How to use Safety data sheets (SDS) and the NIOSH guide

Safety data sheets (SDS) are required for certain products by the Occupational Safety and Health Administration (OSHA). Any product containing chemicals that are potentially hazardous are required to have an SDS. Most of these are available online via an internet search but it is important to get the current version and to be sure it is for the exact product you have.

The SDS includes several parts, prescribed by law. However, the formatting of this information varies quite a bit. The following list describes the different parts of an SDS.

SDS Parts 1-3: Basic Chemical Details

Section 1: Identification
Section 2: Hazard Identification
Section 3: Composition/Information on Ingredients

SDS Parts 4-8: Recommended Actions

Section 4: First-Aid Measures
Section 5: Fire-Fighting Measures
Section 6: Accidental Release Measures
Section 7: Handling and Storage
Section 8: Exposure Controls and Personal Protection

SDS Parts 9-11: Technical Details

Section 9: Physical and Chemical Properties
Section 10: Stability and Reactivity
Section 11: Toxicological Information

SDS Parts 12-16: Information for Specific Needs

Section 12: Ecological Information
Section 13: Disposal Considerations
Section 14: Transport Information
Section 15: Regulatory Information
Section 16: Other Information

Useful information is found in all sections but when evaluating materials in order to prioritize which materials to target for elimination or replacement based upon their hazard characteristics, Sections 2 and 3 are most useful.

Section 2 identifies the hazards associated with the chemicals in the product. As can be seen in the example below, the classification of the substance or mixture includes detail about why the material is classified as hazardous. In this example, a paint stripper, the first category, "**status**" merely confirms that this chemical is required to have an SDS.

The second category, "**Classification of the substance or mixture**" provides information that the material is:

1) A flammable aerosol
2) Under pressure
3) Has acute oral toxicity
4) Is a skin irritant
5) Can cause serious eye damage/irritation
6) Is classified as a carcinogen
7) Can cause respiratory tract irritation
8) Can produce narcotic effects
9) Is an aspiration hazard
10) 9.5% of the mixture consists of ingredients with unknown oral toxicity, 76.4% of the mixture consists of ingredients with unknown dermal toxicity, and 18.7% of the mixture consists of ingredients with unknown inhalation toxicity

Section 2 – Hazards Identification

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE AEROSOLS - Category 1
GASES UNDER PRESSURE - Compressed gas
ACUTE TOXICITY (oral) - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
CARCINOGENICITY - Category 1A
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2
ASPIRATION HAZARD - Category 1
Percentage of the mixture consisting of ingredient(s) of unknown acute toxicity: 9.5% (oral), 76.4% (dermal), 18.7% (inhalation)

GHS label elements

Hazard pictograms :

Signal word : Danger

The "**Hazard pictograms"** are easy ways to quickly assess the hazards of this material. The four listed here are

- flammable,
- gas under pressure,
- acute toxicity (oral), skin corrosive/irritant, eye irritant, carcinogen, organ toxicity, and
- aspiration

See all the Global Harmonized System (GHS) Hazard Pictograms at website.

The "**Signal word**" is also a quick summary of just how hazardous the material is. There are three possible words, "Danger," "Warning," and "Caution."

Section 3 includes the formula, formula weight, concentration, and CAS#. The CAS# is the single identifying number for each specific substance. CAS# should match the CAS# on the bottle label. You can look up a chemical by CAS number in the NIOSH pocket guide to get more information about that specific chemical.

Note that a manufacturer can limit your knowledge about the exact percentage of chemicals in the mixture because it's a trade secret. However, OSHA rules allow for this information to be made available to you if you have a legitimate need. The example below is for Clorox Toilet Bowl Cleaner Bleach.

Section 3 – Composition/Information on Ingredients

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Weight-%	Trade Secret
Sodium hypochlorite	7681-52-9	1-5	*
Lauramine oxide	1643-20-5	0.1 - 1	*
Sodium hydroxide	1310-73-2	0.1 - 1	*
Myristamine oxide	3332-27-2	0.1 - 1	*

*The exact percentage (concentration) of composition has been withheld as a trade secret

Sections 4-8: Recommended Actions

These sections tell you what to do if a hazardous situation occurs. **First-aid** measures are only meant for immediate first aid and should always be followed up with professional medical care.

The **fire-fighting** measures are written for fire fighters. Some chemicals become much more dangerous in fire circumstances, such as reacting when exposed to water. The Flash point (the lowest temperature at which enough vapor is present to form an ignitable mixture with air); Upper and lower flammable limits; and the autoignition temperature (AIT) are common properties included in this section.

The **Handling and Storage** section help you know how and where to store chemicals to prevent a hazardous situation from occurring.

The **Exposure controls and Personal Protection** section tell you what PPE to wear and the OSHA exposure limits.

Sections 9-11: Technical Details

Physical and Chemical Properties section provides clear, concise, and useful physical and chemical properties help you learn more about the chemicals you use. The first part describes the material's appearance. If it doesn't look like this, STOP. Do not use it. It may be more or less hazardous.

Stability and Reactivity section describes the conditions or reactions to be avoided. Also provides some indication about anticipated shelf life.

The **Toxicological Information** section provides medically-oriented detail on how the material may harm you, ranging from routes of exposure to toxic symptoms and including any known acute (short exposure) and chronic (long term) effects along with their target organs. Oral (ORL), inhalation (IHL), and skin absorption (SKN) toxicity data on test animals is included.

Sections 12-16: Information for Specific Needs

Ecological Information section provides information on the ecological impact of the chemical if a spill enters a river or lake. For example, mercury is toxic to humans but will also build up in aquatic ecosystems, posing a serious hazard for fish and other aquatic wildlife. These concerns are regulated by EPA, not OSHA.

Disposal Considerations section provides suggested disposal considerations of wastes and waste residues and contaminated packaging.

Transport Information section refers to Department of Transportation shipping information.

Regulatory information is a catch-all section for applicable information as to which EPA regulations apply for this chemical.

Other information section provides additional, non-regulatory information. This often includes information about the SDS itself, such as date created and abbreviations used in the document.

NIOSH guide for identification of chemicals/products

Another place to look for information about chemicals/products is the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide. It is intended as a source of **general industrial hygiene** information for workers, employers, and occupational health professionals. It is a guide to

chemical exposures in the workplace. The Safety Data Sheet (SDS) contains some toxicological information and information on PPE but the NIOSH guide is a good place to look for more of this kind of information.

The *Pocket Guide* presents key information and data in abbreviated tabular form for 677 chemicals or substance groupings. It is a useful resource for workers, employers, and occupational safety and health professionals. The mobile app (mNPG) is a database of workplace chemical information including exposure limits, chemical/physical properties, personal protective equipment, respirators, and first aid. The mNPG is customizable and easy to use.

- Search by chemical name, trade name or synonym, DOT number and CAS number
    - Chemical Identifier
    - CAS Number
    - Chemical Formula
    - Synonyms and Trade Names
- Exposure Metrics
- Chemical & Physical Properties
    - Includes flash point, flammability class, physical description and more
- PPE (Personal Protective Equipment), includes what types of contact to prevent
    - Respirator Recommendations
- Exposure Routes, Symptoms, and Target Organs
- First Aid
- Save chemical records as favorites for later use
- Customize how you view chemical data
- Review chemical records for physical properties, health hazards, first aid, respirator and personal protective equipment recommendations and regulatory information

For more information on SDS requirements, see
https://www.graphicproducts.com/articles/parts-of-an-sds/