



International
Labour
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ADVANCING DECENT WORK AND
INCLUSIVE INDUSTRIALIZATION
IN ETHIOPIA

**VISION
ZERO
FUND**

Hygiene and Antimicrobial Spray Training: A Reference Manual

ILO- SIRAYE Ethiopia
September-October, 2020

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► Introduction

This manual was prepared in September-October 2020 under the BMZ supported project “Protecting garment sector workers: occupational safety and health and income support in response to the COVID-19 pandemic”, implemented by ILO SOCPRO, Vision Zero Fund (VZF) and Better Work. In Ethiopia, the project was implemented by [SIRAYE](#), an initiative of the ILO¹. VZF, which contributes to SIRAYE by leading its Occupational Safety and Health initiatives, led the implementation of OSH initiatives under this COVID-19 response project.

During the initial phase of the pandemic in 2020, garment factories that are part of SIRAYE, expressed the need for capacity building to make their workplaces safe for workers. One of the basic needs was to implement disinfection measures at shopfloors as well as common areas such as canteens. Responding to this request, SIRAYE team worked closely with a team of public and environmental health specialists (Smret Hagos, Public Health specialist and Hailemichael Hailu, Environment Health Professional) to design an on-site training module, along with this reference manual.

The disinfection trainings and the reference manual target cleaning staffs, health or first-aid officers, maintenance officers, HR and OSH officers working in factories. The original manual was developed in Amharic language and an English version was prepared later for wider dissemination and use. The document has not undergone professional copyediting.

¹. Advancing Decent Work and Inclusive Industrialization Programme (SIRAYE) is a programme in Ethiopia that brings together ILO's key departments and global programmes such as Better Work, Vision Zero Fund, SCORE, LABADMIN/OSH and INWORK to promote sound industrial relations, strengthen enterprise level practices, improve factory productivity, build labour inspectorate capacity, and ultimately, provide a blueprint for the rollout of decent work practices into other industries.

► 1. What is health?

“Health is not just absence of disease or illness; It means having complete physical, mental and social well-being.”

Source: World Health Organization

1.1 Types of Health

Although physical and mental health are often described, spiritual, emotional, and financial health can contribute to our overall well-being.

1.1.1 Physical health

A person with good physical health will be able to perform the highest levels of physical activity and processes. This is not just about not having a disease. Regular exercise, a balanced diet, and adequate rest, all contribute to good health. When necessary, people receive medical attention to maintain balance. Physical well-being involves reducing the risk of illness and living a healthy lifestyle. For example, physical activity can help a person maintain and improve breathing, heart rate, muscle strength, agility, and body composition. Keeping physically fit and safe also includes reducing the risk of injury or diseases, e.g.

- Reducing workplace hazards
- Maintaining cleanliness
- Avoiding using tobacco, alcohol or drugs
- Getting vaccinated

Good physical health can work well with mental health to improve one's overall quality of life. For example, mental illness, such as depression, increases the risk of drug abuse that can have a detrimental effect on one's physical health.

1.1.2 Mental health

Mental health refers to a person's emotional, social, and psychological well-being. Mental health is just as important as physical health to lead a healthy and active lifestyle. Good mental health is not only about depression, anxiety, or other disorders. It is also based on a person's abilities to:

- Enjoy life
- Being able to recover and adapt to difficult situations
- Balance different aspects of life, such as family and finances
- Feel safe
- Work to the best of his/her ability and achieve personal goals

Physical and mental health are closely linked. For example, a non-communicable disease that can affect a person's ability to function normally can lead to depression and anxiety. These feelings may also be due to financial difficulties or inactivity.

Mental illness, such as depression or anorexia, can affect body weight and overall functioning. Since all forms of health are interrelated, it is important to look at “health” in general rather than looking at the individual conditions.

► 2. What is a disease?

Illness is a specific abnormality that affects all or part of the structure or function of a person. Illnesses are often medical conditions associated with certain symptoms.

2.1 Disease-causing microbes

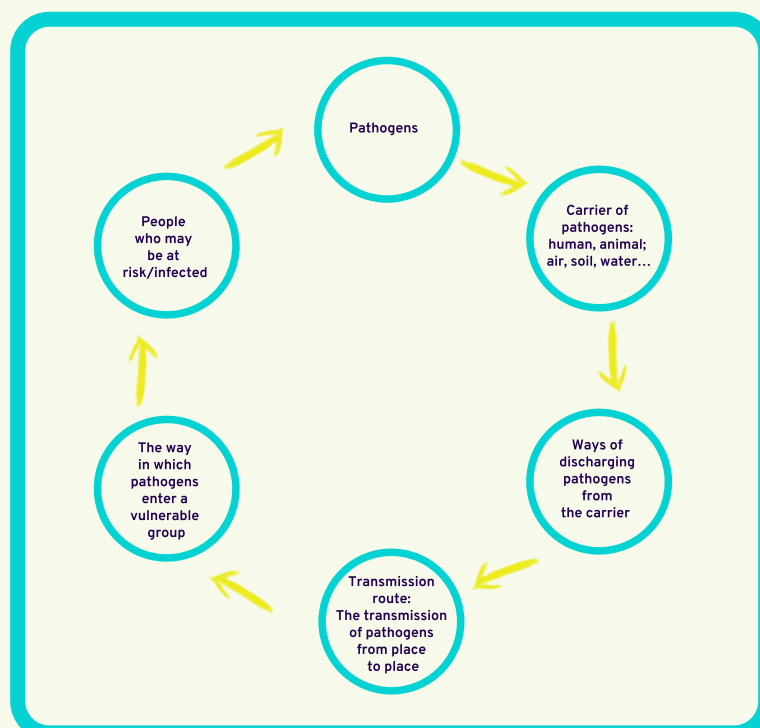
Microbes are the cause of infection. These are:

- Bacteria
- Viruses
- Fungi
- Parasites and others

2.2 Three ways of Disease Transmission

- Source of infectious microorganisms
 - Human sources - patients / hospital staff / visitors
 - Other Sources - Contaminants / Medical waste
- Vulnerable person
- Transmission method
 - Airborne, cracks/mouth droplets/contacts

► Transmission Cycle



2.3 Prevention of disease

Infection prevention is based on placing barriers (physical, chemical, or mechanical) between the exposed person (the immune system) and the pathogen.

Prevention of infectious diseases mainly involves preventing air, blood or body fluids from coming into contact with contaminated objects (surfaces, contaminated food or water), and the spread of the disease through infected animals or insects.

- Prevent or kill pathogens
- Restrict the transmission of pathogens from an infected person to a person at risk
- Make sure people are vaccinated
- Using appropriate personal protective equipment

What are some standard precautions?

To prevent the spread of infectious disease, we need to create a physical, mechanical, or chemical barrier between pathogens and a person. This is used to break down the transmission of the disease.

- **Physical:** By destroying and sterilizing high-grade antimicrobials by burning or drying them in dry ovens.
- **Mechanical:** Personal protective equipment (gloves, face mask, goggles, skirts, plastic or rubber clothing and curtains)
- **Chemical:** Antibacterials (alcohol-containing antiseptics) and high levels of antimicrobials (chlorine-containing antimicrobials)

► 3. Hygiene and antimicrobial processes

► Summary of the cleaning and antimicrobial process

- | | | |
|----------------------|---|--|
| Cleaning | → | Removal of visible debris and dirty stains. |
| | → | Clean space means that it is free of dirt, for example, food scraps; free of bad odors; that there is no grease to the touch and; that it is free of rust, for example. |
| Disinfection | → | It means the elimination of harmful bacteria. |
| | → | Antimicrobial means a clean surface free from high levels of pathogens and microorganisms. |
| Sanitation | → | It is a process by which chemicals, heat, and ultraviolet rays, for example, extinguish most or all of the microorganisms (whether or not they are pathogens). |
| Sterilization | → | The removal all microorganisms (even non-pathogens) and their spores; usually carried out using highly toxic and non-toxic chemicals (chlorine, formaldehyde, glutar-aldehyde, etc.), using high temperatures, or intense radiation. |

3.1 Cleaning

- Cleaning means removing visible dirt or other unwanted material (blood, food scraps, dust, etc.). This process eliminates visible contaminants.
- Systematic removal of waste on a surface or object with the intention of removing it. The cleaning process does not kill pathogens.

Types of energy we use during cleaning:

- Kinetic force - physical, mechanical force
- Thermal energy - in hot water
- Chemical power - with chemical cleaners

“The purpose of cleaning is to ensure visible hygiene.”

3.2 Disinfection

- It is the process of killing upto 99.99% of pathogens in 5 to 10 minutes.
- An antimicrobial process means that a person will no longer be infected with an antimicrobial agent.
- Antibacterial drugs have a higher ability to kill pathogenic bacteria compared to cleaning.

“The purpose of antimicrobials is to kill germs and reduce the number of germs that can no longer transmit the infection.”

3.3 Sanitation

- The process of reducing a specific bacterium or microorganism in 30 second with the highest rate, that is 99.99%. It is done by heating or chemicals. A sanitization may or may not kill all pathogens.

3.4 Sterilization

- It is the process of destroying all microorganisms, including spores.

3.5 The overall process



3.6 The importance of cleaning and disinfection

Physical or chemical processes are used to reduce, eliminate, or destroy pathogens. They are essential for controlling the transmission of microorganisms between animals, the environment, or between humans.

► 4. Cleaning

Cleaning means removing dirt or other unwanted objects (blood, food scraps, dust, etc.). This eliminates visible contaminants.

Hygiene - In addition to aesthetic and psychological role, mechanical removal of bacteria and fungi can significantly reduce the number of bacteria (50 - 90%).

4.1 The Importance of Cleaning

Microbes are the cause of infection. These are:

- Can remove 90% of microorganisms
- Improves the effectiveness of the antimicrobial process

4.2 Cleaning methods

Three main stages in cleaning:

1. Dry clean
2. Washing / wet cleaning
3. Rinse and dry

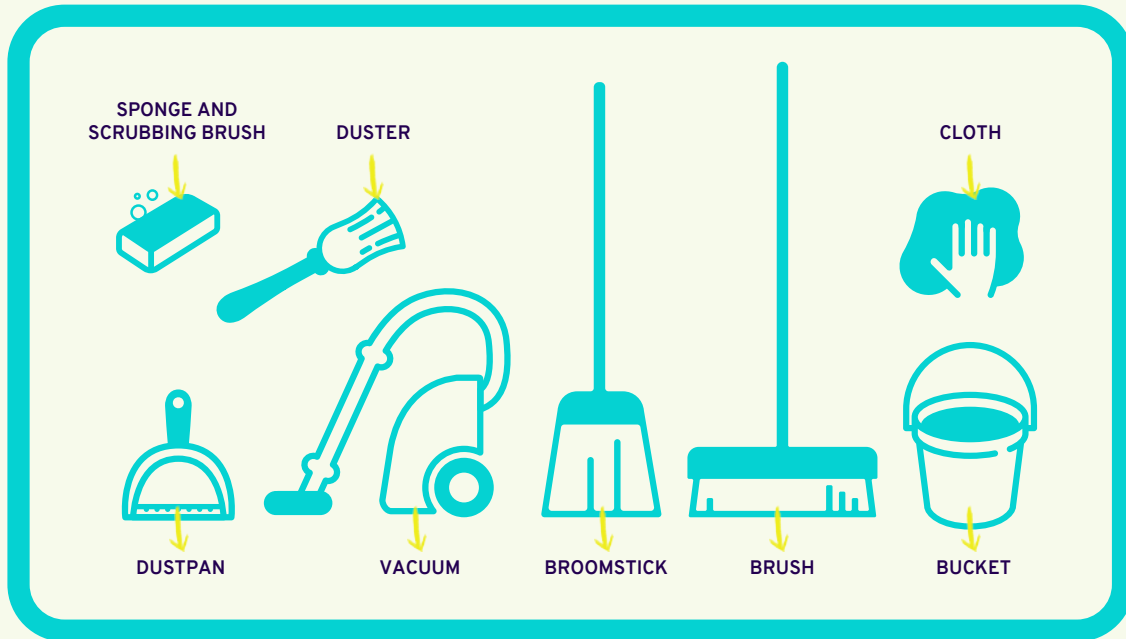
4.2.1 Dry cleaning

- Dry cleaning is removing waste product; dirt and other debris from the floor using a brush or scraper.
- Various tools, such as brooms, cleaners, and water sprays, can be used to push waste products from floor to storage.
- This process can significantly eliminate unwanted surface materials and reduce pollution.
- However, if the cleaning is not performed properly it blocks sewerage systems, and cause problems of wet and solid waste management. It also tends to spread garbage and bacteria to other areas of the plant/factory and can cause contamination in new areas of the factory.

Knowledge of Equipment (Physical Power)

Physical forces such as cleaning, polishing, and dust removal with cleaning tools; wiping with sponge and towels and scrubbing can be utilized. It should be remembered that building materials can be damaged by physical force as well as by chemical forces.

► Household apparatus for cleaning (physical force)



4.2.2 Washing process

Measures to be taken during cleaning/rubbing:

- Close, remove or cover electrical appliances
 - Strictly cover with plastic materials (electrician can help)
- High pressure water is very effective
 - Avoid this process for cleaning highly contagious microorganisms
- Use hot or lukewarm water
- Rubbing may be necessary
- Steam cleaning is effective for cracks, openings, plumbing works

Type of cleaning input

There are four key categories of cleaning agents

- Detergents
- Alkaline solution
- Chlorinated solution
- Acid cleaners

CHEMICAL / DETERGENTS

It is a chemical compound that is a surfactant in water. These ingredients are often similar to soap but contain compounds that are more soluble in hard (alkaline) water.

These chemicals are cleaners that are slightly alkaline and are used to clean fresh debris from floors, walls, ceilings, appliances, furniture, etc. They are very foamy and are especially used for general cleaning like Largo (a local brand of liquid soap), for example.

- They are a special and powerful cleanser that remove dirt, oil and grease from food items etc.
- It is similar to soap but is stronger and completely soluble in water.
- Reduces microbes.
- It helps to dispose off the waste by dissolving it in water and thus altering the nature of the waste.
- Detergents efficiently change the nature of the water, allowing it to penetrate, disperse, and dispose surface debris.
- Detergents contain substances that reduce the tension between the dirt and the floor and easily remove dirt from the floor.

ALKALINE

- Alkaline cleaners are more effective than detergents. It contains strong substances such as sodium hydroxide or potassium hydroxide. Used to clean rust. It is also called soda ash or baking soda.

CHLORINATED

- Chlorine-containing products are often essential for the purification of protein-related impurities/microorganisms; They are important for floors that are difficult to clean due to their shape or size, such as storage boxes and trash cans. They are also alkaline and corrosive substances. They give a great reflective effect on cutlery, kitchen utensils, suitcases and other surfaces.

ACID

- This is made from a mixture of acids and is used to clean and reflect aluminum and stainless steel. Efficiently purifies cargo from ships, rails, vehicles and machinery, and metals contaminated with water pollution. Removes hard water rust.

The cleaning efficiency is mainly based on the following

- ▶ Contact time
- ▶ Temperature
- ▶ Physical force
- ▶ Water Condition

CONTACT TIME

Washing chemicals may not work immediately. It takes time for the rubbish to penetrate and release from the ground. The preparation of tanks is a method of increasing the contact time between the chemical and the surface. When working with alkaline and chlorine cleaners, workers should wear appropriate clothing, such as goggles, long boots, or full protective clothing.

TEMPERATURE

As the temperature rises, most of the chemical activity increases. For example, many steam cleaners can help cleaners penetrate well and remove dirt.

PHYSICAL FORCE

Appropriate methods include the use of brushes, floors, and pressure sprays depending on the instructions. Choosing the right washing methods reduce the burden on manual cleaning.

WATER CONDITIONS

The type of water used will ultimately depend on the method of cleaning and sanitation.

4.2.3 Rinse and dry

- This process removes cleaning chemicals from the floor
- This process prepares the surface for antimicrobial application. All disinfectants must be removed for the chemical to be effective.
- Rinse with cold water at low pressure
- Prior to antimicrobial application, areas should be completely dry. If possible, it may be useful to dry the windshields overnight

Cleaning steps can be determined by the following

- Visual test
- Overview
- Microbiological examination

► 5. Disinfection

5.1 The importance of the antimicrobial process

This process kills pathogens. But bacterial spores do not die. The use of antibiotics means that there is no longer any way for a person to become infected with contaminated substances. This process is usually done using heat or chemicals.

5.2 Disinfectant

Three main stages in cleaning:

1. Quaternary ammonium
2. Hypochlorite
3. Accelerated hydrogen peroxide
4. Phenolics
5. Peracetic acid

5.3 Chemical Antimicrobials

Various antimicrobials kill a variety of pathogens. Many antimicrobial chemicals are available for this purpose.

- Bactericidal = to kill bacteria
- Fungicidal = to kill fungi
- Virucidal = to destroying viruses
- Sporocidal = able to kill spores

5.4 Use of antimicrobial chemicals

Depending on the use of antimicrobial chemicals, apply antiseptic dipping, scrubbing (for example, flooring) or massaging (eg, hand sanitizer).

- Antibacterial sprays are not reliable in terms of effectiveness, they have a negative impact on employees. It is also more expensive than compact cleaning methods because its antimicrobial resistance is limited (hence it needs to be used frequently).
- Therefore, it should be used in cases where no other method (sweeping or mopping/scrubbing) can be used.
- Depending on the product, the antimicrobial chemical is either 'ready to use' or must be mixed with water before use.

When preparing an antimicrobial chemical, you should consider the following:

- The manufacturer's instructions must be checked to verify the correct use.
- They should be measured properly. If a very small amount is used, the antimicrobial will not work properly. Antimicrobial action would not be better if it was used too much, so it would be of no use and could easily damage the environment, be expensive, damage materials, and be harmful to workers.
- Antibiotics should only be used for the intended purpose. That sounds reasonable, but in practice this rule is not always followed. No other disinfectants should be added (for example, all-purpose cleaners) as this antimicrobial chemical may be ineffective.

- Employees should always wear protective gloves when handling antimicrobial chemicals - except for hand sanitizers.
 1. Daily antimicrobial process
 2. Selective disinfection

5.5 Daily antimicrobial process

Workplaces become increasingly dirty and highly polluted over time. To reduce general antimicrobial activity, general antimicrobial cleaning of all work and storage floors should be done once a day, especially at the end of the working day. Use a disposable cloth soaked in local antimicrobial chemicals for cleaning. Drawers should be emptied and cleaned at least once every three months.

5.6 Selective disinfection

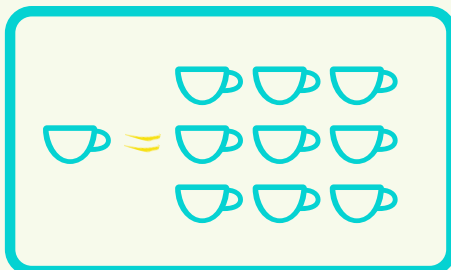
Some antimicrobial process requires immediate action. Alcohol is known for its quick cleansing action, so alcohol-based antiseptic chemicals are used for this purpose.

5.7 Preparation of antimicrobial compounds

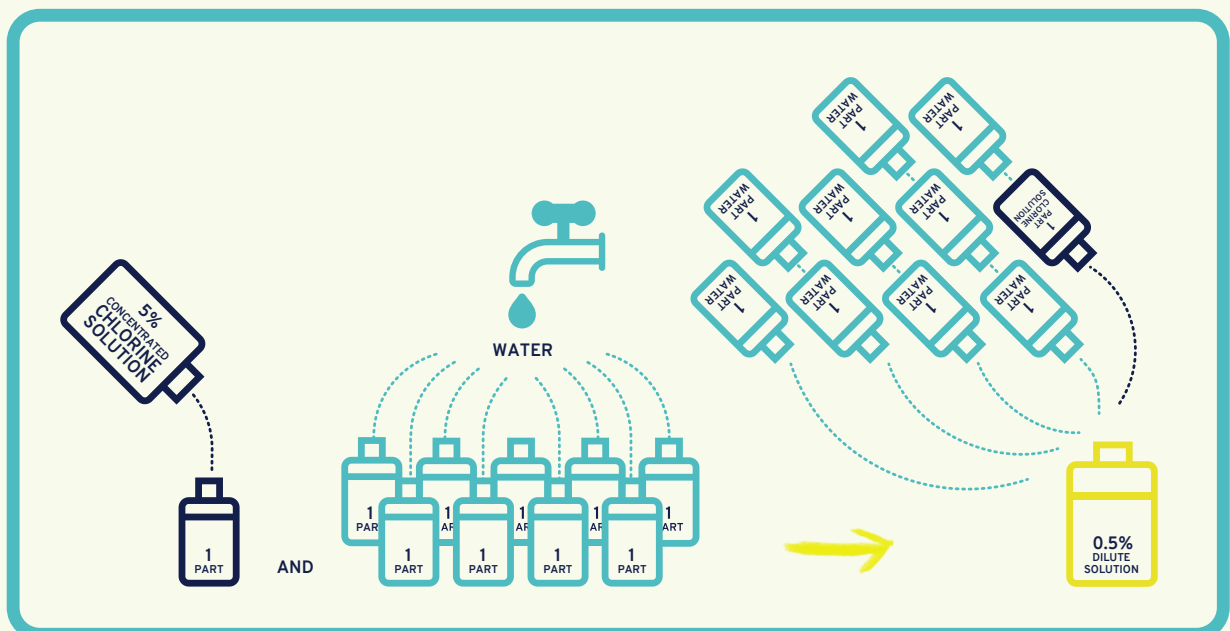
To make 0.5% chlorine solution from a chlorine powder of 35% strength, mix 14.2 grams of powder into 1 liter of water.

For example:

- To prepare 0.5% bleach using a 5% bleach compound



- One part of bleach to 9 parts of water (use the same container to measure the bleach and water)



5.8 Precautions to be taken during mixing Bleach or any chemicals

- Use masks, goggles, rubber gloves, waterproof gowns
- Mix in a well-ventilated area
- Do not use or mix with other cleaners
- Use cold or room temperature water for mixing

▶ 6. Potential safety issues during cleaning and disinfection

Chemical hazards:

- Can affect skin, eyes, respiratory tract

Physical hazards:

- Includes slides, trips, falls and injuries due to heat or high-pressure spray

► 7. Personal Protective Equipment (PPE)

Personal protective equipment is clothing or materials that are worn to reduce the risk of various hazards.

7.1 Types of personal protective equipment

1. Mask
2. Face protection
3. Gloves
4. Eyeglasses
5. Gown
6. Helmet
7. Shoes or boots

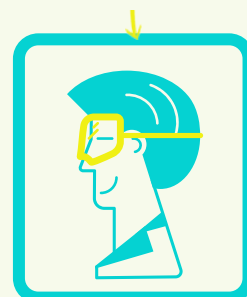
7.1.1 Face Protection

This personal protective device is intended to protect the wearer's entire (or limited) face from various harmful substances such as debris and road debris, chemical sprays (in the laboratory or industry), or contagious materials (in medical and laboratory environments) and so on.



7.1.2 Eyeglasses

These protective goggles are a type of goggles that often cover the area around the eyes to prevent dust, water, or chemicals from entering the eyes. They are used in chemistry laboratories and woodworking. They are often used in ice sports as well as in swimming.



7.1.3 Mask

It should be enough to cover the nose, lower face, jaw and facial hair

Masks should be :

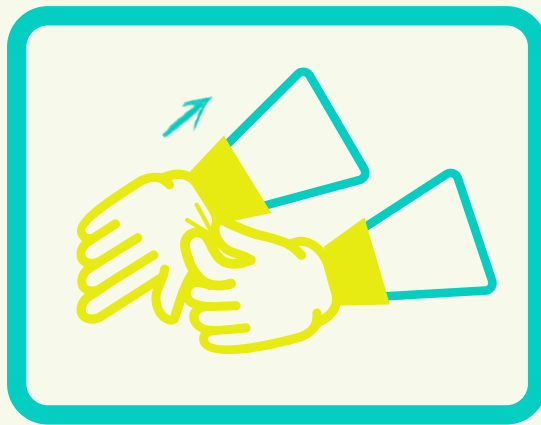
- Suitable for the purpose for which they were made
- Properly worn
- Fit for face shape and size
- Not touched as much as possible
- Changed if wet
- Removed immediately after use.



7.1.4 Gloves

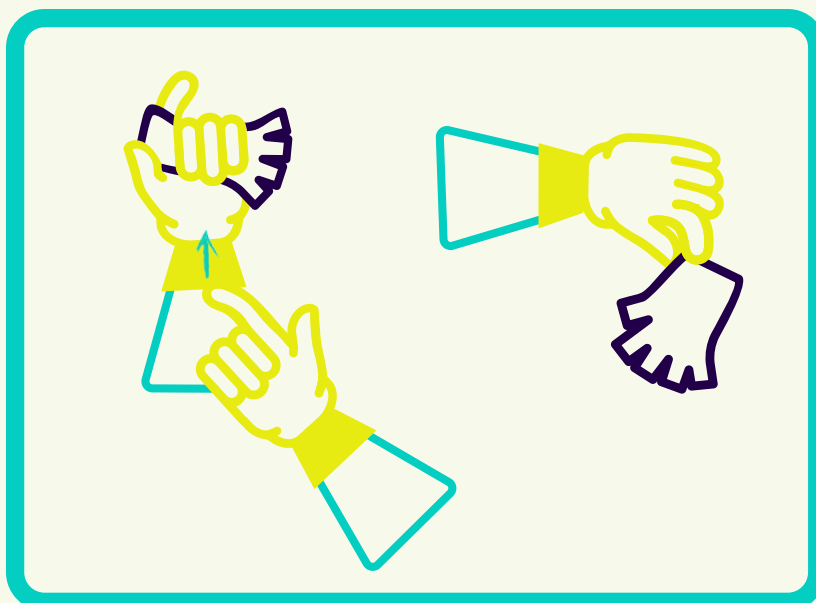
Fluid-resistant personal protective equipment (eg, plastic or rubber band) can protect workers from exposure to chemicals, blood or other body fluids and bacteria. Gloves help to reduce the risk of infection. When using gloves

- Keep nails short
- Choose the right type and size
- Stretching the glove up to your wrist helps reduce risk.
- Remove the glove properly after using it




Glove removal methods

- Hold the outer edge near the wrist
- Take off your glove gloves by turning them over and hold it in your hand that is still gloved
- Next, remove the second glove and wahs your hands.
- Dispose the glove safely.



► Types of gloves

Type	Function/use	
Lightweight rubber, vinyl or nitrile gloves	To protect against biological hazards (blood, body fluids, etc.)	
Disposable gloves	Latex gloves: Protects against the dangers of chemical spraying	
	Economical, similar to latex	
Lightweight chemical resistant gloves	Natural rubber (chemical resistant); protects from inflammable liquids	
Lightweight to heavy chemical resistant gloves (disposable)	For chemicals acting on air pressure or water	
Butyl	Highly resistant to most chemicals	
Heat-resistant gloves	For handling hot liquids and equipment, open flames	
	Protects from extremely cold temperature protection	
Wire protection gloves	Used when working with animals; reduces exposure to cuts	

7.1.5 Protective Gown

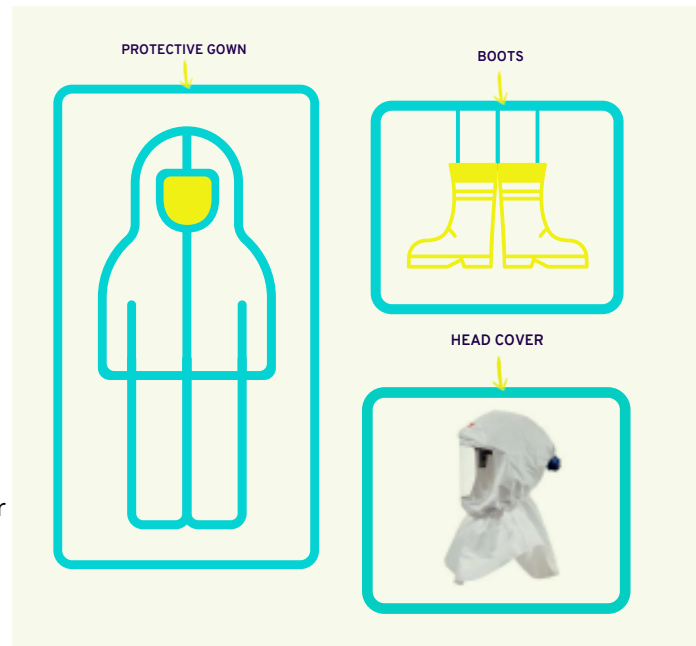
- Protects skin and / or clothing
- Can be reusable or disposable
- Prevents fluid from seeping into it

7.1.6 Boots

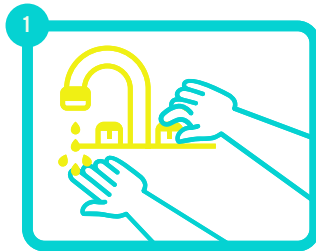
- Helps protect feet from accidental sharp edges or heavy objects.

7.1.7 Head cover

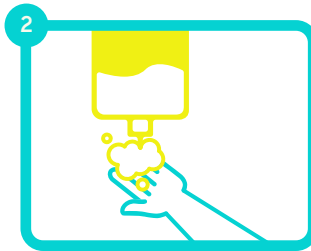
- When spraying or exposed to an environment where airborne diseases might be present, wear a head covering to protect your hair and scalp from contamination.



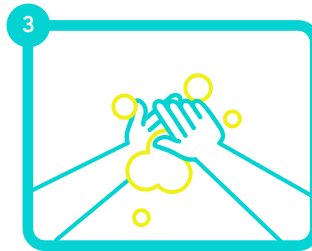
► 8. Hand hygiene methods



Wet hands with water



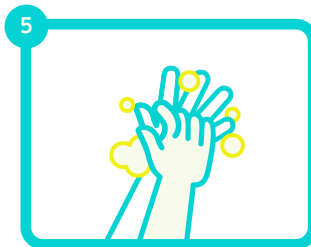
Apply enough soap to cover all hand surfaces



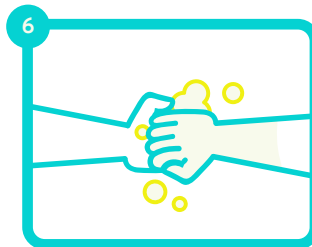
Rub hands palm to palm



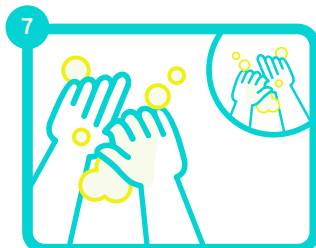
Right palm over left clostrum with interlaced fingers and vice versa



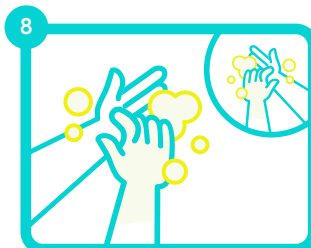
Palm to palm with fingers interlaced



Backs of fingers to opposing palms with fingers interlocked



Rotational rubbing of left thumb clasped in right palm and vice versa



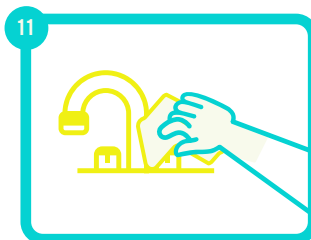
Rotational rubbing backwards and forwards with clasped fingers of right hand in left palm and vice versa



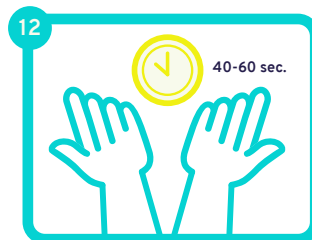
Rinse hands with water



Dry thoroughly with a single use towel



Use towel to turn off faucet



And your hands are safe



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IN ETHIOPIA

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