

# Personal Protective Equipment (PPE) programme

## Introduction

Risks to workers' health and safety at work, or caused by work activities, should be adequately managed so that the risk is reduced to the lowest reasonable or technically practicable level. Many work activities create potential hazards either by the nature of the work or by substances used or made in the cause of work, and it is essential – often a legal duty on the employers underpinned by regulations and guidance – to eliminate or reduce risks arising from those hazards.

To encourage improvements in the control of risks and exposure to hazardous substances, European Council Directive 89/391/EEC 'on the introduction of measures to encourage improvements in the safety and health of workers at work', establishes basic rules on protecting the safety and health of workers related to their work<sup>[1]</sup>. These aim to eliminate or reduce the risk of accidents or developing occupational diseases in a structured and hierarchical manner.

Although the Hierarchy of Controls requires that employers first consider other means of exposure control such as elimination or substitution, followed by collective control measures – engineering and administration controls – before personal protective equipment (PPE) is considered, often PPE is still required. Also, in some applications other control means are not practical or possible and so PPE is then the key control means – such as in emergency escape and rescue situations.

**PPE should only be used when one or more of the following conditions are met:**

- a) Other protective measures are in place, yet an unacceptable risk to exposure or injury still exists
- b) Processes where other protective measures are not practicable
- c) Exposures exceed the relevant occupational exposure limits and protective measures are in the process of being installed
- d) Emergency work which cannot wait until other protective measures at source are put in place
- e) Exposures are infrequent and of short duration and permanent installation of other protective measures are not practicable
- f) PPE is needed for self-rescue in the event of an emergency
- g) Emergency rescue work by trained personnel



## What is PPE?

PPE is personal protective equipment which is intended to be worn or held by a person at work, and which protects the person against one or more risks to that person's health or safety. Examples of PPE include respirators, hearing protectors, mechanical and chemical gloves, fall protection harnesses and coveralls, as well as head, eye and foot protection.

Using PPE is only one element in a complete risk control programme that uses a variety of strategies to maintain a safe and healthy environment. It's important to understand that PPE does not reduce the hazard itself nor does it guarantee total protection.

## Legislation

EU Directive 89/656/EEC – on the use of personal protective equipment establishes employers' obligations with respect to the use of PPE<sup>[2]</sup>. The Directive includes the following provisions:

### All PPE must:

- a) Be appropriate for the risks involved, without itself leading to any increased risk
- b) Be appropriate to the existing conditions at the workplace
- c) Take account of ergonomic requirements and the worker's state of health
- d) Fit the wearer correctly after any necessary adjustment
- e) Be maintained in good working order
- f) Be compatible with other items of PPE required when in the presence of more than one risk

The employers' duties also extend to the provision of information, instruction and training for the correct use of PPE, prior consultation with their employees directly or their elected representative and the establishment of procedures for the use of PPE.

The decision to deploy PPE as a control measure therefore requires several actions to be taken by the employer. A way to manage these actions and to effectively control the risks is to apply a structured approach – a PPE programme.

When employers document how they implemented each element of a PPE programme, they're more prepared if required to demonstrate compliance with applicable regulations.

**It's important to understand that PPE does not reduce the hazard itself, nor does it guarantee total protection.**

## PPE programme

A PPE programme consists of several elements which when implemented and effectively managed, should achieve adequate control. Failure to implement one element is like breaking a link in a chain – the result being that workers may not be adequately protected. Management of a PPE programme is therefore key to the success of the PPE in protecting the wearer. The following graphic shows the various elements within a PPE programme:

Figure 1. A visual overview







## Programme and procedures

A PPE programme establishes how PPE is selected, used and maintained. Procedures should be established (preferably in writing) so that all those involved – including PPE wearers and supervisors – understand the programme and their role and responsibility within it. Procedures should cover all the elements in the programme (see Figure 1, previous page).

## Roles and responsibilities

**Employer/PPE administrator:** Some country's regulation requires that a PPE programme administrator be appointed to manage its implementation and delivery. Whether or not it's required by regulation, it's good practice to assign a person to implement and manage the programme. Ultimately it's the employer who's responsible for the entire PPE programme, but defining clear roles and responsibilities for those involved will help define a transparent structure so that any issues on the use of PPE, e.g. the need for additional training or reporting of a faulty item, are raised and actioned promptly. All persons involved in the programme should be competent in their area of responsibility and maintain the appropriate knowledge, experience and training to effectively carry out their duties.

**Wearers:** PPE wearers also play a vital role in the success of the programme. Wearers should use the PPE in accordance with the instructions and training received and report any defects or non-function of the PPE provided to the appointed person. Not using or wearing PPE correctly can compromise the protection offered. Where PPE is not used correctly it's recommended that the reasons behind this are investigated. It may be due to lack of awareness of the risks, a lack of training in the use of the PPE or that the PPE is making the task more difficult – such as restricting movement, reducing their field of vision or not being the correct size. Wearers should know how concerns can be raised to rectify problems as early as possible.

During the selection process wearers should also report any physical or medical limitations – such as reduced lung function – or changes like the need to wear corrective eyewear that can impact on their ability to wear the PPE correctly. As we age our decline in sensory capacities such as eyesight and hearing can impact on the choice of suitable PPE and changes to cardio-respiratory function may have an impact on the most suitable choice for respiratory protection.



## Risk assessment

To decide on the correct protective measures and equipment to provide it's essential that the employer understands the risks and those exposed or potentially exposed to those risks. A thorough and well-documented risk assessment will help achieve this.

The risk assessment should consider the hazard, its nature, the sources contributing to the exposure, the degree of exposure, the working environment, the tasks and the workers carrying out the tasks, the effectiveness of preventive measures already installed - such as local exhaust ventilation and containment (for respiratory and noise). The risk assessment should also include foreseeable consequences of the failure of protective measures or the failure of plant or processes that may create an emergency situation - such as a large chemical spill.

In the risk assessment:

- Identify potential health and safety risks to workers
- Prioritise those risks and tackle the most serious first
- Measure exposure levels through an airborne contamination survey or a sound level survey to see if they're acceptable or not in relation to your local safe exposure levels
- Develop a plan to control exposures and hazards following the principles of the hierarchy of control and look for collective controls before individual controls
- Include routine work, emergency maintenance, escape and rescue situations
- Keep records of exposure levels for communicating to workers and complying with local regulations

## Selection process

The aim of the selection process is to choose the correct type and class of PPE which is suitable for the wearer, the task and the environment that will reduce exposure to those risks identified in the risk assessment. The result of the risk assessment and the selection process is to be able to select an item of PPE that is adequate such that it prevents injury or reduces exposure to the level required to protect the wearer's health and is suitable such that it's right for the wearer, the task and the work environment while still enabling the wearer to work freely without additional risks caused by the PPE.

Key elements of the selection process are:

- 1) Understand the nature of the hazards – this will come from the risk assessment and provide information on the type of hazards present such as:
  - a) **Respiratory** – whether the work environment contains a particulate hazard (particles such as hazardous dusts or fibres), a gas or vapour hazard (such as solvent vapours or chlorine gas), or both types of hazards or the potential for oxygen deficiency
  - b) **Hearing** – the level, frequency and duration of exposure to loud noise
  - c) **Eyes** – the potential for eye injury and the nature of the hazard – such as flying particles, chemical splash or fine dust
  - d) **Face and head** – the potential for head and face injury from falling objects or flying particles and chemical splash
  - e) **Fall protection** – the potential for falls from height and the protective measures required
- 2) Determine the level of protection required – this step will identify the type and class of PPE required to reduce exposure to safe levels or prevent injury as stipulated by national regulations.
- 3) Choose a PPE type – having followed the actions above this step is to select a type of PPE that will be adequate and suitable.

If a PPE device is uncomfortable, cannot be worn or fitted correctly, or interferes with their ability to perform the task it's unlikely that it will be worn or will be worn incorrectly, meaning compliance is likely to be poor. It's important to therefore involve workers in the selection process by obtaining a few different models of PPE to trial in the workplace. In this way, much information regarding fit, comfort, and worker acceptability will be gained.

When several forms of PPE are worn together, interactions must be kept in mind so that PPE is selected which is compatible with each other. Head worn PPE requires the greatest attention to ensure that head protection, respiratory, eye and hearing protection does not compromise each other. In situations where multiple head worn PPE is required then choosing an integrated PPE solution - such as a powered respirator fitted with ear muffs which will offer respiratory, eye, head, face and hearing protection.





## Medical evaluation

Using PPE places an additional physiological burden on the wearer. This can be due to the additional breathing resistance imposed by an item of respiratory protecting, increased body heat from protective clothing or a combination of other factors such as weight and the combined effect of a PPE ensemble – e.g. RPE, protective clothing, gloves, safety helmet and hearing muffs.

Also, some applications require more than one set of coveralls or gloves to be worn at the same time, for example to manage decontamination procedures in nuclear or asbestos applications. This can be particularly challenging to wearers especially if they are working at elevated temperature and humidity. High work rate which also increase cardio-respiratory function also contributes to an increase in body burden.

The impact on the worker will depend on their medical health and this should be considered when selecting PPE. For example, workers with cardiovascular problems, respiratory illnesses, impaired sight and hearing or psychological problems such as claustrophobia may require different forms or types of PPE than other workers due to these medical conditions. A 'one-size fits all' approach will not be a good principle to deploy and may result in unsuitable PPE being provided – the consequence of which is that it may not be worn and therefore the worker not adequately protected.

Please also consult your national regulations on the need and frequency for medical evaluation.







## Fit testing

Just as it is important to select the right Personal Protective Equipment (PPE), it's also vital that the product fits the individual wearer correctly in order to provide adequate protection.

'Fit Validation' or 'Fit Testing' is a method to assess the quality of fit achieved by the wearer for a given item of PPE, and whether they meet any applicable regulatory compliance. It can be a binary assessment, i.e. it does or does not fit, or it can be assessed by how well it fits the wearer and therefore how much protection can be provided.

This is not an exhaustive list but highlights some of the most important points of fit testing. Incorrectly fitted PPE will result in a loss in protection and the amount of loss can vary depending on how poorly a product is fitted. In the case of something like fall protection, a poor fit could even result in no protection!

For example, a respirator with incorrectly adjusted nose clip or poorly adjusted straps, or a wearer with facial hair or stubble can result in a reduction in the level of protection provided. Other examples include incorrectly rolled foam earplugs, which can lead to a significant reduction in the actual level of attenuation achieved by the wearer if the pinna is not pulled upwards and outwards before inserting the earplugs into the ear. For head protection, poor adjustment of the head cradle coupled with high vertical clearance (i.e. helmet sitting too high on the head) can result in loss of protection. Similarly, eye and face protection with large gaps around the orbital area of the eye or other parts of the face can also lead to loss of protection.

There are many factors that can affect how well PPE fits the individual wearer, including:

- The size and shape of the individual
- The level of training received by the wearer
- Individual wearer motivation and attitude
- The extent to which the product has been put on effectively
- Whether there is facial hair that can affect the seal of a tight-fitting respirator
- Facial jewellery
- Other equipment or clothing





## Fit testing

There are three types of PPE that have a recognised fit validation method:



**Respiratory**



**Hearing**



**Eyewear**

- Respiratory protective equipment – applicable to all tight-fitting filtering respirators ranging from disposable particulate respirators to full facepiece respirators fitted with filters, turbo units or used with breathing apparatus
- Hearing protection – applicable to a wide range of hearing protection devices ranging from disposable earplugs to reusable earmuffs
- Eye protection – applicable to a wide range of safety glasses, goggles and visors, checking for gaps around the orbital region of the eye as well as the wearer's field of view

In the absence of such methods there are simple steps that can be taken to assess the fit by the wearer.

Consider the following examples where the product size is normally indicated on the packaging, but the wearer can assess how well the product fits the individual:

- Protective coveralls – check for overall length and fit
- Can a good fit be obtained without the need for turning up arms/legs of the coverall which could increase the risk of injury or accident (e.g. trapping in machinery or or trapping molten metal splash)?
- Safety harnesses – must form a snug fit for comfort and protection when worn with normal workwear
- Safety gloves and shoes – as in the case of other products, safety gloves and shoes must fit the individual wearer comfortably so that the product is worn for the entire duration of the working period and does not require individual adjustment that could increase risk of injury or accident

Some fit validation methods are supported by published standards and validated by independent third parties. In particular, respiratory fit testing is mandated in many countries with a number of different methods available - both qualitative and quantitative - and is supported by published standards and guidance. Even when not mandated, respiratory, hearing and eye fit validation is often carried out as best practice or as part of a company's written health and safety management programme.

## Information, instruction and training

All people involved in the PPE programme need to be adequately trained. The training content, method, and frequency should be matched to the nature of the risks and the complexity of the PPE used.

Wearers should be trained in the correct use of PPE, how to correctly fit and wear it, and what its limitations are. Managers and supervisors should also be aware of why PPE is being used and how to use it properly. Those involved in cleaning, maintaining, repairing and testing the equipment and its selection for use should also receive training. Training should include elements of theory to understand the risks and how the PPE works as well as practice in checking and using the equipment.

The extent of the instruction and training will vary with the complexity and performance of the equipment. For PPE which is simple to use and maintain, such as safety helmets and protective eyewear, some basic instructions to the wearer will be all that's normally required. More detailed training is needed for more complex PPE such as breathing apparatus and fall prevention equipment.

Training should be carried out in accordance with any recommendations and instructions supplied by the PPE manufacturer and be repeated at suitable intervals appropriate to the nature of the risks.

Training should include the following elements, where applicable:

- PPE programme policies
- Why the PPE is needed
- The hazards, risks and effects of exposure
- What PPE is being provided and its limitations
- How the PPE works
- Why fit testing is required (if relevant)
- How to wear and check the PPE correctly
- Where and how it should be cleaned and stored
- What maintenance is required and when
- How to report or fix any problems
- Employee and employer responsibilities
- Use of the PPE in routine and emergency situations

Manufacturers' user instructions will provide guidance on the following:

- How to correctly assemble the PPE components
- What pre-use checks are required and how to conduct them
- How to correctly don and doff the PPE
- How to clean and maintain the PPE





## Use of PPE includes:

- Correct use
- Inspection
- Cleaning and maintenance
- Storage and disposal

## Correct use

PPE should only be used in the configuration(s) permitted by the manufacturer, in accordance with the manufacturers' instructions and the training received. The PPE should be used where required as set out in the PPE programme even when tasks may be of short duration. The protection provided will be dramatically reduced if workers remove their PPE, even for short periods of time. The loss of protection during the periods when the PPE is not worn may easily outweigh the protection when it's used. This is particularly important for both hearing and respiratory protection. Below are examples of the effect of removing hearing and respiratory protection:

Impact of removing hearing protection		Impact of removing respiratory protection	
Time removed (in 1hr use time)	Maximum 25 dB Protection is reduced to (dB)	Time removed (in 1hr use time)	Nominal protection factor (NPF) of 500  Protection is reduced to (PF)
0 min	No reduction	0 min	No reduction
1 min	17	1 min	54
5 min	11	5 min	12
10 min	8	10 min	6
30 min	3	30 min	2
60 min	0	60 min	1

**Table 1.** Impact on wearer protection as a consequence of removing hearing and respiratory protection while still exposed to noise or inhalation hazards

For tight-fitting respiratory protection, the wearer should not have facial hair that may compromise the face seal.

Wearers should not undertake any modifications to the PPE to improve comfort or compatibility with other PPE, or to enable them to perform their task unimpeded. Any issues should be reported to the programme manager.

If any faults are identified during use, the wearer should exit the area as soon as possible and report the fault to the responsible person for repair or disposal.

## Inspection

Inspection of PPE should take place prior to each use and at regular intervals. Regular inspection intervals may be set out in national regulations. It's recommended that pre-use checks and regular intervals are recorded. Many manufacturers provide an inspection check-sheet to assist in making appropriate records.

### Pre-use checks

The wearer or user of the PPE should check their PPE every time they use it – this is known as a 'pre-use check'. The checks will cover a variety of things depending on the type of PPE – and includes checks like the correct configuration of the PPE, inspection for damage, measurement of air flow rate, ensuring the filter type is correct for the task and checking that the PPE or their components are still within their service life.

The use of defective PPE will not offer the expected level of protection and could place the wearer at risk – a very serious issue in the case of faulty breathing apparatus or fall prevention equipment. Any PPE found to be defective during inspection should not be used, segregated from other PPE so that it cannot be mistakenly used by another wearer, and then reported to the responsible person for repair or disposal.

### Regular inspection

3M recommend that PPE is inspected on a regular basis which is commensurate with the degree of risk and complexity of the PPE. The frequency should increase where the health risks and conditions of exposure or injury are particularly severe. PPE manufacturers' user instructions will usually list the type of inspection and tests required.

# Use

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## Cleaning

Reusable PPE should be thoroughly cleaned and disinfected after use following the manufacturer's instructions. The purpose of cleaning and disinfecting the PPE is required to prevent build-up of contamination which may compromise the performance of the PPE, and to prevent transfer of potential infectious microbes between wearers when PPE is used by more than one person – such as shared powered or supplied air respirator facepieces.

The manufacturers' user instructions will provide advice on cleaning and inspection of the PPE, including the appropriate cleaning materials and disinfectants to use. The use of cleaning products other than those recommended by the manufacturer may cause damage to the PPE which may not be obvious.

Cleaning and drying should be carried out in a clean area to avoid cross contamination of the PPE. Depending on the contamination it may be necessary to provide PPE such as gloves and disposable respirators to those who are cleaning the PPE; this activity should be included in the risk assessment.

It may be necessary to disassemble the PPE in order to clean it throughout and therefore the people responsible for cleaning the PPE, including wearers, should be adequately trained to do so.

There should be an appointed area for cleaning the PPE and materials for cleaning and drying the PPE prior to storage should be available.

## Maintenance

PPE should be properly maintained in an efficient state and in good working order to retain its original protective effectiveness. The maintenance programme will consist of periodic inspection, cleaning, repair and replacement. Those involved in maintaining PPE should be competent to do so.

## Repair

During inspection, cleaning or maintenance, PPE that does not pass inspection or has been found to be faulty should be removed from service and discarded or repaired as appropriate. Any repairs carried out on PPE must be done with original manufactured parts designed for the PPE. Repairs should be made in accordance with the manufacturer's recommendations and specifications for the type and extent of repairs to be performed. Anyone authorised to carry out repairs should be adequately trained to do so. Depending on the type of PPE, those carrying out repairs may be required to undertake training and a competence assessment by the PPE manufacturer – consult your PPE provider if unsure.





## Storage

When not in use, PPE should be stored in a suitable location to ensure the performance of the PPE is not adversely affected. Most if not every item of PPE will come with user instructions or markings advising the suitable conditions for storage.

### Storage should:

- a) Be clean
- b) Prevent damage from chemicals, sunlight, high humidity, heat and accidental knocks
- c) Prevent contamination from dirt and harmful substances present in the workplace
- d) Reduce the possibility of losing the PPE or its components
- e) Be located so that it's easily accessible for use when commencing work and convenient so that the PPE can be safely stored during breaks
- f) Be in accordance with the manufacturer's user instructions

PPE storage can be simple, for example, coat pegs in a dry and clean location for weatherproof clothing and safety helmets or a PPE storage box suitable for reusable RPE and hearing muffs located near to a static working area. It does not have to be fixed, for example, safety spectacles could be kept by the wearer in a suitable carrying case or PPE used by mobile workers can be stored in suitable containers in their vehicle. When using storage containers for PPE the container should protect the item of PPE against contamination from dirt and harmful substances present in the workplace.

Where PPE becomes contaminated during use, it should be cleaned and decontaminated before being stored otherwise the storage facility may itself become contaminated. This can lead to cross contamination of the PPE with the potential to contaminate surfaces inside the PPE, which could pose a potential hazard to the wearer. Where PPE is required to be maintained following use this should be conducted before the PPE is placed into storage.

Once designated, ensure that storage accommodation, maintenance and cleaning areas are not used for other purposes which may lead to cross-contamination, prevent continued suitable storage or prevent PPE being cleaned and dried appropriately.





## Programme review

Once implemented, the PPE programme should be regularly reviewed to ensure that it continues to control the hazards as required. Implementing a programme and then not managing its continued performance will most likely lead to its failure. It's good practice that the frequency of the review, which should be undertaken by a competent person, should be at least annual or in accordance with national or local regulations. Depending on the hazards and complexity of the PPE programme, a shorter review frequency may be appropriate.

The individual programme elements should be reassessed when there has been a change in either process, the task, the materials used or the workforce, as these may in turn result in a change to the hazards or risks against which the PPE programme is intended to protect.

Where medical checks (such as a chest examination) and biological monitoring (such as lead level in blood) are performed – like in the case of a respiratory protection programme – the information derived can be used to evaluate the effectiveness of the programme.

## Records and record keeping

The employer should keep records of risk assessment, the PPE programme policy, assessment of adequacy and the suitability of the PPE, including fit testing records, inspection, maintenance and repairs undertaken on the PPE, and details of the training provided to the wearers, supervisors and anyone else with a role in the PPE programme. Records of medical evaluation and any occupational health surveillance should be kept and managed as required by any relevant national regulations.

Records should be retained for a period appropriate to the toxicity and latency of any diseases associated with the contaminants concerned and at least to the minimum period required by any relevant national regulations.





## Achieving success

Implementing a PPE programme is only part of the bigger picture of risk management and control. The success of achieving adequate protection from the implementation of a PPE programme relies on many factors and commitment of both management and workers. The safety culture within an organisation can play a vital role in success of a PPE programme.

Hazard awareness and risk perception are key elements at all levels. It's important that those with management or supervisory responsibilities, as well as the PPE wearers, are aware of the hazards involved and the possible consequences of exposure or injury, and recognise and accept the role which correctly selected and worn PPE can play in controlling such risks.

As with other workplace health and safety issues, those with management or supervisory responsibilities have a key role in demonstrating and setting a good example of health and safety management. Their attitudes and behaviour can be a major positive (or negative) influence.

Encouraging an inclusive health and safety culture where such issues are the responsibility of all, not just a designated person, will make a valuable contribution to the subsequent effectiveness of any programme. Involving the workers in the selection process and, where possible, providing them with a degree of personal choice, helps to ensure better acceptance and compliance. Together with an inclusive health and safety policy this will also encourage PPE faults, and situations where PPE may no longer be suitable, to be reported so that prompt corrective actions can be taken.

Inclusive and regular refresher training to all PPE wearers and those with PPE programme responsibilities will help maintain the knowledge and skills required for success – training should include both theory and practice.

Today's workforce is more diverse than ever and so a 'one size fits all' approach does not work. In the PPE selection process, it's important to consider the diverse workplace needs of workers by age, gender, ethnicity, ability and health. The principles of PPE selection do not change though – PPE should still be adequate and suitable for the hazards, the task, the environment and the wearer, but it's the latter where more attention is required with the focus on each and every individual wearer.

## References

1. Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work.  
<https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:31989L0391>
2. Council Directive 89/656/EEC of 30 November 1989 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace (third individual directive within the meaning of Article 16 (1) of Directive 89/391/EEC).  
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31989L0656>

For advice and support  
on implementing a fit testing  
programme, please contact  
your local 3M representative.

**3M Personal Safety Division**

3M United Kingdom PLC  
3M Centre, Cain Road  
Bracknell, Berkshire RG12 8HT  
Tel: 0870 60 800 60  
[www.3M.co.uk](http://www.3M.co.uk)

3M Ireland Limited  
The Iveagh Building  
The Park, Carrickmines  
Dublin 18  
Tel: 1800 320 500

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