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Material Safety Data (MSDS) Education

EWHA Industrial-Academic Cooperation Group

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Basic Overview

Understanding Material Safety Data

1 MSDS : **M**aterial **S**afety **D**ata **S**heets Definition

- Materials explaining the hazards and dangers of chemical substances, emergency measures, handling methods, etc.
- The Industrial-Academic Cooperation Group manages chemical substances handled through information on MSDS.
- Workers protect themselves from occupational diseases and accidents.

2 Differences between MSDS and GHS

- GHS classification and labeling methods of unified chemical substances
- MSDS contains information on safety handling of chemical substances, including information on chemical substances classified according to GHS.

*** GHS : Globally Harmonized system of classification and Labelling of chemicals**

3 Application target

Substances subject to MSDS are not listed

- MSDS targets basically hazardous and hazardous substances
- Enforcement Rules of the Occupational Safety and Health Act [Attachment 11-2]

  1. Chemical substances that meet the criteria for classification of chemical substances and preparations containing chemical substances (target chemicals) are the targets.

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Understanding Material Safety Data

4 Standard for classification of chemical substances

1. Physical risk classification criteria (16 in total)

- explosive substances, flammable gases, flammable aerosols, oxidizing gases, high-pressure gases, flammable liquids, flammable solids, self-reactive substances, spontaneous ignition liquids, spontaneous ignition solids, self-heating substances, Water-reactive substances, oxidative liquids, oxidative solids, organic peroxides, metal-corrosive substances

2. Criteria for classifying health hazards (a total of 11)

- Acute toxic substances, Skin corrosive or irritating substances, Severe eye damage or irritating substances, Respiratory irritants, Skin irritants, Carcinogens, Reproductive cell mutagenic substances, Reproductive toxic substances, Specific target organ toxic substances (one exposure), Characteristic target organ toxic substances (repeated exposure), Aspiration hazardous substances (11 total)

3. Criteria for classifying environmental hazards (one in total)

- Hazardous substances in the aquatic environment

※ Refer to the criteria for classification and labeling of chemical substances and material safety data (Ministry of Employment and Labor Report No. 2013-37) for detailed standards.

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4 Excluded to

- Drugs that are excluded from application regardless of harmfulness or risk

① Radioactive materials under the Nuclear Safety Act

② Medicines and non-pharmaceutical products under the Pharmaceutical Affairs Act

③ Cosmetics under the Cosmetics Act

④ Under the Drug Management Act,
drugs and psychotropic drugs

⑤ Pesticides under the Pesticides Control Act

⑥ Feed according to the Feed Management Act

⑦ Fertilizer under the Fertilizer Control Act

⑧ Food and food additives under the Food Sanitation Act;

⑨ Gunpowder under the Gunpowder, Sword, Gunpowder, etc. Control Act

⑩ Waste under the Waste Management Act

⑪ Medical devices under Article 2 (1) of the Medical Devices Act;

⑫ A preparation other than subparagraphs 1 through 10, which is mainly provided for the daily use of general consumers.

→ Detergents, locks, etc., sold as household goods

⑬ Other preparations publicly notified by the Minister of Employment and Labor, recognizing that the degree of harm caused by toxicity, explosiveness, etc. is small.

→ Refer to Article 3 (2) of the Notice.

Notification Article 3 (2) (Exclusion from Application)

① Preparations containing less than 1% of substances falling under subparagraph 1 (a) of attached Table 11-2 of the Enforcement Rules of the Industrial Safety and Health Act;

② As a solidified finished product, a preparation that is unlikely to be exposed to the product and the target chemicals contained in the product when working (excluding products containing special management substances)

Related Acts and Regulations

5 relevant laws and regulations

- Articles 41 of the Occupational Safety and Health Act, Article 32-2 of the Enforcement Decree, and Articles 92-2 through 92-10 of the Enforcement Rules.
- Ministry of Employment and Labor Notice No. 2013-37 on Classification and Labelling of Chemical Substances and Material Safety Data

※ **Notification confirmation: Ministry of Employment and Labor website - Information disclosure (top menu) - OrderRegulatory Notice - Search by "Chemistry"**

6 Contents of related regulations

- A person who transfers or provides chemical substances

1. Preparation and provision of MSDS

(Article 41 (1) of the Occupational Safety and Health Act)

2. Warning signs on containers and packaging

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Related Acts and Regulations

6 Related regulations

- A person who is transferred or provided with a chemical substance

1. Post or keep MSDS in a place that can be easily seen by workers handling target chemicals in the workplace.
2. Warning signs on containers containing target chemicals
3. Post it in an easy-to-see place, including the following management instructions:

① Name of target chemical substance
② Hazard/Danger
③ Precautions for Handling
④ appropriate protective equipment
⑤ Tips for emergency measures and countermeasures in case of accidents

4. Educate the workers who use the chemical substances.
   Record training hours, contents, etc.

Material Safety Data Confirmation Method

Checking Material Safety Data

1 Related Acts and subordinate statutes

- Article 111 of the Occupational Safety and Health Act (Provision of Material Safety Data)

* A person who transfers or provides substances subject to material safety and health data shall provide material safety and health data to a person who receives or receives such substances.

2 Material Safety Data Search

- Make sure to check the safe handling and storage methods through MSDS before handling chemical substances.

* Chemical information from the Korea Safety and Health Agency (http://msds.kosha.or.kr/MSDSInfo/).

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Checking Material Safety Data

2 Material Safety Data Search

- Make sure to check the safe handling and storage methods through MSDS before handling chemical substances.

*** Korea Safety and Health Corporation Mobile App (Material Safety and Health Data)**

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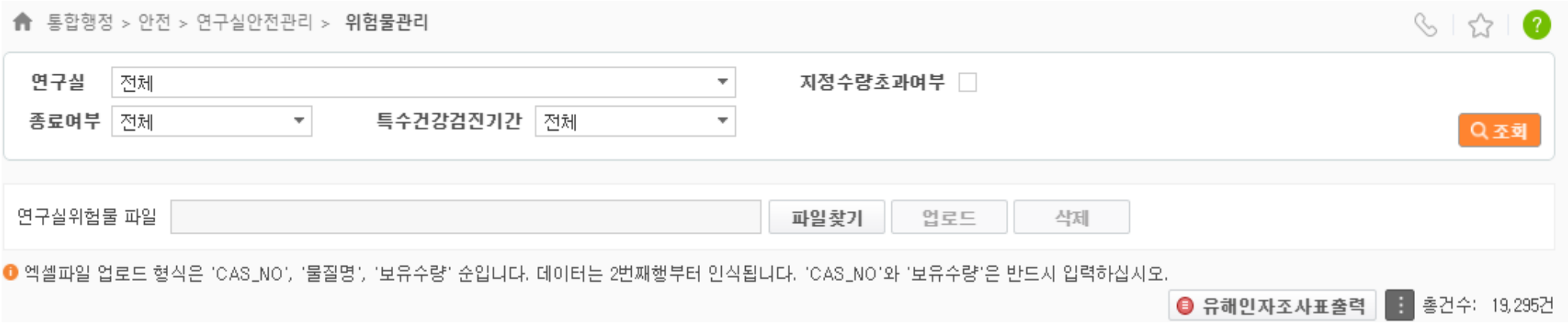
Checking Material Safety Data

2 Material Safety Data Search

- Make sure to check and use dangerous substances used before the study through the Eureka Laboratory Safety Management Program.

* Ewha Portal Eureka Integrated Administration (https://ewportal.ewha.ac.kr/) → Integrated Administration → Laboratory Safety Management → Dangerous Goods Management



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Material Safety Data Composition and Utilization Method

Configuration and Utilization methods

1 Composition of Material Safety Data

- 16 items and 72 detailed items
- Use the information you need for that item as appropriate.

16 items

1. Information about chemicals and companies
2. Hazard/Danger
3. Name and content of components
4. Tips for First Aid
5. How to deal with explosions and fires
6. How to deal with leakage accidents
7. Handling and storage methods
8. Exposure protection and personal protective equipment
9. Physicochemical properties
10. Safety and responsiveness
11. Information about toxicity
12. Environmental impact
13. Precautions for disposal
14. Information required for transportation
15. Legal regulatory status
16. Other Notes

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Configuration and Utilization methods

2 Application of Material Safety Data

1. Information about chemicals and companies
2. **Hazard/Danger**
3. **Name and content of** components
4. Tips for First Aid
5. How to deal with explosions and fires
6. How to deal with leakage accidents
7. Handling and storage methods
8. Exposure protection and personal protective equipment
9. **Physicochemical properties**
10. **Safety and responsiveness**
11. **Information about toxicity**
12. Environmental impact
13. Precautions for disposal
14. Information required for transportation
15. Legal regulatory status
16. Other Notes

When you wants to know general information on chemical substances, physical and chemical properties, toxicity information, etc.;

➡

Use number
2, 3, 9, 10, 11.

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Configuration and Utilization methods

2 Application of Material Safety Data

1. Information about chemicals and companies
2. Hazard/Danger
3. Name and content of components
4. Tips for First Aid
5. How to deal with explosions and fires
6. How to deal with leakage accidents
7. **Handling and storage methods**
8. **Exposure protection and personal protective equipment**
9. Physicochemical properties
10. Safety and responsiveness
11. Information about toxicity
12. Environmental impact
13. **Precautions for disposal**
14. **Information required for transportation**
15. Legal regulatory status
16. Other Notes

When handling, using, discarding, or moving chemical substances in the workplace for the first time

Use number
7, 8, 13, 14.

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Configuration and Utilization methods

2 Application of Material Safety Data

1. Information about chemicals and companies
2. **Hazard/Danger**
3. Name and content of components
4. **Tips for First Aid**
5. How to deal with explosions and fires
6. **How to deal with leakage accidents**
7. Handling and storage methods
8. Exposure protection and personal protective equipment
9. Physicochemical properties
10. Safety and responsiveness
11. Information about toxicity
12. **Environmental impact**
13. Precautions for disposal
14. Information required for transportation
15. Legal regulatory status
16. Other Notes

In the event of chemical leakage and exposure to workers

Use number
2, 4, 6, 12.

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Configuration and Utilization methods

2 Application of Material Safety Data

1. Information about chemicals and companies
2. **Hazard/Danger**
3. Name and content of components
4. **Tips for First Aid**
5. **How to deal with explosions and fires**
6. How to deal with leakage accidents
7. Handling and storage methods
8. Exposure protection and personal protective equipment
9. Physicochemical properties
10. **Safety and responsiveness**
11. Information about toxicity
12. Environmental impact
13. Precautions for disposal
14. Information required for transportation
15. Legal regulatory status
16. Other Notes

In the event of an explosion or fire accident due to a chemical substance

Use number
2, 4, 5, 10.

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Configuration and Utilization methods

2 Application of Material Safety Data

1. **Information about chemicals and companies**
2. Hazard/Danger
3. Name and content of components
4. Tips for First Aid
5. How to deal with explosions and fires
6. How to deal with leakage accidents
7. Handling and storage methods
8. Exposure protection and personal protective equipment
9. Physicochemical properties
10. Safety and responsiveness
11. Information about toxicity
12. Environmental impact
13. Precautions for disposal
14. Information required for transportation
15. **Legal regulatory status**
16. **Other Notes**

Where there is an inquiry about the status of chemical substances regulation and material safety data to the manufacturer or supplier

➡

Use number
1, 15, 16.

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Understanding by Detail

Understanding by Detail

1 Information about chemicals and companies

1. Name of the product

- MSDS, warning signs, and product names on containers and packaging must all be the same

2. Recommended use and usage limitations of the product

- Use of chemicals as indicated by the manufacturer

3. Provider Information

- Users of chemicals can contact their suppliers for additional information on chemicals, such as first aid tips

Understanding by Detail

2 Hazard/Danger

1. Hazard and risk classification

- Understand the hazards and dangers of chemicals at a glance
- It is marked as "OO Hazard Classification OO (Number)" but the smaller the number of categories, the greater the hazard and risk.

ex)

"Flammability Liquid Classification 1" is more dangerous because fire can occur at lower temperatures than "Flammability Liquid Classification 3"

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Understanding by Detail

2 Hazard/Danger

1. Hazard and risk classification

Physical Risks	Health and Environmental hazards
1. Explosive substances	
2. Self-reactive substances	
3. Organic peroxide	17. Acute toxicity
4. Oxidizing gas	18. Corrosion or irritation of skin
5. Oxidative liquid	19. Severe eye damage or irritation
6. Oxidative solids	20. Respiratory irritability
7. Flammable gases	21. Skin irritability
8. Flammable aerosol	22. Carcinogenic
9. Flammable liquids	23. Reproductive cell mutagenicity
10. Flammable solids	24. Reproductive toxicity
11. Naturally ignited liquid	25. Specific Target Organ Toxicity - Exposure once
12. Naturally ignited solid	26. Specific Target Organ Toxicity - Repeated Exposure
13. Water-reactive substances	27. Hazardousness
14. High Pressure Gas	28. Environmental hazards
15. Self-heating substances	
16. Metal Corrosion Materials	

Understanding by Detail

2 Hazard/Danger

1. Hazard and risk classification - Detailed classification

Physical Risks		Health and Environmental hazards
Explosion	- Explosive substance - Self-reactive substance - Organic Peroxide	- Acute toxicity (peritoneal, percutaneous, inhalation) - Corrosive or irritating skin - Severe eye damage or irritation - Respiratory hypersensitivity - Skin sensitivity - Carcinogenicity - Mutagenicity of gametes - Reproductive toxicity - Specific target organ toxicity - Aspiration hazard
Fire (flammable)	- Flammable gases, liquids, solids, aerosols - Spontaneous ignition liquid - Water-reactive substance - Self-heating substance	
Fire (oxidizing)	Oxidative gases, liquids, solids	
etc.	- High-pressure gas - Metallic corrosive substance	

Understanding by Detail

3 Name and content of components

1. Chemical name, common name and tinnitus

- Even if it is the same chemical substance, it has various names
  (tolerance name, tinnitus, product name, etc.).

2. CAS number or identification number

- CAS No. : Unique identification number for each chemical given
  by the American Chemical Abstracts Service (CAS).
  e.g. Benzene's CAS No. 71-43-2
- UN No. : UN No. is a four-digit number given to dangerous goods by the UN.
  May not be unique to each chemical
- KE No. : List number of existing chemicals in Korea
  The Ministry of Environment gives registration numbers to regulated substances
  such as prohibited substances, restricted substances, toxic substances, and accident preparation substances.

3. content

- Write as weight (w) ratio for solids and liquids and volume (v) ratio for gases

Understanding by Detail

4 Tips for First Aid

- Due to contact with chemicals or accidents Measures to be taken when exposed to the human body

- Before you use the chemical, you can use it. You must be familiar with the first aid measures.

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Understanding by Detail

5 How to deal with explosions and fires

1. an appropriate digestive medicine

- Before using a chemical, you should know the appropriate extinguishing agent for that chemical.
- Depending on the properties of chemicals, powder extinguishers, carbon dioxide extinguishers, regular foam extinguishers, water spraying (spraying) extinguishing, etc.
- Appropriate digestive medicine is listed.
- Substances that react with water to cause properties such as explosion, oxidation, and corrosion (e.g., water-reactive substances) use water as a digestive agent.
- If there is an inappropriate digestive medicine, such as not to be used, it is listed, so be careful.

2. Certain hazards arising from chemicals

- In general use environment, toxic substances, etc.
  may be generated due to
  high temperature in case of fire
  even if there is no particular hazard

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Understanding by Detail

6 How to deal with leakage accidents

- Purification and removal of chemicals are important in case of leakage, but secondary accidents due to leakage must also be prevented
- In case of leakage, it may be exposed to higher concentrations than in general use environments, so caution is required.

- When purifying or removing a chemical substance, use a suitable purifying agent.

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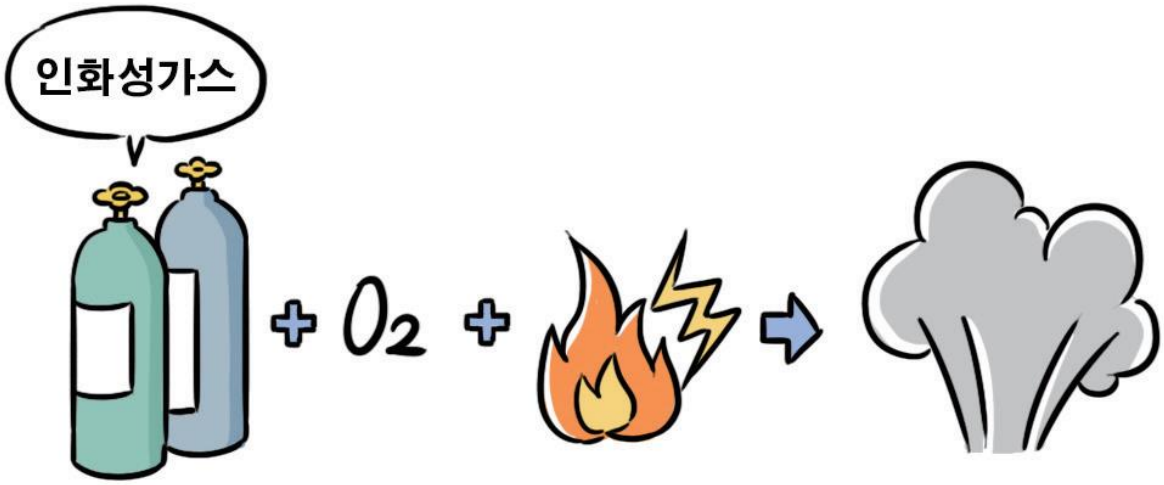
Understanding by Detail

7 Handling and storage methods

- Special conditions may be required to safely handle and store certain substances and to maintain the quality of the product
- Closely related to the physical hazards of the chemical substances

e.g. Explosive, self-reactive, organic peroxide is sensitive to temperature, pressure, friction, etc.
Flammable substances affect temperature, water reactivity, and humidity.



Exposure protection and personal protective equipment

8 Exposure protection and personal protective equipment

1. Exposure standards

- Concentration in the air that does not adversely affect almost all workers if exposed below the exposure standard based on 8 hours a day
- When measuring the working environment, the working environment can be evaluated by comparing the measured value (exposure level) with the exposure criteria.
- a related terminology

① Time-weighted average exposure standard (TWA): 8 hours a day working standard

② Short-term exposure standard (STEL): Exposure standard for 15 minutes at a time

③ Maximum exposure standard, ceiling value (C): Criteria that should not be exposed for a short time during working hours per day

2. Personal protective equipment

- As there are various types of protective equipment, select and use protective equipment suitable for chemical substances.
- The respirator is determined by considering the characteristics and exposure concentration of chemical substances.
- For corrosive or penetrating chemicals through the skin.

Wear full-face respirators, impervious protective gloves, protective clothing, etc.

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Understanding by Detail

9 physicochemical properties

1. Smell threshold.

- The smell of the chemical gives a rough idea of the presence and concentration of the substance

2. pH

- Indicator of the acidity/alkaliity of a substance
- pH up to 14 is neutral 7 and high or low pH is corrosive

3. Melting/frozen point

- The melting point is the temperature at which the temperature changes from solid (liquid) to liquid (solid)
- Note when storing and handling chemicals as they may change their physical conditions
- If the melting/frozen point is higher than room temperature, it exists as a solid and if it is lower as a liquid.

Understanding by Detail

9 physicochemical properties

4. Boiling point

- Reference when storing and handling liquids as temperatures at which they begin to change into gases
- Exists as a liquid if the boiling point is higher than room temperature, and as a gas if it is lower

5. a flashpoint

- The lowest temperature at which combustible steam is generated enough to be ignited by the ignition source, and the lower the flash point, the greater the risk of fire.
- Flammable liquids should be below the flash point when stored.

6. Upper/lower limit of range of ignition or explosion

- Ignition if the gas or vapor of the substance is mixed with air at concentrations within this range.
- The lower the lower the lower limit, the greater the difference between the upper limit and the lower limit, the higher the risk of fire.

Understanding by Detail

9 physicochemical properties

7. Steam pressure

- the ability of a liquid or solid to emit steam
- The higher the temperature, the higher the vapor pressure, and the higher the number, the more vapor can be generated

8. Solubility

- The degree of dissolution in a solvent such as water is expressed as a numerical value.

9. Steam density

- Density of gas or vapor relative to air (=1)
- Less than 1 is more likely to spread and scatter, but greater than 1 may sink and deposit

Understanding by Detail

9 physicochemical properties

10. n-octanol/water distribution coefficient

- a figure indicating whether a substance is close to n-octanol or water
- A larger value than 0 means that it dissolves well in fat, and a smaller value than 0 means that it dissolves well in water.
- n-octanol/water distribution coefficient can be used to predict whether substances will remain in the body (fat) or be discharged into the environment (water)
- Larger than zero and higher values dissolve well in fat, making it easier to remain in the human body

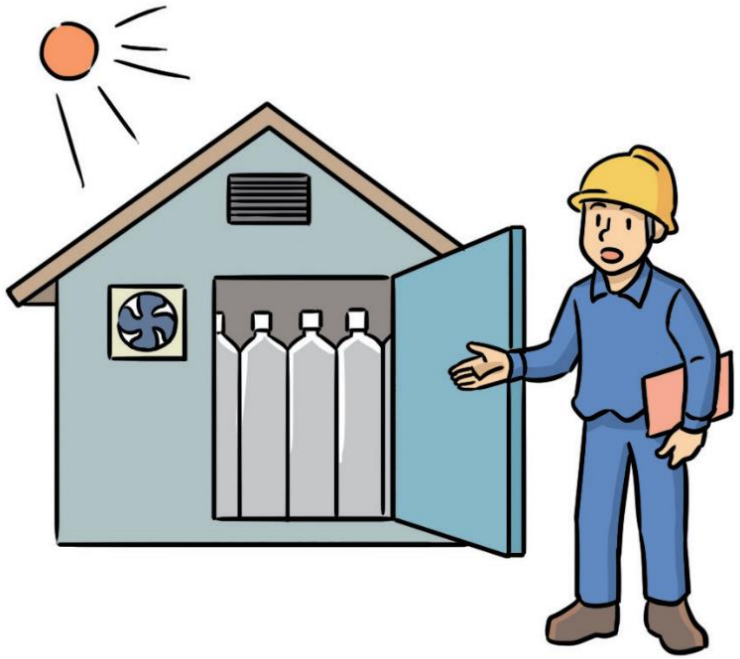
11. Natural ignition temperature

- the lowest temperature at which a substance can catch fire without an ignition source
- Smaller values are more likely to cause a natural fire

Understanding by Detail

10 Stability and Reactivity

- Information to view when using chemicals in environments other than normal handling and storage
- It means the effect of heat, air, water, sunlight, other substances, etc.



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Understanding by Detail

11 Information about toxicity

- Substances that can lead to death by exposure through the mouth (peripheral), skin (percutaneous), and respiratory system (inhalation) in a short period of time.
- Be especially careful when handling chemicals marked with skull pictograms
- It is usually presented as a number with expressions of LD50 (percutaneous, percutaneous) and Lc50 (intake), and the smaller the value, the more harmful it is.
- Wear appropriate protective gear when handling

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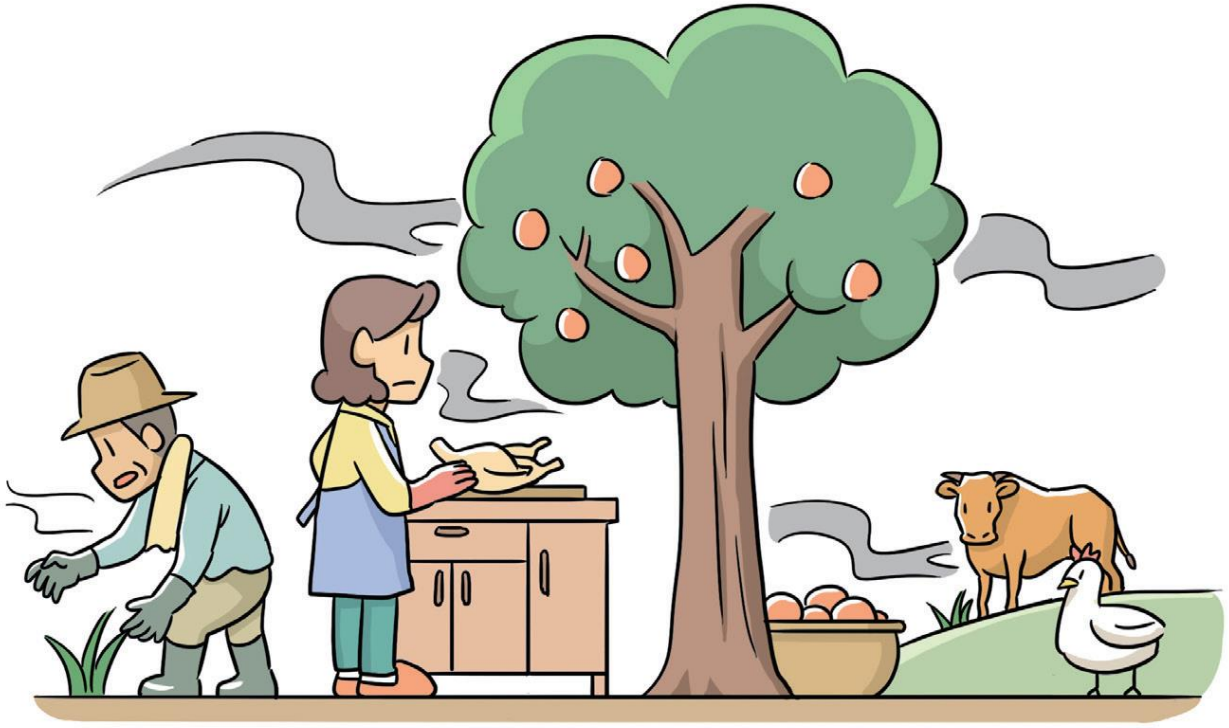
Understanding by Detail

12 environmental impact

- Acute or chronic harmful effects on fish, crustaceans (shrimps, etc.), birds (a aquatic plant), etc.
- Can affect people indirectly depending on the food chain
- It is usually presented as a number with expressions of Lc50, ec50, and erc50, and the smaller the value, the more harmful it is to aquatic organisms.

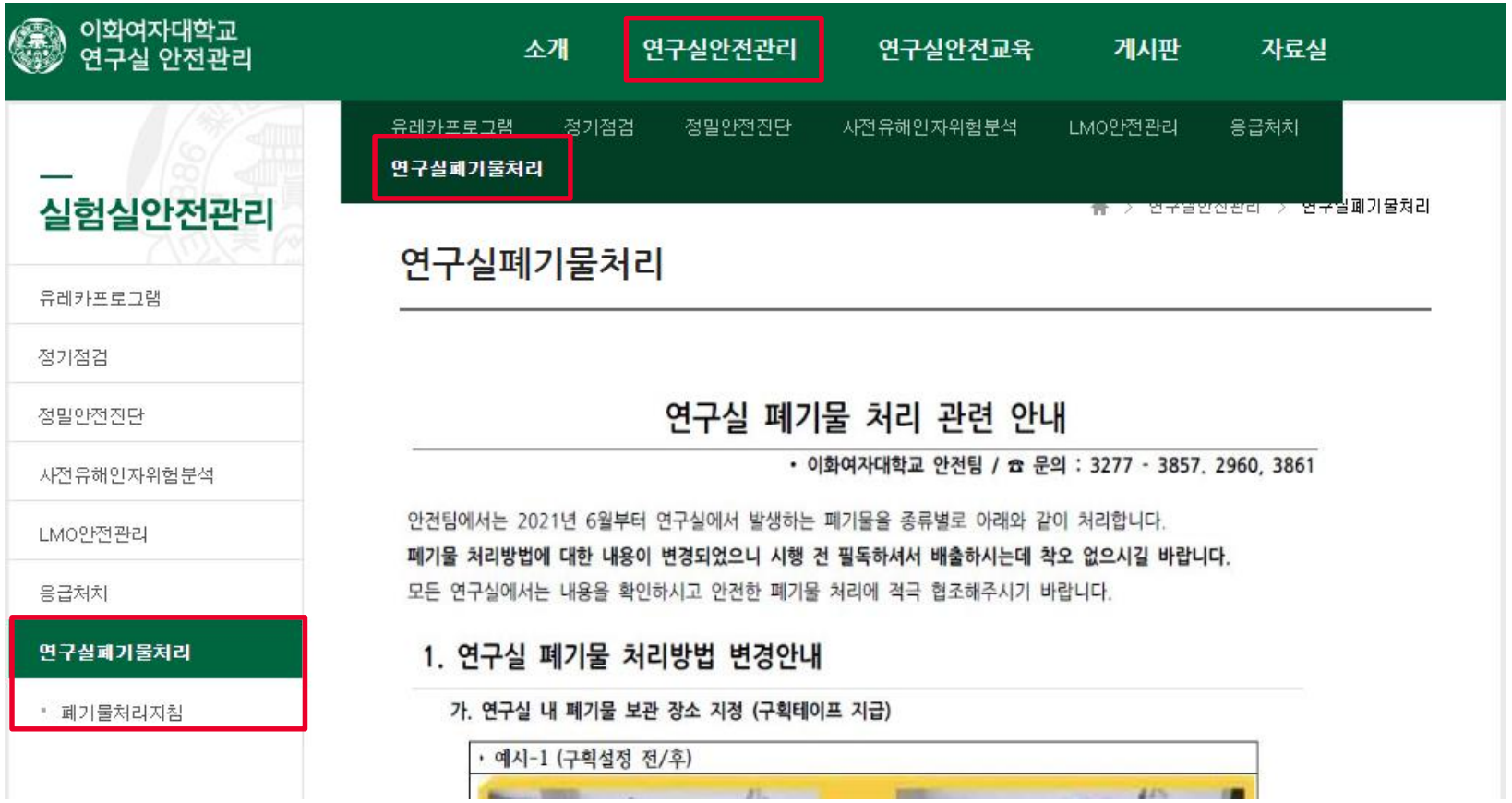


Understanding by Detail

13 Precautions for disposal

- Refer to disposal of hazardous substances

*** Our school's laboratory safety management website [https://cms.ewha.ac.kr] → Laboratory safety management → Refer to laboratory waste disposal.**



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14 information required for transportation

- Dangerous goods have long been classified by UN experts and accumulated information is used for transportation.
- There are detailed differences depending on the transportation method (sea, land, air, inland route, railway, etc.), but the same dangerous goods are given the same 4-digit Un number.
- Each UN number typically has a container rating with a risk rating

Risk rating of the United Nations

- Class 1: Explosives
- Class 2.1/2.3 : Flammable gas/toxic gas
- Class 3: Flammable liquid
- Class 4.1/4.2/4.3 : Flammable solids, self-reactive substances/ spontaneously ignited substances
  a self-heating/water-reactive substance
- Class 5.1/5.2 : Oxidizing substance/organic peroxide
- Class 6.1 : Acute Toxic Substances
- Class 8: Corrosive substances

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Understanding by Detail

15 Legal regulatory status

1. Occupational Safety and Health Act

① Prohibited substances: Hazardous substances prohibited from manufacturing, importing, transferring, providing, or using

② Hazardous substances subject to permission: Substances subject to permission to manufacture or use

③ Hazardous substances subject to management: Substances requiring management prescribed by the Act and prescribed in attached Table 12 of the Regulations on Industrial Safety and Health Standards.

④ Hazardous factors to be maintained below the allowable standard: Substances to be managed below the prescribed exposure standard

⑤ Hazardous factors subject to work environment measurement: Substances to be measured in the workplace

⑥ Hazardous factors subject to special health examination: Substances that require special examination of workers handled

⑦ Hazardous and hazardous substances subject to process safety report (PSM) submission

⑧ Hazardous substances

⑨ Hazardous factors that set exposure standards

Understanding by Detail

15 Legal regulatory status

2. Chemical Substance Control Act

① Prohibited substances: Prohibition of manufacture, import, sale, storage, storage, transportation, or use for all purposes.
② Licensed Material: Manufacturing, importing and using with the permission of the Minister of the Environment
③ Restricted substances: Chemical substances deemed to be highly hazardous when used for a specific purpose are prohibited from being manufactured, imported, sold, stored, stored, transported or used for that purpose.
④ Toxic substances: Hazardous chemicals determined and publicly announced by the Minister of Environment in accordance with the standards prescribed by Presidential Decree.
⑤ Accident preparation substances: Chemical substances that are highly likely to cause chemical accidents due to strong acute toxicity, explosive, etc. or are feared to cause large damage in the event of a chemical accident.

※ A list of each publicly announced substance can be found on the Ministry of Environment's website.

Detailed understanding of hazards

Detailed understanding of hazards

1 Explosion

1. explosive substance

- Including products such as ammunition and fireworks from explosives such as TNT and dynamite

2. self-reactive substances, organic peroxides

- Be careful as it may react explosively because it is sensitive to heat (temperature) and friction.
- Highly reactive, violent reaction with other substances

* Examples of organic peroxides

MEKP

Dicumyl Peroxide

Didenzoyl Peroxide

Acetone Peroxide

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Detailed understanding of hazards

2 Fire (flammable)

1. Flammable gas, liquid, solid, aerosol

- Ignition sources (heat, fire, spark, etc.) can cause a fire.
- Volumes of vapor from flammable gas or liquid in a smuggled space can cause an explosive fire.
- Ground containers or equipment or install explosion-proof equipment
- Smoking is prohibited in place where chemical substances of the relevant risk are handled or stored.

  *** Examples of flammable gases: propane, acetylene, LPG, butane, etc.**

  *** Examples of flammable liquids: ethanol, alcohol, nail polish, acetone, paint, kerosene, gasoline, etc.**

2. Self-ignition liquid, solid

- Naturally ignited by contact with air without ignition source
- Natural ignition points are listed in item 9 (physical and chemical characteristics) of material safety and health data.
- Save with the spontaneous ignition point in mind when saving
- If impurities are mixed, they may ignite naturally.

Detailed understanding of hazards

2 Fire (flammable)

3. Self-heating substances

- a substance that accumulates heat in the air and generates heat on its own
- Heat accumulation accelerates and can generate heat, keeping it low

4. Water-reactive substances

- Substances that spontaneously ignite or produce flammable gases in contact with water
- Handling and storing in an inert gas to avoid contact with water, or keeping it dry by being careful of moisture.
- It is dangerous to use water as a fire extinguisher in case of fire.

5. Oxidative gases, liquids, solids

- Stimulate the fire in the event of a fire as it promotes combustion
- Oxidative materials may be corrosive, so protective equipment must be worn when handling them

* There is a difference from the flammability indication.

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Detailed understanding of hazards

3 etc.

1. High pressure gas

- a gas filled with pressure
- Heat exposure can cause containers to explode

2. Metal Corrosion Materials

- a substance that corrodes and damages metals
- If it is placed in a container other than the original container, it can be corroded.

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Detailed understanding of hazards

4 health hazards

1. acute toxicity

- Substances that can lead to death through the mouth, skin, and respiratory tract in a short period of time.
- Be especially careful when handling chemicals marked with skull pictograms
- Present numerically in item 11 (information on toxicity) along with expressions of usually LD50 (percutaneous, percutaneous) and LC50 (intake).
  → Lower values are more harmful
- After handling, wash the handling area thoroughly and avoid getting on the eyes, skin, or clothing.
- Do not eat food or smoke while handling the substance.
- Protective equipment must be worn when handling

2. Skin corrosive or irritating/severe eye damage or irritation

- Corrosive causes irreversible changes to the eyes and skin
- Irritability is recoverable damage.

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Detailed understanding of hazards

4 health hazards

3. respiratory/dermatological sensitivity

- Irritable is also known as sensitization, allergic reaction.
- Exposure to irritable substances affects the immune system of the respiratory system and the skin, overreacting.
- Once an overreaction occurs, even if it's exposed to low concentrations, it reacts.
- Respiratory Overaction: Asthma
- Skin hypersensitivity: hives, redness, spots, edema

4. Carcinogenic, reproductive cell mutagenicity, reproductive toxicity

- In many cases, CMR* refers to three hazards together
- Carcinogenic is what causes cancer.
- Reproductive cell mutagenicity affects human reproductive cells that can be inherited by offspring.
- Reproductive toxicity affects reproductive functions, such as the effect on sperm and eggs, and fetal deformities, etc.

that have a detrimental effect on the development and development of the fetus

*** CMR :** C(Carcinogenicity), M(Mutagenicity), R(Reproductive toxicity)

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Detailed understanding of hazards

4 health hazards

5. Specific target organ toxicity

- Hazardous effects of chemicals on certain organs, such as liver, kidneys, and nervous system, depending on one or repeated exposure

6. Inhalation hazard

- Liquid or solid matter can enter the respiratory system directly or indirectly through the nose and mouth, causing chemical pneumonia and lung damage

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Detailed understanding of hazards

5 Hazardous nature of aquatic environment

- Acute or chronic harmful effects on fish, crustaceans (shrimps, etc.), birds (a aquatic plant), etc.
- indirectly affecting people according to the food chain
- Usually presented in numerical terms with expressions of LC50, EC50, and ErC50

→ The smaller the value, the more harmful it is to aquatic organisms

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Warning sign

Warning sign

1 Example of warning signs

Warning signs are required when used in small portions.

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Warning sign

2 How to create a warning sign

- Chemical information from the Korea Safety and Health Agency → Write a warning sign → Enter Cas No.

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How to apply for personal protective equipment

How to apply for personal protective equipment

1. Check Material Safety Data (MSDS)

- Check the Material Safety Data (MSDS) of all chemicals in use.
- Ensure that the material safety and health data are provided by the supplier

2. Check item 8 (exposure prevention and personal protective equipment) in the Material Safety Data (MSDS).

3. Fill out the application form for protective equipment based on item 8.

- Application for personal protective equipment attached

4. Send an application to the safety manager of the research promotion team of the Industry-Academic Cooperation Group.

- 김소현, p.nutbutter1103@ewha.ac.kr, ☎ 3107

5. Receiving personal protective equipment

- Work at this school: Main Building No. 309 (Safety Manager of Research Promotion Team)
- Working at Mok-dong and Seoul Hospital: Medical College Administration Office (고선경 선생님, ☎6010)

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Thank you