

## **M3-EN.4 PERSONAL PROTECTIVE EQUIPMENT**

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### **M3-EN.4 Chapter Description**

In this chapter, Personal Protective Equipment is described. This chapter aims at the familiarization of those who are engaged in Occupational Health and Safety with the PPEs used in a workplace and especially in Metal Processing workshops, resulting in health and safety of the employees.

### **M3-EN.4.1 Definition of PPE**

Every workplace has its own dangers for the health and safety of employees. Those dangers can be found in many points like sharp surfaces, falls, chemical substances, noise etc. The best way for the employees to be protected is to minimize the danger at the source. When this is impossible because of technical or economic problems then the employer should supply his employees with Personal Protective Equipment.

Personal Protective Equipment: Every apparatus that a person should wear or bring to be protected from any danger that threatens his health and safety.

The Personal Protective Equipment includes apparatus, which protect employees from injuries or accidents and minimize the risk of exposure to chemical substances. The PPEs are made to protect:

- The eyes
- Hearing
- The face
- The respiratory system
- The head
- The legs and feet
- The arms and hands
- The whole body

### **M3-EN.4.2 Personal Protective Equipment**

There are many PPEs to mention for instance like, goggle, respirators, helmets, safety shoes, safety gloves, working clothes. The PPEs should fit the special characteristics of the user. The majority of those PPEs are capable at many sizes so the employee can choose the right for him. Moreover, it is important to take into consideration the compatibility of the different PPEs.

In a Metal Processing Workshop, there are many dangers that oblige employer to buy some PPEs for the employees.

### **M3-EN.4.3 Face and Eyes**

Some potential dangers in a metal processing workshop that can cause severe damage to employee's eyes and face are the existence of pendulous particles- particularly metallic dust from cutting works, dressing and processing- hot splashes from molten metal and other hot liquids, fog and organic vapours, metallic colours, radiation from welding etc. The selected form of eye protection at a workplace must be appropriate to the work being performed and properly fits each worker exposed to the hazard. Employees wearing corrective lenses or contact lenses are not being protected from eye hazards. Therefore, they must use eye protective equipment that incorporates with the prescribed lenses they use. It is important to make sure that the protective eyewear does not disturb the proper positioning of the prescription lenses, and that the employee's vision will not be inhibited or limited.

Some of the most common types of eye and face protection are given below:

- Safety spectacles - These protective eyeglasses have safety frames constructed of metal or plastic and impact-resistant lenses. Some models have side shields (M3.04.01)
- Goggles - These tight-fitting eye protections completely cover the eyes, eye sockets and the facial area immediately surrounding the eyes and provide protection from impact, dust and splashes. There are several types of goggles fit over corrective lenses (M3.04.02)
- Welding shields - Constructed of vulcanized fibre or fibreglass and fitted with a filtered lens, welding shields protect eyes from burns caused by infrared or intense radiant light; they also protect both the eyes and face from flying sparks, metal spatter and slag chips produced during welding, brazing, soldering and cutting operations (M3.04.03)
- Laser safety goggles - These are specific goggles protecting against intense concentrations of light produced by lasers. The type of laser safety goggles an employer chooses depend on the equipment and operating conditions in the workplace
- Face shields - These are transparent sheets of plastic extend from the eyebrows to below the chin and across the entire width of the employee's head. Some are polarized for glare protection. Face shields protect against dusts and potential splashes or sprays of hazardous liquids but will not provide adequate protection against impact hazards. Face shields used in combination with goggles or safety spectacles will provide additional protection against impact hazards (M3.04.04 and M3.04.05)

### **M3-EN.4.4 Head**

A very important part of the body prone to accidents is the head. A serious damage on the head can cause from partial loss of memory to loss of conscience and even death. The most appropriate way for head protection is the use of a helmet. It can protect the head from falling objects, bump with stable surfaces etc. The appropriate helmet for a metal processing workshop should absorb all vibration from the bump, be waterproof and slow firing (M3.04.06).

### **M3-EN.4.5 Ears**

Where noise levels exceed the standards, ear protection must be provided and used. A variety of effective hearing protection exists, so that employers can choose the proper hearing protective equipment. The choices are:

- Earmuffs, which completely cover the ear (M3.04.7)
- Earplugs, which are inserted in the ear canal (M3.04.08)
- Semi-inserts (called ‘canal caps’), which cover the entrance to the ear canal

### **M3-EN.4.6 Respiratory protection**

In a metal processing workshop there are vapours and gases from the use of organic solvents and cutting metal fluids. At the same time there are vapours from cutting works and welding, while particles flying in the air especially metallic dust. So it is essential the use of respiratory protection. Respirators protect the user in two main ways. The first is by the removal of contaminants from the air. Respirators of this type include particulate respirators, which filter out airborne particles (M3.04.09); and "gas masks" which filter out chemicals and gases (M3.04.10 and M3.04.11). Some other respirators protect by the supply of clean and respirable air from another source. Respirators that fall into this category include airline respirators, which use compressed air from a remote source; and self-contained breathing apparatus (SCBA), which include their own air supply. Respirators should only be used as a last protective measure when engineering control systems are not sufficient. Engineering control systems, such as adequate ventilation or scrubbing of contaminants should be used to negate the need for respirators.

In some cases like fire there should be respiratory apparatus to help employees to escape the danger and the smoke.

### **M3-EN.4.7 Body**

Personal protective clothing equipment, should be safely designed and constructed, and should be maintained in a clean and reliable fashion. Employees in Metal Processing Workshops may meet a variety of threats for their body and skin. Examples of body protection include laboratory coats, coveralls, vests, jackets, aprons, surgical gowns and full body suits (M3.04.12, M3.04.13 and M3.04.14) . In order to obtain adequate protection, this should be made of material with high resistance to such aggressive substances as concentrated acids (sulphuric, nitric, etc) and liquid condensed gases (chlorine, ammonia, etc). The protection should be in the form of a single overall that can provide a gas-tight unit. Boots worn must also be sealed to the overall.

### **M3-EN.4.8 Arms and hands**

If a metal processing workplace hazard assessment shows that employees face potential injury to hands and arms that cannot be eliminated through engineering and work practice controls, employers must ensure that employees wear appropriate protection. Potential hazards include skin absorption of harmful substances, chemical or thermal burns, electrical dangers, bruises, abrasions, cuts, punctures, fractures and amputations. Protective equipment includes gloves, finger guards and arm coverings or elbow-length gloves.

A variety of gloves exists for the protection against several hazards. The way gloves will be selected, depends on the type of the hazard and the operation involved.

Gloves:

- Against physical impacts (M3.04.15 and M3.04.16)
- Against chemical impacts (M3.04.17)
- For electrical dangers
- For protection from heat (M3.04.18)

### **M3-EN.4.9 Legs and feet**

When employees might face possible foot or leg injury, then protective footwear should be used. Injuries might occur as a result from falling or rolling objects, or from crushing or penetrating materials.

Some examples of situations in which an employee should wear foot and/or leg protection are among others:

- When heavy objects (barrels or tools) might roll onto or fall on the employee's feet
- Working with sharp objects such as nails or spikes that could pierce the soles or uppers of ordinary shoes
- Exposure to molten metal that might splash on feet or legs
- Working on or around hot, wet or slippery surfaces
- Working when electrical hazards are present

There are also “special purpose shoes”; such as electrically conductive shoes that provide protection against the build-up of static electricity; and foundry shoes that keep the isolate the feet from the extreme heat of molten metal, and keep hot metal from lodging in shoe eyelets, tongues or other shoe parts. As with all protective equipment, safety footwear should be inspected prior to each use.