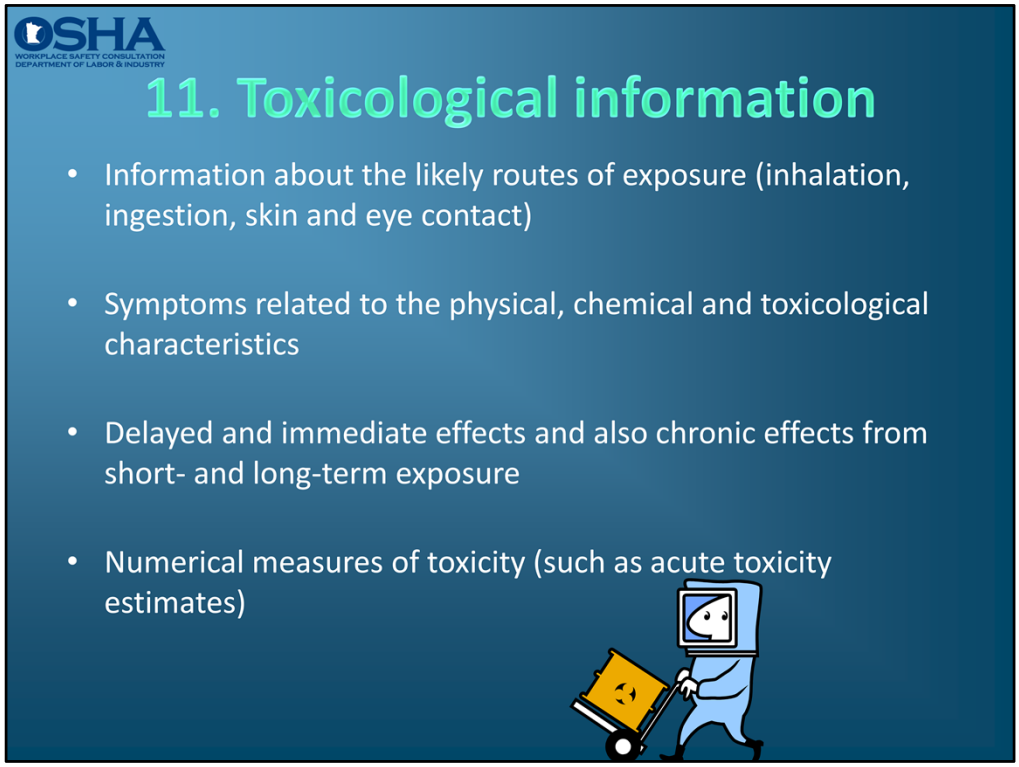
Chemical stability:

- indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled;
- description of any stabilizers that may be needed to maintain chemical stability; and
- indication of any safety issues that may arise should the product change in physical appearance.

Other:

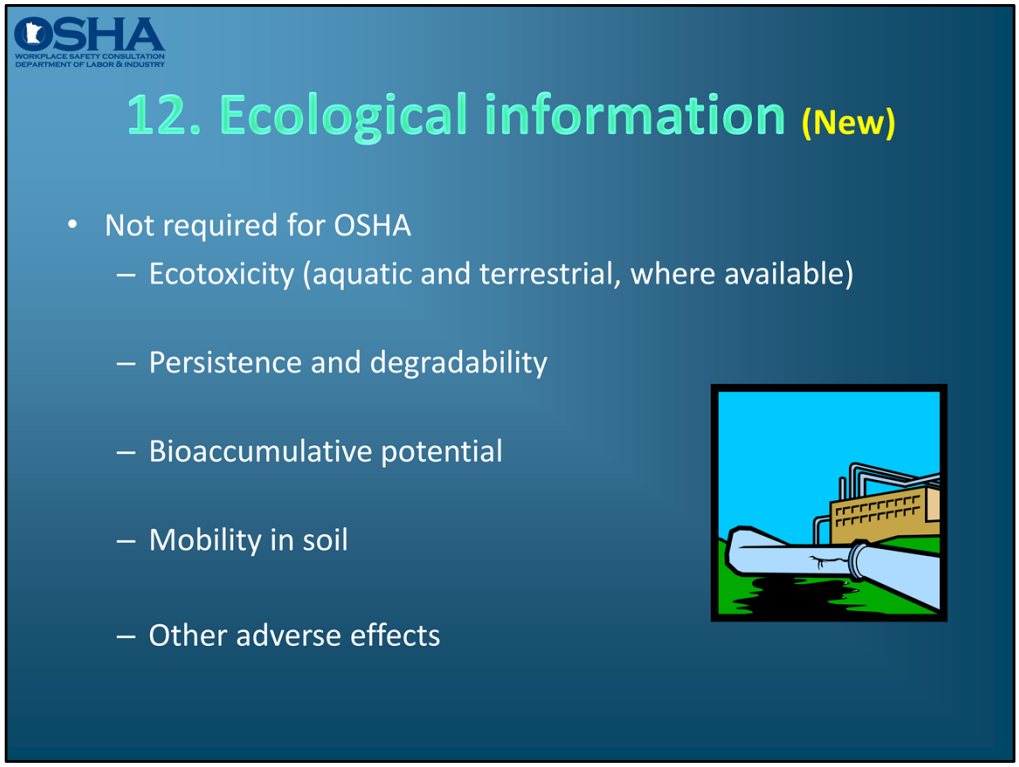
- indication of the possibility of hazardous reactions, including a statement whether the chemical will react or polymerize, which could release excess pressure or heat, or create other hazardous conditions, plus a description of the conditions under which hazardous reactions may occur;
- a list of all conditions that should be avoided (such as static discharge, shock, vibrations or environmental conditions that may lead to hazardous conditions);

- a list of all classes of incompatible materials (such as classes of chemicals or specific substances) with which the chemical could react to produce a hazardous situation; and
- a list of any known or anticipated hazardous decomposition products that could be produced because of use, storage or heating (hazardous combustion products should also be included in section five, firefighting measures, of the SDS).



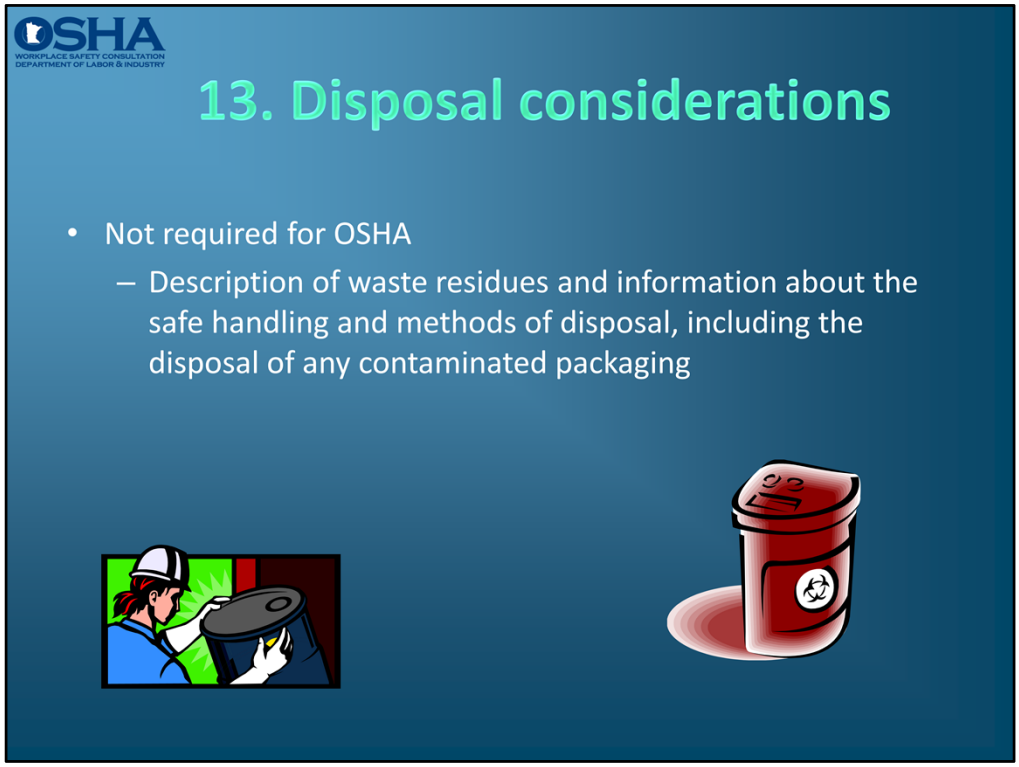
Section 11 identifies toxicological and health effects information or indicates that such data is not available. The required information consists of:

- information about the likely routes of exposure (inhalation, ingestion, skin and eye contact) – the SDS should indicate if the information is unknown;
- description of the delayed, immediate or chronic effects from short- and long-term exposure;
- the numerical measures of toxicity (for example acute toxicity estimates such as the LD50 (median lethal dose)), the estimated amount of a substance expected to kill 50 percent of test animals in a single dose;
- description of the symptoms, including the symptoms associated with exposure to the chemical from the lowest to the most severe exposure; and
- indication of whether the chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (most recent edition), has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (most recent editions) or has been found to be a potential carcinogen by OSHA.



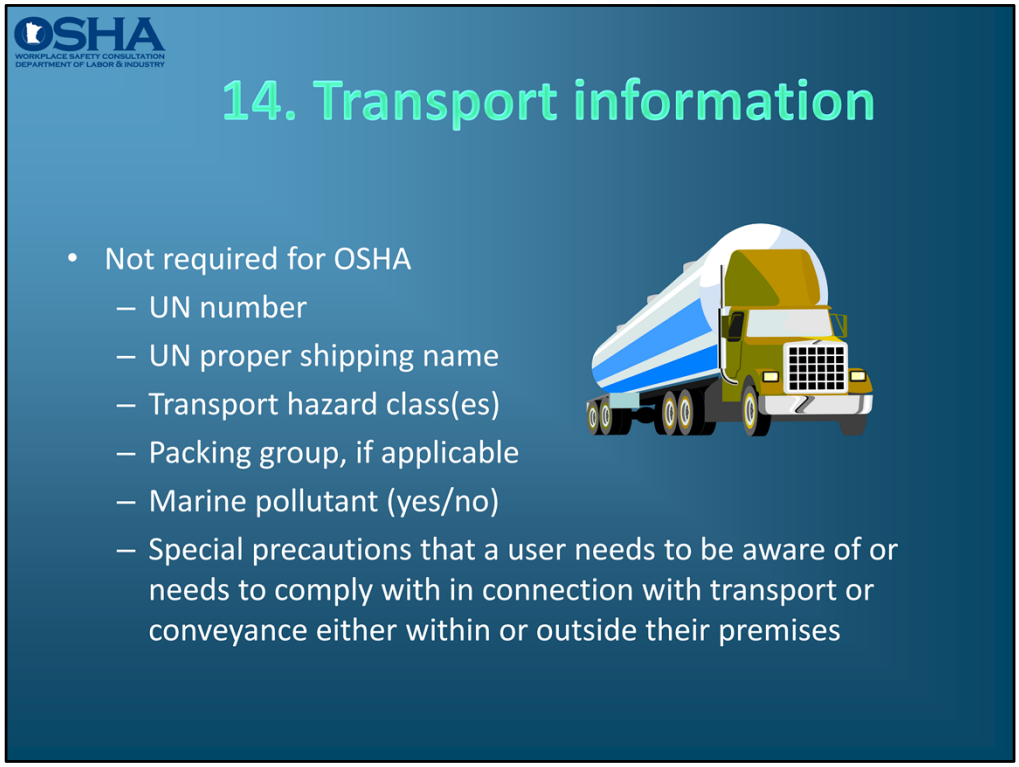
Section 12 provides information to evaluate the environmental impact of the chemical if it were released to the environment. The information may include:

- data from toxicity tests performed on aquatic and/or terrestrial organisms, where available (such as acute or chronic aquatic toxicity data for fish, algae, crustaceans and other plants, and toxicity data about birds, bees, plants);
- whether there is a potential for the chemical to persist and degrade in the environment either through biodegradation or other processes, such as oxidation or hydrolysis;
- results of tests of bioaccumulation potential, making reference to the octanol-water partition coefficient (Kow) and the bioconcentration factor (BCF), where available;
- the potential for a substance to move from the soil to the groundwater (indicating results from adsorption studies or leaching studies); and
- other adverse effects (such as environmental fate, ozone layer depletion potential, photochemical ozone creation potential, endocrine disrupting potential and/or global warming potential).



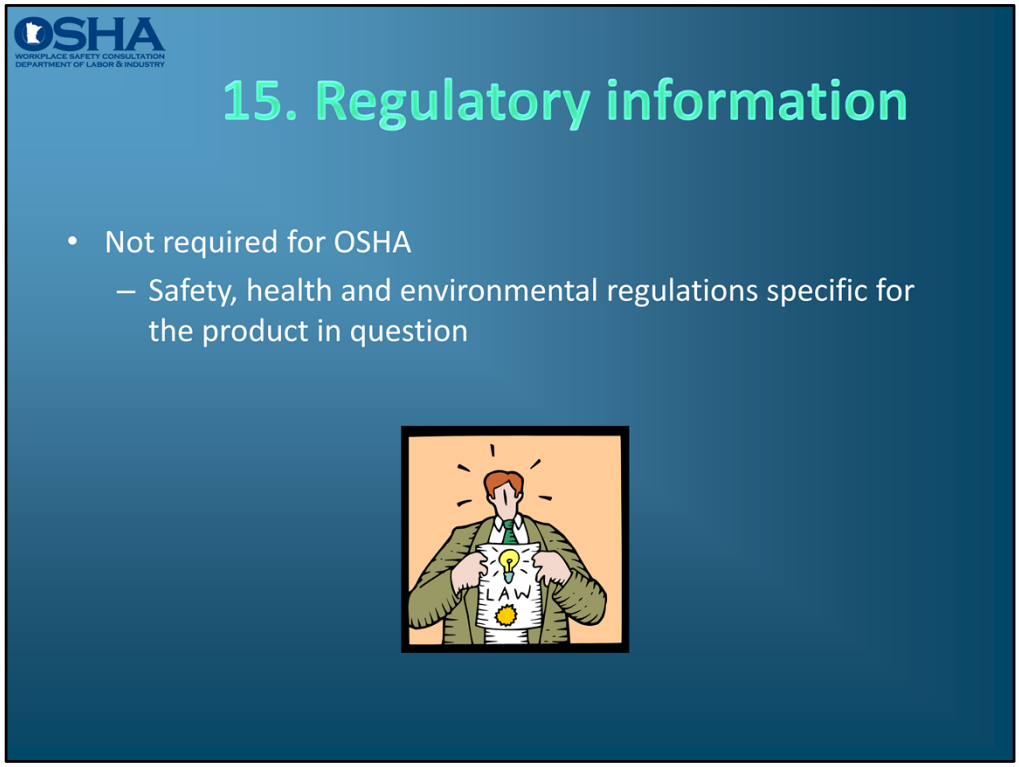
Section 13 provides guidance about proper disposal practices, recycling or reclamation of the chemical(s) or its container and safe handling practices. To minimize exposure, this section should also refer the reader to section eight (exposure controls/personal protection) of the SDS. The information may include:

- description of appropriate disposal containers to use;
- recommendations of appropriate disposal methods to employ;
- description of the physical and chemical properties that may affect disposal activities;
- language discouraging sewage disposal; and
- any special precautions for landfills or incineration activities.



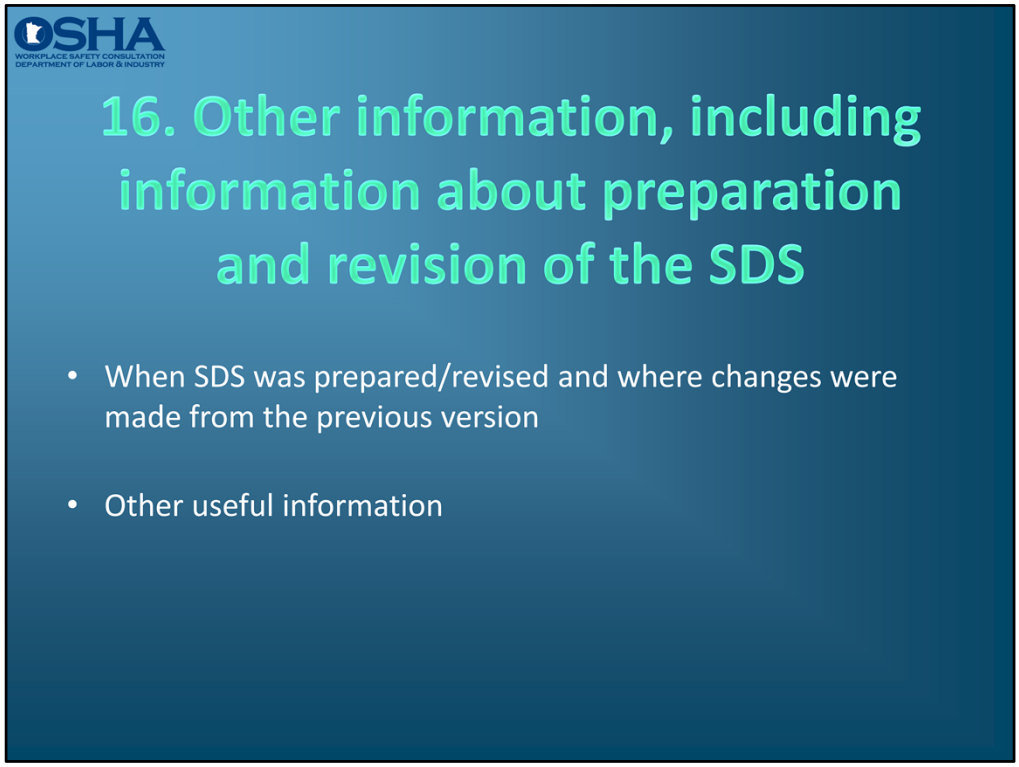
Section 14 provides guidance about classification information for shipping and transporting of hazardous chemical(s) by road, air, rail or sea. The information may include:

- UN number (a four-figure identification number of the substance);
- UN proper shipping name;
- transport hazard class(es);
- packing group number, if applicable, based on the degree of hazard;
- environmental hazards (for example identify if it is a marine pollutant according to the International Maritime Dangerous Goods (IMDG) code);
- guidance about transport in bulk (according to Annex II of MARPOL 73/78[3] and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (International Bulk Chemical (IBC) Code); and
- any special precautions that an employee should be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises (indicate when information is not available).

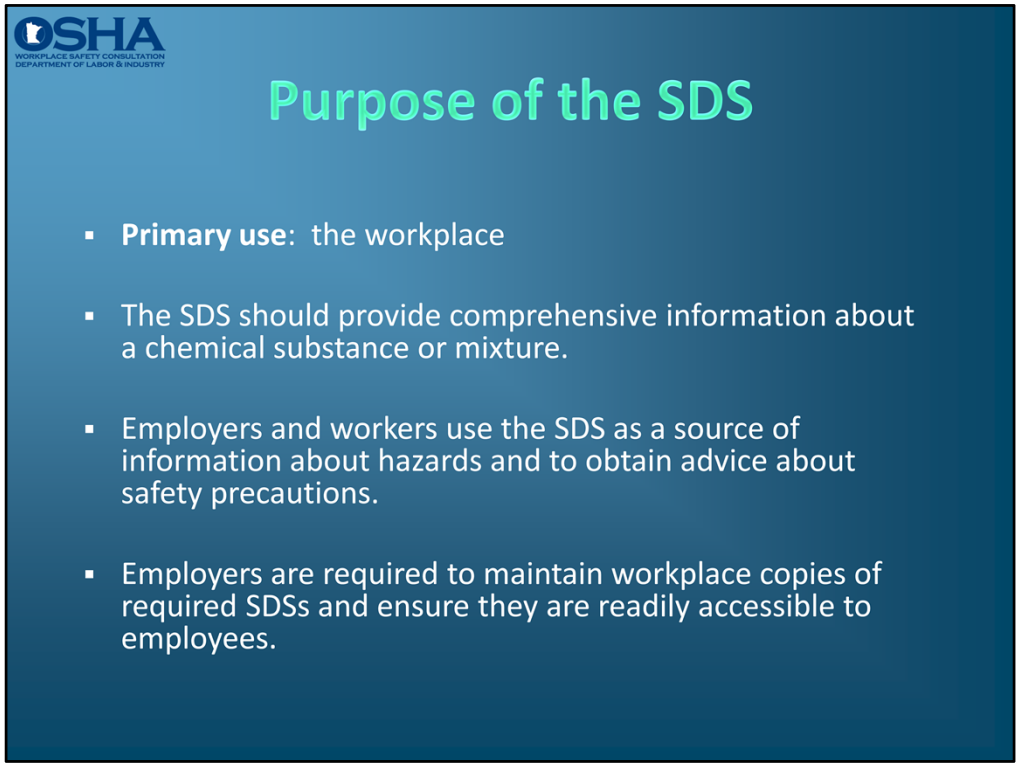


Section 15 identifies the safety, health and environmental regulations specific for the product that is not indicated anywhere else on the SDS. The information may include:

- any national and/or regional regulatory information of the chemical or mixtures (including any OSHA, Department of Transportation, Environmental Protection Agency or Consumer Product Safety Commission regulations).



Section 16 indicates when the SDS was prepared or when the most recent known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes. Other useful information also may be included here.



The employer shall maintain in the workplace copies of the required safety data sheets for each hazardous chemical and shall ensure they are readily accessible during each workshift to employees when they are in their work area(s). (Electronic access and other alternatives to maintaining paper copies of the safety data sheets are permitted as long as no barriers to immediate employee access in each workplace are created by such options.) Furthermore, employers may want to designate a person(s) responsible for obtaining and maintaining the SDSs. If the employer does not have an SDS, the employer or designated person(s) should contact the manufacturer to obtain one.

Where employees must travel between workplaces during a workshift, for example their work is carried out at more than one geographical location, the safety data sheets may be kept at the primary workplace facility. In this situation, the employer shall ensure employees can immediately obtain the required information in an emergency.

Safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. However, the employer shall ensure that in all cases the required information is provided for each hazardous chemical and is readily accessible during each workshift to employees when they are in their work area(s).

Safety data sheets shall also be made readily available, upon request, to designated representatives, the assistant secretary and the director, in accordance with the

requirements of 29 CFR 1910.1020(e).

More information

- A Guide to The Globally Harmonized System of Classification and Labeling of Chemicals (GHS)
  - www.osha.gov/dsg/hazcom/ghs.html
- The full text of GHS is available at
  - www.unece.org/trans/danger/publi/ghs/ghs_rev00/00files_e.html
- GHS and Hazardous Communication federal OSHA Web page with fact sheets and quick cards
  - www.osha.gov/dsg/hazcom

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