How to read a Safety Data Sheet (SDS)

SDS content and regulations

Manufacturers and suppliers allocate substantial budgets for issuing and regular updating of safety data sheets on millions of products. On the other side, their customers must maintain easily accessible comprehensive libraries of up-to-date SDSs for all hazardous chemicals they possess. Governments create special agencies, which control and regulate SDS circulation process and issue large fines for violations. All these efforts demonstrate the significance of SDS documents as a source of vital safety and hazard information for any person interacting with chemicals.

SDS document format

The content of Safety Data Sheets must be in full compliance with national regulations. Most countries adopted Globally Harmonized System (GHS) format of Safety Data Sheets, which was developed by the United Nations organization. Such global standardization made SDSs look very similar in different countries. There are 16 sections in a GHS format Safety Data Sheet, which contain vital information on chemical hazards, properties, and handling instructions.

SDS document sections:

SECTION 1. ***Identification***	Section 1 provides the name of the product and the supplier's contact information, including emergency phone number.
SECTION 2. ***Hazard(s) identification***	Section 2 is the most important section, which provides summary of all hazards associated with the chemical. Special pictograms are used in this section to broadly identify typical hazards. All broad hazards are divided into specific categories, which are further ranked according to their severity (Category 1, 2, 3 etc.) with Category 1 chemicals considered the most dangerous.
SECTION 3. ***Composition/information on ingredients***	Section 3 provides detailed information on composition of the product, which includes CAS numbers and concentration of all ingredients.
SECTION 4. ***First-aid measures*** **SECTION 5.** ***Fire-fighting measures*** **SECTION 6.** ***Accidental release measures***	Sections 4-5 provide instructions for corresponding hazardous scenarios involving the product. It is usually recommended to consult a physician in case of exposure to hazardous chemicals.
SECTION 7. ***Handling and storage*** **SECTION 8.** ***Exposure controls/personal protection***	Sections 7 and 8 provide important instructions on how to use the product safely with all recommended personal protection equipment.
SECTION 9. ***Physical and chemical properties*** **SECTION 10.** ***Stability and reactivity*** **SECTION 11.** ***Toxicological information*** **SECTION 12.** ***Ecological information***	Sections 9-12 provide detailed information on different properties of the product, including toxicity data. This information is used to determine all the main hazards associated with the product.
SECTION 13. ***Disposal considerations***	It is highly important to dispose the product appropriately. All disposal instructions can be found in Section 13. It is usually recommended to use a professional waste disposal service.
SECTION 14. ***Transport information*** **SECTION 15.** ***Regulatory information*** **SECTION 16.** ***Other information***	Sections 14-16 provide regulatory information on transportation and the contents of SDS.

Safety Data Sheet
Hazard Identification Summary

(As described in Section 2. Hazard(s) Identification)

Signal word **WARNING** is used for the less severe hazards. Signal word **DANGER** is used for the more severe hazards

Hazard Pictograms. Standard pictograms are used graphical illustration of main hazards associated with a product					
	**Exploding bomb:** Explosion and reactivity hazards		**Flame:** Fire hazards		**Exclamation mark:** Less serious health hazards and damage to ozone layer
	**Environment:** Hazardous to aquatic environment		**Flame over Circle:** Oxidizing hazards		**Health Hazard:** More severe health hazards
	**Corrosion:** Corrosion damage to skin, eyes, and metals		**Gas Cylinder:** Gasses under pressure		**Skull and Crossbones:** Severe acute toxicity with small amounts

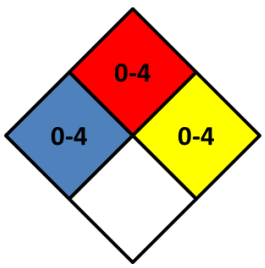
Hazard Statements. Standard hazard statements with corresponding H-code are used to describe the hazard(s) of a product**:**

H2xx: Physical hazards (For example, H220: Extremely flammable gas)
H3xx: Health hazards (For example, H303: May be harmful if swallowed)
H4xx: Environmental hazards (For example, H411: Toxic to aquatic life with long-lasting effects)

Precautionary Statements. Standard precautionary statements with corresponding P-code are used to describe recommended measures to minimize or prevent adverse effects:

P1xx: General precautionary statement (For example, P102: Keep out of reach of children)
P2xx: Prevention precautionary statement (For example, P222: Do not allow contact with air)
P3xx: Response precautionary statement (For example, P315: Get immediate medical advice/attention)
P4xx: Storage precautionary statement (For example, P410: Protect from sunlight)
P5xx: Disposal precautionary statement (For example, P501: Dispose of contents/container to)

National Fire Protection Association (NFPA) ranking



Blue for Health Hazard: 0-4
Red for Fire Hazard: 0-4
Yellow for Instability Hazard: 0-4
White for Specific Hazard:
OX – for oxidizers
~~W~~ – use no water
SA – for asphyxiant gases

Ranking scale: 0 = low hazard to 4 = high hazard

Hazardous Materials Identification System (HMIS) ranking

Health	0-4
Flammability	0-4
Physical Hazard	0-4
Personal Protection	

Blue for Health Hazard: 0-4
Red for Flammability Hazard: 0-4
Yellow for Physical Hazard: 0-4
White for Personal Protection(PPE)

Ranking scale: 0 = low hazard to 4 = high hazard