

Guidelines for the Safe Use of Common Chemical Disinfectants



職業安全健康局
OCCUPATIONAL SAFETY & HEALTH COUNCIL





1. Introduction

To combat the threat of bio-hazards in the workplace, sterilization and cleaning of the workplace and personal hygiene are very important. There are many different types of chemical agents for disinfection purposes. Despite their disinfectant and antiseptic functions, the chemical agents, if used improperly, may lead to accidents. However, a full understanding of the properties of the chemical agents being used and the taking appropriate precautionary and protective measures will ensure safety and efficiency at work.



2. Types of Chemical Disinfectants

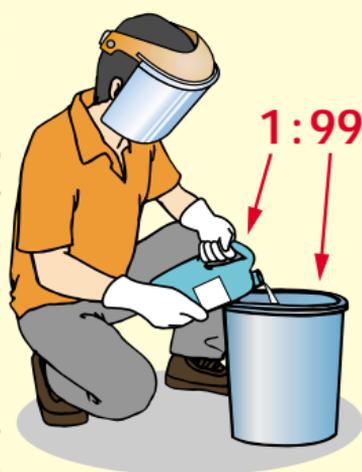
- Phenols, such as Lysol, o-phenylphenol solution
- Alcohols, such as 75% Ethyl Alcohol solution or 60-80% Isopropyl Alcohol solution
- Aldehydes such as Glutaraldehyde
- Halogens such as Iodine, Hypochlorite, bleaching powder
- Oxidising Agents such as Hydrogen Peroxide, Peracetic Acid
- Surfactants such as Quaternary Ammonium Compounds

Different disinfectant agents have varying applications, actions and effectiveness on bacteria, fungi and viruses. The effectiveness may also be subject to interference from other substances to various extents.

Among all the chemical agents, Sodium Hypochlorite, NaOCl (commonly known as liquid bleach) is the most widely used agent. The available chlorine produced by the



agent possesses disinfectant, sterilizing and bleaching properties. Commercial liquid bleach in general contains 5 - 10% of available chlorine and needs to be diluted before use (approximately 50 to 100 times dilution). For the general purposes such as wiping the surface of articles or cleaning the floor, a 1 in 99 dilution of the liquid bleach should be used. For places with serious grime such as garbage rooms, the dilution should be 1 in 49.



Another commonly used chemical agent is alcohol such as Ethyl Alcohol or Isopropyl Alcohol. A 70-75% of alcohol solution is suitable in general for wiping articles or work surface. If no water is available for washing, tissues permeated with 70% alcohol solution can be used to wipe the hands. A small piece of alcohol-soaked tissue is insufficient to deal with a vast amount of bacteria but in no way can kill all pathogens. Therefore, the most thorough cleaning is to wash the hands with liquid soap or soap under running water to flush away the bacteria and viruses. The disadvantage of alcohol is that it evaporates quickly and its antiseptic effectiveness therefore does not last for long. If the object contains organic material, the antiseptic effect of alcohol is also reduced. Apart from being flammable, alcohol also has degreasing property, leading to dry skin and irritation as well as damage to the mucous membrane. Rubber material such as gloves absorbs alcohol, causing a change in the property of the rubber and thus lowering the effectiveness of protection.





3. Choosing Disinfectants

In choosing a disinfectant, both the disinfecting properties and safety have to be considered. Many chemicals are corrosive, toxic or irritants. If used improperly or not according to instructions on the proper protection, accidents can happen. When employees are required to use the chemical agents at work, employers not only have to provide appropriate precautionary and protective measures but also to offer related occupational safety training. On the other hand, employees have to follow guidelines on the safe use of such agents and the proper use of personal protective equipment. For example, Sodium Hypochlorite, a liquid bleach, which is a weak alkaline will emit fumes causing irritation to the lung when mixed with acids. High concentration of the fumes might cause damage to the lung. To safeguard their health, employees have to be careful when diluting and using the agent. They have to avoid direct skin contact with the liquid bleach or inhale its vapour. Some of the cleaning agents such as toilet bowl cleaner may contain strong acids. For safety purposes, do not mix cleaning and disinfectant agents together during uses.



4. Health Hazards Posed by the Chemical Disinfectants

Generally speaking, all chemical agents are hazardous to a certain extent. When used improperly, they will pose hazards to health. Hazardous properties of the chemical agents include:

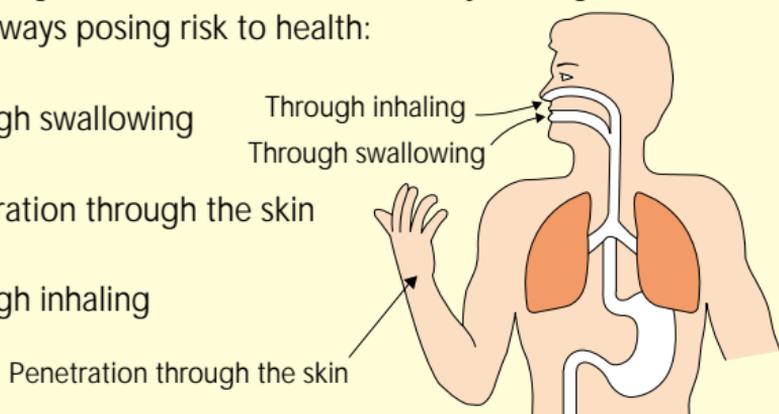
- Corrosive – e.g. liquid bleach containing over 10% of available chlorine
- Irritant – e.g. general household liquid bleach (containing 5 - 10% available chlorine), agents containing high concentration phenols
- Oxidizing – e.g. powder bleach containing over 40% of available chlorine
- Flammable – e.g. 70% Ethyl Alcohol or Isopropyl Alcohol solution





Chemical agents can enter into the body through three different ways posing risk to health:

- Through swallowing
- Penetration through the skin
- Through inhaling



Health hazards caused by the chemical agents include:

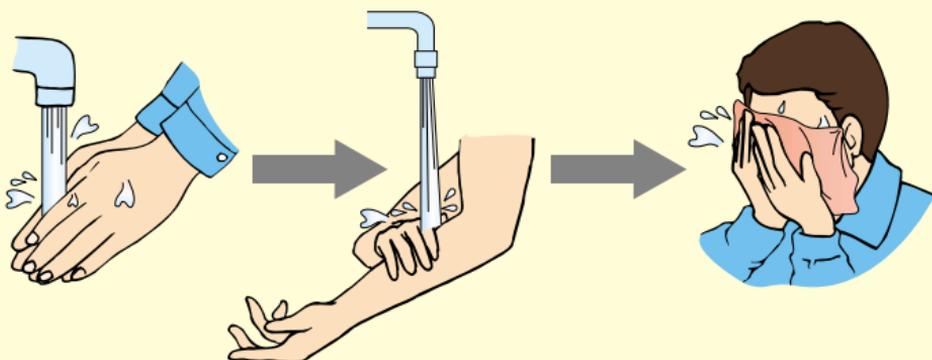
- **Skin** – burns, itch, allergy, dryness and inflammation
- **Eyes** – burns, redness and swelling or blindness in serious cases
- **Respiratory system** – coughing induced by irritation; the respiratory tract and lung might be affected when serious
- **Nerve system** – headache, dizziness and dumbness
- **Other organs** – liver and kidney functions might be affected



5. Safe Usage and Storage

The following protection measures should be taken when using and storing the chemical agents.

- Do not eat, drink, smoke, make up or store food in the workplace containing chemicals.
- Wash hands, arms and face immediately after using the chemicals and before taking food after work.



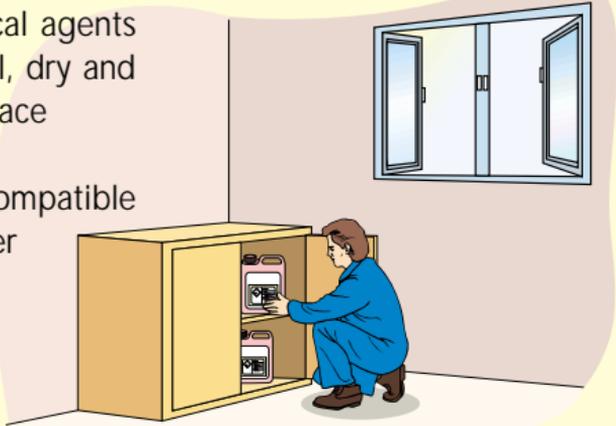


- Keep the floor clean, the passageway clear and the workplace well ventilated
- Understand the properties of the sterilizing agents being used
- Follow the instructions and safety measures as recommended by the product manufacturer
- Containers must be properly labelled
- Cover the container securely



- Never mix disinfectants with other cleaning agents in uses

- Store the chemical agents in a shaded, cool, dry and well ventilated place
- Do not place incompatible materials together



- Do not dispose of chemical agents improperly



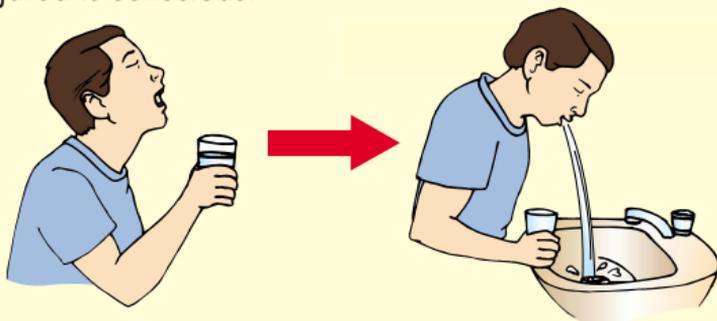
- Use personal protective equipment properly
- Ask for guidance from supervisors when in doubt
- Understand emergency measures fully
- Inform the doctor of the chemical agent used if feeling unwell



6. Emergency Measures

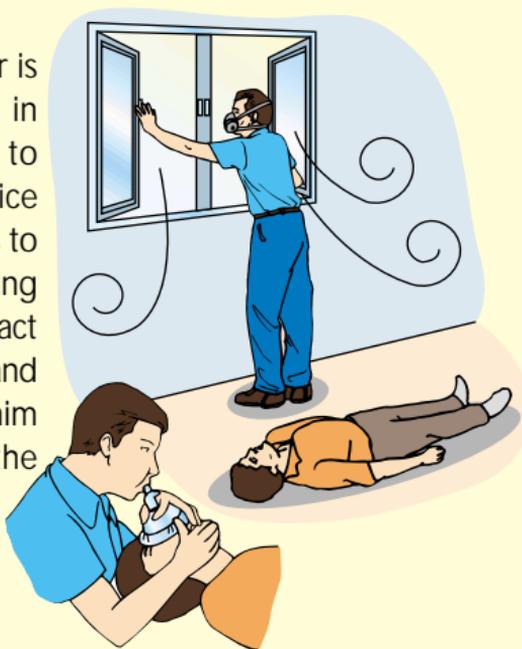
In case of an emergency when using chemical agents, adopt the following first aid measures:

- **Mouth** – Rinse the mouth with clean water if the injured is conscious.



- **Inhalation** – Rescue personnel should be protected with all necessary protective equipment first. Move the injured to a location with fresh air. Administer mouth-to-mouth resuscitation if the injured has difficulty breathing or stops breathing.

Pocket mask resuscitator is recommended to use in rescue. It is a mouth to mouth resuscitation device with one-way valve helps to perform rescue breathing and eliminate direct contact with the injured's nose and mouth, thus preventing him from breathing in the injured's exhalation.



- **Skin** – Flush the skin with copious clean water for at least 15 minutes and take off the contaminated clothes.



- **Eyes** – Push the eye open and rinse with slow-running clean water for at least 15 minutes. Avoid splashing the uncontaminated eye with the washings while rinsing.

- Seek medical assistance if required.



7. Handling of Spillage

In case of spillage of the chemical agents, the following measures should be taken:

- Restrict access to the contaminated area until it is cleaned properly.
- Wear suitable personal protective equipment.
- Remove all sources of fire or heat if it is safe to do so.
- Do not handle the spilled substance without proper hands protection. Try to stop or reduce the spill only if it is safe to do so.



- Contain the spilling substance to prevent seepage to water chutes or other confined space.
- Use inert absorbents such as sand to soak up the spill and dispose of the used absorbents in a suitable covered container.
- Draw in fresh air and clean the scene thoroughly
- If necessary, seek assistance from the Fire Services.



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