	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 1 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
		Revision: 01	10/12/2022
	Document	Date:	
	Revision: 00	02/04/2018	

PPE is required when engineering controls are not possible or inadequate and is considered a last line of defense. The PPE should be selected according to the hazards that are or may be present. PPE should be capable of safeguarding the worker, with reasonable comfort and it should permit essential movement of limbs required for job performance.

## Understanding of PPE

### Examples of Hazards

All the below hazards originate from various forms of energy (e.g. thermal, mechanical, chemical, electrical).

Exposure to these hazards can be controlled through the proper use of PPE.

- Hot materials
- Corrosive substances
- Sharp-edged materials
- Falling objects
- Falling from heights
- Moving machines or parts
- Splashes or releases of chemicals
- Electrocutation

Health hazards include:

- ✓ Physical hazards - noise, heat, vibration, radiation, etc.
- ✓ Chemical hazards - dust, vapours, fumes, smoke, etc.
- ✓ Biological hazards - germs, bacteria, bio-infective substances, etc.

Exposure to these hazards can be controlled through the proper use of PPE.

### What PPE does?

PPE provides:


- ✓ A barrier between the hazard and worker
- ✓ Protection against specific hazards
- ✓ A sense of protection and confidence to perform the task safely and effectively

The degree of protection achieved depends on the suitability and capability of the PPE and its proper use.

### Ground Rules for PPE

- PPE is the third line of defence for employee protection after Engineering and Administrative Controls.
- PPE does not eliminate the hazard.
- PPE should be used only if the hazard cannot be removed.
- PPE only helps to eliminate injuries/occupational diseases.
- PPE relevant to the hazard(s) should be selected and used.

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 2 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
Revision: 01		10/12/2022	
	Document	Date:	
	Revision: 00	02/04/2018	

- PPE should conform to the applicable National Standards or Codes of Practice.
- Safeguard workers from identified hazards
- Provide reasonable comfort
- Permit essential movement of limbs required for efficient job performance
- Be easy to clean and maintain

### Regulatory requirements

The Factories Act and State Factory Rules state:

The employers must:

- Provide Personal Protective Equipment
- Provide eye protection against foreign bodies, chemicals or exposure to excessive light
- Provide protection against dangerous fumes, gases, particles
- Ensure that workers use tight fitting and suitable clothing
- Provide portable electric lighting (24 volts)
- Provide training to workers for working safely, including the use of Personal Protective Equipment

**The workers must:** Use any appliance, including PPE, which is provided for securing health and safety

Elements of personal protection program to comply with the regulations are:

- ◆ Hazard identification and evaluation - ensures the selection of suitable personal protection
- ◆ The proper fitting of PPE without hampering work performance and comfort
- ◆ The training and education of workers in the proper use of PPE
- ◆ The upkeep, maintenance and repair of PPE

## HEAD PROTECTION


An injury to the head can pose a serious threat to the brain. It is of utmost importance to protect the head against all injuries and accidents.

Workplace Hazards to the head include:

- ◆ Objects falling from height
- ◆ Striking head with wall or projections
- ◆ A blow to the head
- ◆ Banging against hard solid substances
- ◆ Collapsing cave roofs/walls
- ◆ Sudden cascade of loose masonry wall

Safety Headgear

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 3of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
Revision: 01		10/12/2022	
	Document	Date:	
	Revision: 00	02/04/2018	

No piece of headgear can protect against all hazards. Different protective headgear suit specific jobs with their particular hazards.

#### How Safety Helmets Protect

<u>Hard shell</u>	Protects against impact
<u>Deflects objects</u>	Distributes the force of impact over the whole head. Diffuses the gravity of the blow
<u>Peak</u>	A permanent extension of shell over the eyes. Protects the face and the eyes from injury
<u>Chinstraps</u>	Hold the helmet securely in place
<u>Ventilation Holes in the shell</u>	Allow circulation of air inside hard hat.
<u>Cushioning inside a crash helmet</u>	Reduces impact considerably during road accidents

#### Other Protective Headgear

Sundry accessories may be used with the helmet.

Face shield mounts	which hold the face shield in place where there is a danger from flying objects or liquid splashes or heat radiation
Ear defenders	are useful in noisy environments. Some safety helmets have built-in brackets for attaching ear muffs.
A fixture for lamps on the helmet	can be of great help to a miner or a person working in a confined space.


#### Use and care

- ◆ The helmet should be the right size.
- ◆ Use the chinstrap, especially in windy conditions.
- ◆ Adjust the chinstrap correctly. The straps should be snug, but not too tightly in place.
- ◆ Wear the helmet straight on your head, not tilted.
- ◆ Check regularly for cracks/dents/signs of wear in the shell and loose or broken straps.
- ◆ Never wear an ordinary cap or hat under your helmet.
- ◆ Do not keep cigarette packs, cards, letters, etc. in the clearance of the hat.
- ◆ Replace damaged or worn out helmets.

#### Care for Headgear

- ◆ Take good care of the helmet.
- ◆ Do not fling it around carelessly or drop it.
- ◆ Protect it from exposure to extremes of heat and cold and sunlight.
- ◆ Protect it from exposure to chemicals.
- ◆ Remove dirt and moisture after use.
- ◆ Clean it at least once a month using a recommended cleanser.

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 4 of 22	
		Format Revision: 01	Date: 10/12/2022
	<b>Guidelines for selection and use of Personnel Protective Equipments (PPE)</b>		Document Revision: 00

- ◆ Do not sit on it.
- ◆ Do not keep a load on it.
- ◆ Store it in a rack or locker.


## EYE PROTECTION

To protect against basically three types of hazards

Mechanical Hazards	Chemical Hazards	Thermal & Radiation Hazards
Flying particles of: Dust, Chips, Sparks, Molten metal splashes  <u>may be caused by:</u> Machining, Grinding, Chipping, Cutting, Handling molten metals	Chemical dust, Fumes Liquid chemical splashes  <u>may be caused when:</u> Handling and transporting chemicals, Rinsing with chemicals, Working in laboratories, Inspecting processes and pipe lines, Opening a container/pouring chemicals, Vessels or pipe lines burst	Heat, Glare, Ultraviolet rays Infra-red rays  <u>may be caused when:</u> Observing/monitoring certain processes, Carrying out arc-welding, Suffering accidental exposure

Types of eye protectors	Protection characteristics	Protect against
Spectacle-type Goggles	Plain, shatter- proof, toughened glass or plastic lenses. With or without side shields. Metal or heat resistant frames	flying objects - dust, metal, chips, etc.  Machining, grinding
Panorama Goggles	Light weight. Non-fogging cellulose clear visor. Ventilation holes on either side. Soft pliable plastic frame wide enough to wear over prescription glasses	Oil and paint splashes, dust and chip exposure
Leather Mask Goggles	Sweat lining along edges. Ventilation holes with baffles for light and dust. Shatter-proof lenses	smoke, dust and foreign objects
Chemical Goggles	acid/alkali resistant rubber frames, clear lenses and shielded ventilation ports	chemicals and toxic dust
Gas-Tight Goggles	Air-tight fitting without ventilating ports	irritating fumes and vapours/gases

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 5 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
Revision: 01		10/12/2022	
	Document	Date:	
	Revision: 00	02/04/2018	

Welding Goggles	Similar to panorama goggles. Filter glass of suitable grade. Indirect ventilation ports.	welding sparks
Welding Shields	Fiber or fiberglass shield. Hand-held or suspended from a helmet, with a window for filter glass	sparks and light radiation from arc-welding/cutting flames

### Use and care

- The Material Safety Data Sheets (MSDS's) will outline what type of Personal Protective Equipment must be worn for various chemical hazards.
- Make use of the machine guards or static shields in addition to eye protection.
- When wearing glasses or goggles, tilt your head forward before removing. This will help keep dust or particles that have collected on the top from falling into your eyes.

### Points To Remember

- Use safety eyewear recommended for the particular job.
- Maintain eye protector - clean it daily.
- Replace it if the lenses are scratched, cracked, chipped, pitted or faded.
- Keep your safety eyewear in a clean container, preferably with your name on it.
- Safety eyewear must fit right.
- Eyewear should fit snugly close to the eyes without touching the eyelashes and without hampering body movement.
- Safety eyewear is meant for constant use in the work place, it guards you against hazards.
- Cleaning and Disinfecting
- Clean with soap and warm water to remove oil and grease.
- Keep them in hot water for 5 minutes or expose to steam for 5 minutes.
- Solvents (petrol, thinners, etc.) should not be used for cleaning glasses.
- Avoid very high temperature water.
- Follow the manufacturer's instruction at all times.
- When clean, place the cleaned goggles in a suitable container.


### Emergency Measures

#### Chemical Splashes :

- Flush the eyes using an eye shower.
- If an eye shower is not available:
- Flush with low-pressure water for 5 -15 minutes.
- Pour water on the bridge of the nose so water runs down into eyes.
- Never pour liquid directly onto eyeballs.
- Get medical help immediately.

Cuts, Abrasions, Punctures : Bandage the eye lightly - if possible with a sterile bandage.

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 6 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
Revision: 01		10/12/2022	
	Document	Date:	
	Revision: 00	02/04/2018	

Do not flush the eye - call a doctor immediately. Do not take out a foreign object yourself, go to a doctor.

Blows: Get medical help immediately, even if there is no pain, reddening or swelling.

#### General

- Keep the first aid station properly equipped at a convenient location near the work area.
- Keep a generous supply of defogging materials, cleaning tissues, etc.
- Have emergency eye wash stations.

## EAR PROTECTION

### Hearing Process

Sound enters the ear, passes through the ear canal to the eardrum. These vibrations are carried by Ossicles (the tiniest bones) to blood contained in the Cochlea (a tiny snail-shaped structure containing microscopic nerves). The neural impulses created by nerve endings are transmitted to the brain, which interprets them as sound.

Sound is measured by its frequency and intensity.

Frequency - Measured in "Hertz" (Hz). Human ears can hear sound ranging from 20 to 20,000 Hz

Intensity - Sound pressure level. The loudness of sound. Measured in decibels (dB)

### **Hazards**

Hearing loss as a result of repeated exposure to excessive noise is much more subtle. It occurs more often and can go undetected for long periods of time. Damage to the hair cells or auditory nerve of the ear will result in noise-induced hearing loss.

### **Effects**


Exposure to noise higher than the threshold value over an extended period affects people in two ways:

1. Auditory effects - temporary or permanent hearing loss
2. Non-auditory effects - irritation, sleeplessness, high blood pressure, etc.

### Aim of Ear Protection

Reduce the noise exposure to the permissible level (90 dB for 8 hours exposure) by engineering or administrative controls.

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 7 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
Revision: 01		10/12/2022	
	Document	Date:	
	Revision: 00	02/04/2018	

If above is not possible: Workers exposed to high noise levels should be provided with suitable hearing protection.

### Regulatory Requirements

Noise levels can become dangerous depending on three elements:

1. Loudness of the noise
2. Duration or length of exposure
3. Distance from the source

These three elements can combine together to create a hazardous environment. The objective of ear protectors is to limit the amount of sound reaching your eardrum.

The different types are:


Ear plugs	Most commonly used, Comfortable and inexpensive. Easily inserted inside the ears Expand and fit snugly in to ear canals	give a reduction of 3 to 6 dB.
Ear muffs	Fit over the whole ear to seal out noise. Cups - made of moulded plastic and filled with foam. Cushions - covered with plastic and filled with foam or air to ensure comfort  Spring loaded headband holds the cups in place	15 to 30 dB.
Ear Seals	Made of silicone, rubber or plastic. Universal types - come in standard sizes . Multi-size types - come in several sizes	Give a reduction of up to 10 dB.

### **Use and care**

#### How To Properly Wear Hearing Protection

Ear plugs	Ear Muffs
<ul style="list-style-type: none"> <li>• should fit snugly in your ear canal</li> <li>• With clean hands, roll the ear plug into a small elongated shape.</li> <li>• Pull your ear back and upwards</li> <li>• Insert the plug into your ear canal.</li> <li>• Hold it there for a few seconds to ensure a good fit.</li> <li>• Make sure to check the fit every few hours</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that there is a good seal around the outside of the ear.</li> <li>• Remove eyeglasses, earrings or any hair that may interfere with this seal.</li> <li>• In extremely noisy work environments, you may need to wear a combination of earplugs and earmuffs.</li> <li>• This allows the greatest reduction in sound level, as well as blocking out harmful dirt, sparks, and welding spatter</li> </ul>

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 8of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
Revision: 01		10/12/2022	
	Document	Date:	
	Revision: 00	02/04/2018	

	from entering the ears.
<ul style="list-style-type: none"> <li>• Insert them with clean hands.</li> <li>• Be free of any contamination.</li> <li>• Clean and sanitise reusable earplugs after each use.</li> <li>• Throw away any disposable earplugs immediately.</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect them both prior to and after use.</li> <li>• Replace damaged ones.</li> <li>• Clean and sanitise your earmuffs after use with a cleaner appropriate for ear muff material.</li> </ul>

### Choosing Hearing Protection

1. You must wear the appropriate protection for the job.
2. The equipment may block out voices and alarms - ensure you can get messages across to other co-workers by:
  3. Installing flashing lights with alarms
  4. Developing hand signals

## RESPIRATORY EQUIPMENTS

Respiration : The act of inhaling fresh air into the lungs and exhaling stale air from them.

The respiratory system consists of several vital organs of the body such as nose, upper throat, larynx, trachea, bronchi, lungs. If it fails, life itself is extinguished. The system is an intricate one with built-in safeguards against normal hazards.

Respiratory equipment is required when:

- Air contaminants are at a level which may be harmful to the worker.
- There is a chance that workers will be exposed to a toxic or harmful substance.

### Hazards

There are two main types of respiratory hazards:

1. Harmful substances/contaminants - including: smoke, fumes, sprays, mists, gases, vapours, dusts

These are likely to be generated from processes, from chemical reactors, while handling chemicals and in the event of leakages and spills.


2. Oxygen deficiency: In confined spaces, air may be diluted or displaced by choking, poisonous gases or vapours.

There are three basic types of respiratory protective equipment.

1. Air Purifying Respirator

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022



	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 9 of 22	
		Format Revision: 01	Date: 10/12/2022
	<b>Guidelines for selection and use of Personnel Protective Equipments (PPE)</b>		Document Revision: 00

- Cleans the contaminated air before it is breathed in.
- Filters out dangerous dust particles, mists, sprays, fumes, etc.
- Disposable models are available for coarse dust particles.
- In some models, dust-clogged filters can be replaced by clean ones.
- In other models, dust-clogged filters can be cleaned and reused.
- Does not provide protection against oxygen deficiency and toxic gases and vapours.

## 2. Vapour and gas respirator

- Absorbs or removes gases and vapours
- One or two cartridges may be used, usually attached to the face piece

3. Canister respirators are generally used in emergencies, comprising of a large canister held against the body with a breathing tube attached to the face piece

### Limitations

The filters do not completely eliminate the hazard.

The filters and cartridges have limited life spans.

### Caution

- Should breathing become difficult or should you begin to smell or taste any substance, replace the filter or cartridge immediately.
- Never use them in oxygen-deficient atmospheres
- Never use them in areas where there is immediate danger to your life or health.
- Never use them with hazards with poor warning properties.

## 2. Fresh Air Breathing Apparatus

- Fresh air is supplied from an outside source.
- In some models, compressed air passes through regulator mechanism.
- In others it flows continuously, preventing foul, contaminated air from leaking in.

### Limitations

This type may not give total protection in a highly toxic atmosphere. The inconvenient length of the hose may restrict movement, and contaminated air may leak into the face piece.


In the air hose mask, the air hose should be of large diameter and should not be more than 15 metres in length. A pressure hose mask may be operated by a motor-operated blower and can have a length of up to 100 metres.

### Caution

In all cases, it is of paramount importance that the air drawn into the breathing apparatus is clean, breathable and free from contamination such as toxic gases, vapours, objectionable odours/oils/mists/dusts, etc.

Supplied Air Breathing Apparatus (SABA) consists of a face piece connected to a hose that is supplied with a large source of air located away from the hazard. This system is normally

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 10 of 22	
		Format Revision: 01	Date: 10/12/2022
	<b>Guidelines for selection and use of Personnel Protective Equipments (PPE)</b>	Document Revision: 00	Date: 02/04/2018

equipped with a 5-minute escape pack between the hose and the face piece in case of an emergency. These can be used for longer duration jobs, from 30 to 45 minutes.

### 3. Self Contained Breathing Apparatus (SCBA)

- Air is supplied from a source carried by the user.
- Some of these are closed circuit devices that purify air by removing Carbon Dioxide and restoring Oxygen.
- Open circuit devices supply clean, compressed air from a backpack cylinder.
- Air may flow continuously or only when the wearer breathes.

## Use and care

### Selection Criteria

You must know:

- The nature of the work and duration
- The concentration of the hazards
- Distance from the work site to the safe area
- Canister information and filter label
- Use only IS-marked approved equipment.

### Use

- Use your respiratory protection whenever you might be exposed to a hazard
- Consider the limitation of engineering controls in some situations like spills/leakages
- Before using, inspect each part carefully.
- Face piece must be clean and without cracks or holes.
- Hose must be clean and unbroken with clamps tightened and in place.
- Head strap must be sufficiently elastic to hold the respirator snugly in place
- Valves must be clean and clear.


### Fit

- Ensure correct fit.
- Fit testing must be done.
- Select your size.
- Beards, side burns, facial scars, etc. may hamper fit.
- Thorough checking for gaps must be done.
- Should be snug enough to prevent leaks.
- Use specially designed respirators for spectacles and eye protection.
- Contact lenses should not be worn with respirators.
- Never use damaged respirators.

### Limitations, Care and Maintenance

1. Replace valves, hoses, etc. with approved parts.
2. Parts of different models should not be mixed.

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 11 of 22	
		Format Revision: 01	Date: 10/12/2022
	<b>Guidelines for selection and use of          Personnel Protective Equipments (PPE)</b>		Document Revision: 00

3. Never use solvents on rubber or plastic parts.
4. If necessary, soak in disinfectant and rinse according to instructions.
5. Store away from chemicals, sunlight, temperature variations, dust.
6. Store in such a way that masks, hoses and straps are not creased, bent or stretched.
7. Identify your respirator.
8. All masks have a limited lifespan
9. Ensure that you clean the masks after use
10. Inspect them before each use
11. Replace any defective or worn parts
12. This is the equipment that can protect your lungs and your bloodstream from contaminants.

### Emergency measures

- Get out of a hazardous area if you feel sick, dizzy or find it difficult to breath.
- Help anybody in trouble to a safe area
- Use your respiratory protection before you go to help.
- Remove worker from danger area and give artificial respiration if necessary.
- Administer first-aid if you know how

## HAND PROTECTION

Hand injuries are extremely difficulty to treat and to fix - therefore, protect yourself!

### Hazards


Three Basic Hazards

1. Mechanical Hazards: Sharp-edged cutting objects - guillotine cutters, shears, axes, rotary saws, belt pulleys
2. Environmental Hazards: Exposure to hot surfaces, molten metals, liquids
3. Chemical and Biological Hazards: Contact with irritating substances, solvents, biological agents like bacteria and fungi. Dermatitis can be caused both by chemical and biological agents.

Remember - even though you may be experienced, you always have to be cautious. You do not want to hurt your hands due to unnecessary inattention!

There are other dangers in the workplace, which may not require the use of PPE, but can still pose a threat to your hands. These include Pinch-points, Rotating machine surfaces,

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 12 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
		Revision: 01	10/12/2022
		Document	Date:
		Revision: 00	02/04/2018

Automated machinery with relays, remote controllers, delay timers, or robotics, Jewellery and loose clothing

Inspect the machine closely before use and identify whether the machine, or your attire, present any potential hazard.

### Prevention of injuries

- Keep your hands out of moving parts and sharp objects.
- Use tools properly.
- Using aids like push sticks to feed material into equipment.
- Use brushes to clear away debris.
- Take off watches, bangles, rings, bracelets.
- Do not wear loose flowing clothing.
- Before starting the job, identify hazards and use appropriate hand protection.
- Take special care in handling chemicals, molten metals.

### Type of hand protection

1. There are two special types of gloves
  - a. Electrical gloves - class ratings on the cuff
  - b. Chemical gloves
2. Make sure that the class of the glove matches the requirements of the job.
3. If the exact glove is not available, use one that is one class higher, but never lower.
4. Hand pads protect from splinters and abrasive materials.
5. Forearm cuffs of cloth, aluminised fabric protects the forearm from heat
6. Fabric or metal thumb guards and tapes offer protection against pinched fingers.
7. A variety of fabrics guards the hands against sharp/rough material and also in cold/hot conditions.
8. Various barrier creams offer protection from irritants like acid, alkalis, oil and solvents.

### Selection of hand protection


Use hand protection when you:

- Handle chemicals - Skin irritants such as cleaning fluids, acids and solvents are dangerous to your hands and could be absorbed into your body
- Perform heavy lifting
- Move a lot of abrasive materials - wooden crates or corrosive materials
- Work near electrical equipment or high voltage electricity

While selecting hand protection keep four things in mind.

1. Type of job: Hand protection should not interfere with job performance.

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 13 of 22	
		Format Revision: 01	Date: 10/12/2022
	<b>Guidelines for selection and use of          Personnel Protective Equipments (PPE)</b>	Document Revision: 00	Date: 02/04/2018

2. Specific hazard: No single glove can be effective for all hazards. Match the glove with the specific hazard
3. Proper fit: Gloves must fit comfortably. Too loose will hamper dexterity and increase the chance of accidents. Too tight will constrict muscles, veins and nerves.
4. Proper design: The design of the gloves should fit the job requirement. Inner seams and linings should be comfortable and non-irritating.

#### Use and care

- Wear gloves that fit.
- Wear sleeves over gauntlets for extra protection.
- Use additional protection like barrier creams, if necessary.
- Have a spare pair of gloves available so your hands are protected at all times.
- Inspect and test gloves and other equipment for leaks, etc.
- Repair or replace damaged gloves.
- Wash and clean your gloves and store them as per the recommendation of manufacturer.
- Do not put them in the family laundry.
- While operating electrical equipment, do not use wet gloves.
- Keep gloves away from harmful substances.

#### Limitations, Care and Maintenance

- Ensure that your gloves are compatible with the hazards, Example: Working with chemicals, Never wear canvas or cotton gloves. Use rubber gloves.
- You can tape the top of the glove to your protective suit.

#### When NOT to wear gloves

Anytime that you are near anything that could catch onto a piece of fabric and then draw your hand into the machine, gloves will be more of a hazard than a protective agent.

Regular inspection is important.

Before wearing any gloves, inspect them for defects - cuts, tears, surface blemishes, or punctures.

If you discover any defects, the gloves must be replaced.


If you doubt the ability of the gloves to protect you, always replace them.

When storing rubber and other specialty gloves make sure that the equipment is protected from light, temperature extremes, excessive humidity, ozone and other damaging substances and conditions.

#### Emergency measures

Cuts                                      Put direct pressure on wound.

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 14 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
Revision: 01		10/12/2022	
	Document	Date:	
	Revision: 00	02/04/2018	

Minor Heat Burns	Keep injured hand elevated. Seek medical care Soak in cold water immediately. Continue soaking until pain subsides.
Sprains/Blows	Get medical help to determine extent of injury
Blisters	Leave blistered skin unbroken. Avoid further irritation and pressure. Apply sterile dressing and get medical help.
Chemical Burns	Flush injured area thoroughly in cool running water for at least 10 minutes. See a doctor immediately
Amputation	Put amputated limb in a bag of ice and rush victim with it to nearest emergency unit of hospital.

## FOOT PROTECTION

Causes of foot injuries - examples

- Step on sharp objects
- Slip and fall on wet or slick surfaces
- Become careless with objects such as nail guns or substances like molten metals and hot cement powders

Your feet should be protected from:

- Extreme temperatures
- Corrosives substances

Protective footwear can prevent lifelong disabling injuries - protect yourself!

### Hazards


- Mechanical: pressure, abrasion, An area where heavy objects are being lifted, Sharp objects that may pose tripping or cutting hazards, Forklifts or other heavy, dangerous equipment
- Chemical: Extreme temperature, chemicals
- Electrical: Loose wires
- Sanitation: exposed sewage
- Slipping: wet floors

### Type

- Safety Shoes should have:
- Carbon Steel Toe Caps - 1.4 to 1.0 mm. Thickness.
- Ankles To A Height - 12 cms.
- Soles Of Shore Hardness - 55 A
- Toe Caps able to withstand an impact of: 14 Kgs.
- Should not distort or depress so as to reduce the clearance inside the shoe to less than 13.5 mms.

### Safety Shoes - Types

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 15 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format Revision: 01	Date: 10/12/2022
		Document Revision: 00	Date: 02/04/2018

- Conductive shoes
- Electrical safety shoes
- Foundry shoes
- Shoes for working on hot surfaces
- Rubber boots

#### Care of foot protection

- Keep boots dry.
- Shoes used in explosive/flammable environments should not be used outdoors - dirt impairs conductance.
- Electrical resistance of shoes should be tested periodically.
- Wash feet and change socks daily - perspiration harms the leather and causes the lining to wear out.
- Repair or replace worn-out or defective shoes.
- Follow manufacturer's recommendations.
- Inspect regularly for dampness or damage by embedded metal pieces.

## BODY PROTECTION

The Skin: The body's first line of defence has two layers:

1. Epidermis - outer layer
2. Dermis - inner layer, contains sweat glands, nerve endings, oil, etc.

For your own body's well-being, protect your skin against all hazards, both at home and at work.

#### Hazards & Examples

Physical hazards	Pressure, Abrasion, Moisture, Heat, Cold, X-rays, Other rays
Chemical hazards	Inorganic acids, Salts, Hydrocarbons, Dyes, Solvents
Biological Hazards	Bacteria, Viruses, Fungi, Parasites, Insects, Mites, Plants
Plant products	Wood dust, Flowers, Resins, Some roots

#### Preventive Measures


Some practical measures may be followed to protect skin:

- Wash frequently using proper cleansers.
- Change clothes often.
- Remove irritants.
- Take showers.
- Separate soiled clothing.
- Treat abrasions promptly.
- Identify hazards and use adequate and suitable protection.

#### Types of Protection

- Aprons - provide limited protection
- Full-body rubber suits - provide protection from chemicals

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 16 of 22	
		Format Revision: 01	Date: 10/12/2022
	<b>Guidelines for selection and use of Personnel Protective Equipments (PPE)</b>		Document Revision: 00

- Full-body aluminium suits - provide fire/heat protection
- Gloves, arm covers, leg wear, face shields or combinations of these should be used after assessing the hazards
- Protective creams or barrier creams - can be a supplement to protective clothing
- Leather aprons - provide protection from hot materials
- Kevlar aprons - provide protection from heat radiations
- Asbestos aprons should not be used because Asbestos is a hazardous substance
- PVC aprons (acid/alkali-proof rubber apron with or without face shields) - provide protection from chemical splashes
- Lead aprons - provide protection from ionizing radiations (x-rays, gamma rays)
- Impervious clothing - provides protection from dust, vapours and droplets of hazardous substances
- Acid/alkali-proof rubber or plastic body suit - provides protection from corrosive chemicals
- Special clothing - made of special plastic with lead lining to protect from low- level nuclear radiation
- Electromagnetic radiation suits - provide protection from harmful biological effects of electromagnetic radiation found in high-level radar fields

### Use and care of Body Protection

- Identify and acquaint yourself thoroughly with the hazards.
- Wear suitable aprons and overalls.
- Immediately change apron or body suits that have become soiled.
- Do not use damaged or defective protective gear.
- Be careful of loose strings, belts, ties, etc.
- Use equipment appropriate for the hazard.
- Store aprons and body suits in designated places.
- A shower and first-aid station should be conveniently located.

## FALL PROTECTION

Workers MUST be protected if they can fall:


- 3 metres (10 feet)
- Into operating equipment
- Into water or another liquid
- Onto any hazardous substance
- Through opening in work surface

Each situation presents a hazard to the worker's well-being. The workers must be protected when working in any of these situations.

### Eliminating the Hazard

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022



	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02		
		Page: 17 of 22		
	Format	Date:	Revision: 01	10/12/2022
	<b>Guidelines for selection and use of Personnel Protective Equipments (PPE)</b>		Document	Date:
		Revision: 00	02/04/2018	

1st Line of Defence is to Eliminate the Hazard. Eliminating the hazard means not subjecting anyone to the potential of a fall.

"PREVENTION IS THE KEY"

There are many strategies for eliminating the hazard and we will cover some of them in the next section.

There are several ways that you as the worker can eliminate the fall hazard.

- Move equipment to ground level
- Work on the ground
- Install permanent ladder with a fixed support system
- Frequent jobs at an elevated position should have a permanent structure (platform, ladder, etc.) so that the work can be done safely, e.g. sample points, valves, etc.
- Jobs that require a large number of workers to access at a height should be planned to minimize risk.
- Some permanent structures could be installed.
- Bring the equipment to the ground so that it can be repaired.
- Jobs that are infrequent, but require access at a height, should be well planned and utilise an appropriate combination of Passive and Active Fall Protection.

### Passive Fall Protection

Components and systems, such as guardrails, that do not require any action on the user's part.

**Guardrails & Handrails** - An assembly of components that provide a barrier to prevent a worker from falling from the edge of a work surface

When working at elevated heights, a worker must be protected by a guardrail system.


When the use of guardrails is inappropriate or impractical, the worker and employer must choose another type of Fall Protection.

**Scaffolding systems** - A form of guardrail system

Using your cursor, highlight each component of the scaffold:

1. The base-plate provides a firm surface
2. The jack-bolts provide a level system
3. Top and intermediate rails and the toe-board

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02		
		Page: 18 of 22		
	Format	Date:	Revision: 01	10/12/2022
	<b>Guidelines for selection and use of          Personnel Protective Equipments (PPE)</b>		Document Revision: 00	Date: 02/04/2018

4. Ladder is past the point of support and secure, and the feet are flat on the ground
5. The base is completely boarded

**Protective coverings** - Devices put in place to stop a worker from falling through an opening in the work surface

**Barriers** - Devices that restrict a worker's movement through the use of a visual aid. Working on flat surfaces or roofs - Warning Barriers or Caution Tape

Tape to Alert Workers or Cable to Protect the Worker

These warn workers of the open surface and alert them to the fact that they are getting too close to the edge of the work surface.

Must be installed at least 2 metres (6.5 feet) from unprotected edges

When a roof is enclosed by properly installed and maintained warning barriers or caution tape, work may be done within the area without any additional Fall Protection measures.

**Powered elevating work platforms** - For jobs where you cannot use any of the first four systems. The powered elevating work platform or lift must be:


- Equipped with guardrails
- Used on a flat surface
- Kept in good working order
- And, all safety features must be used including the safety-jacks.
- The powered elevating work platform cannot be moved while workers are inside unless each worker is wearing a full body harness tied off to the platform.
- If the elevating work platform is operated from the ground the operator must be a competent person and the safety of the person in the basket must be of paramount importance.

### Ladders

- The ladder must be in good shape and be inspected.
- The feet, rungs and side rails must be in good condition.
- The hooks that hold the extension ladder in place must be in good condition and working properly.
- Proper inspection is a key element in the prevention of ladder falls.
- One should always inspect all equipment, including the ladder, before use.
- Check that:

1. Rungs are in good shape
2. The feet are working properly

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 19 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
		Revision: 01	10/12/2022
		Document	Date:
		Revision: 00	02/04/2018

### 3. There are no broken parts

#### Cause of Ladder Accidents - Placement of Ladder

Improper angle - The proper angle for a ladder is 1 foot (30cm) out at the base for every 3 to 4 feet (91 to 122cm) in vertical height.

Unsecured ladder - Ladders should be secured to an attachment point capable of holding the ladder from falling under a loaded condition.

Electrical work near energized equipment requires ladders made of non-conducting material.

Extra precautions must be taken when working in high winds.

Neglecting to use 3-point contact - having 3 points of contact between yourself and the ladder, whether it is having 2 hands and 1 foot, or 2 feet and 1 hand

Carrying materials up a ladder

Reaching beyond side rails

#### **Nets**

Safety nets can be used as Fall Protection provided:

- Designed, tested, installed according to local standards
- Installed by competent worker
- Design must be documented, inspected and tested
- Keep a copy of the document at project
- The image illustrates the use of a safety net as a means of Fall Protection.

Passive Fall Protection systems also include:

General all purpose nets


Personnel nets

Debris nets

These nets must be designed to provide protection under and around an elevated work area where fall hazard exists (to catch workers falling before they hit the ground).

Two major types of nets are available.

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 20 of 22	
	Format Revision: 01	Date: 10/12/2022	
	<b>Guidelines for selection and use of Personnel Protective Equipments (PPE)</b>	Document Revision: 00	Date: 02/04/2018

Personnel Nets - can be used for a large work crew  
Examples:

Bridge construction  
Repair on long term structural projects

The advantage of the net is that individual worker training is not required. Once installed, nets are always in place and ready for use.


The net must be:

Close to the work level as possible and not lower than 8 metres (26 feet)  
Tested and certified

Debris Nets - designed to catch falling debris (falling concrete, tools, foreign objects, etc.) to protect pedestrians and workers below.  
Popular net size ranges from 1/4 inch (6mm) to 1/2 inch (12mm).

#### INDIAN STANDARD

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 21 of 22	
	<b>Guidelines for selection and use of</b> <b>Personnel Protective Equipments (PPE)</b>	Format	Date:
		Revision: 01	10/12/2022
		Document	Date:
		Revision: 00	02/04/2018

Head protection.

IS 2925:1983 - Industrial safety helmets

IS 2745:1983 - Non-metal helmets for firemen and civil defence personnel

IS 4151:1982 - Protective helmets for scooter and motorcycle riders

Eye Protection

IS 1179:1967 - Equipment for eye and face protection during welding

IS 5983:1980 - Eye protectors

IS 8520:1977 - Guide for selection of safety equipment for eye, face and ear protection

IS 8940:1978 - Code of practice for maintenance and care of industrial safety equipment for eye and face protection

IS 9973:1981 - Visors for scooter helmets

IS 8521 (Part 1): 1977 - Industrial safety face shields

Hearing Protectors

IS 6229:1980 - Method of measurement of real-ear protection of hearing protectors

IS 8520:1977 - Guide for selection of industrial safety equipment for eye, face and ear protection

IS 9167:1979 - Ear protectors

Ear protection

IS 8522:1977 - Respirators, chemical cartridge

IS 8523:1977 - Respirators, canister type (gas mask)

IS 9473:1980 - Filter type particulate matter respirator

IS 9623:1980 - Recommendation for selection, use and maintenance of respiratory protective devices

IS 10245:Part 1:1982 - Closed circuit breathing apparatus

IS 10245:Part 2:1982 - Open-circuit breathing apparatus

IS 10245:Part 3:1982 - Fresh air hose and compressed air-line breathing apparatus

IS 10245:Part 4:1982 - Escape breathing apparatus (short duration self-contained type)

Hand protection

IS 2573:1986 – Leather gauntlet and mittens (second revision)

IS 4770:1968 – Rubber gloves for electrical purposes


IS 6994:1973 - Industrial safety gloves (Leather and cotton gloves)

IS 8807:1978 - Guide for selection of industrial safety equipment for protection of arms and Hands

IS 4148:1967 - Surgical rubber gloves

Foot Protection

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022

	<b>Integrated Management Systems</b> <b>Occupational health &amp; Safety Manual</b> (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018)	Doc. No.: GT/IMS/OHS/GL/02	
		Page: 22 of 22	
		Format Revision: 01	Date: 10/12/2022
	<b>Guidelines for selection and use of Personnel Protective Equipments (PPE)</b>		Document Revision: 00

IS 583:1981 Ankle boots for general purpose  
 IS 4128:1980 Fireman's leather boots (first revision)  
 IS 10348:1982 Safety footwear for steel plants  
 IS 1989:1986 (part-1) Safety shoes for miners  
 IS 5557:1869 Industrial and safety rubber knee boots

Body protection

IS 4501:1981 Aprons rubberized (acid and alkali resistant 0)  
 IS 6153:1871 Protective leather clothing  
 IS 7352:1974 X-ray lead rubber protective aprons  
 IS 6407:1971 Rubber aprons for hospital use  
 IS 3322:1965 PVC-coated fabrics for foul weather clothing

PREPARED BY	AUTHORIZED BY	EFFECTIVE DATE
OHS Head	Business Head	10.12.2022