BRITISH SAFETY COUNCIL

Respiratory Protective Equipment

A guide to the selection and use of RPE at work

September 2021

BRITISH SAFETY COUNCIL

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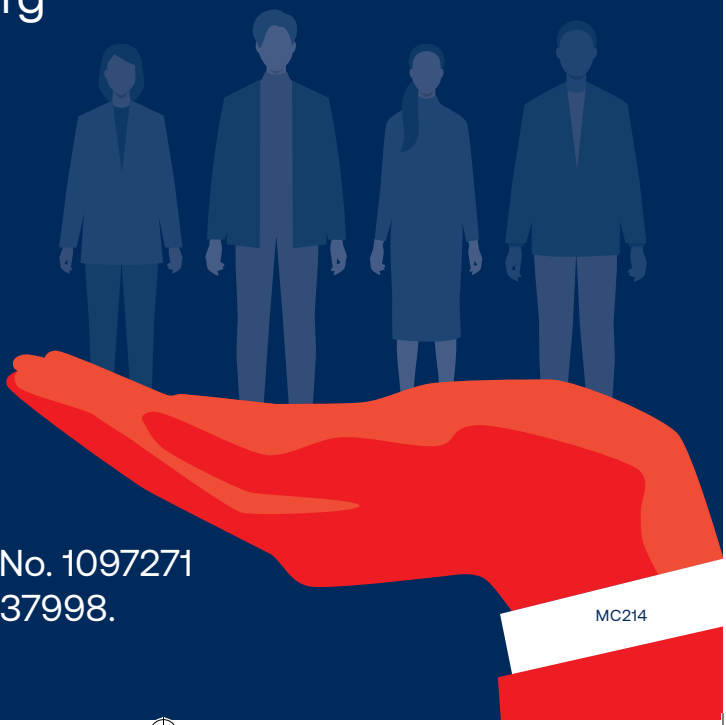

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Introduction

Respiratory protective equipment (RPE), such as face masks, can be a vital tool in preventing workers from breathing in harmful substances that can seriously damage their health or even kill them, such as dusts, fumes, vapours and gases.

However, RPE must only be used as last line of protection once all other reasonable methods of preventing exposure have been attempted. It must also be properly selected, used and maintained so that it adequately protects the health and safety of the user.

This guide provides some general advice on the correct selection and use of RPE.

Thomas Tevlin
Editor

The Guide is published by the British Safety Council, 70 Chancellors Road, London, W6 9RS, United Kingdom

Respiratory Protective Equipment

Exposure to hazardous airborne substances is one of the most serious risks to the health and safety of people at work, and can result in serious and fatal diseases, such as asthma and lung cancer. Workers can also face the risk of immediate death as a result of inhaling substances such as asphyxiating gases.

Indeed, a huge range of tasks can lead to harmful substances contaminating the air in the form of dusts, mist, vapours, gases or fumes, with potentially serious and fatal consequences for the workers who inhale them.

For example, workers who cut up materials such as stone, concrete and wood can inhale harmful dusts; people who undertake welding work on stainless steel can inhale harmful fumes; and people working with certain solvent-containing paints, thinners and glues can breathe in harmful solvent vapours.

Exposure to these substances by inhalation can harm workers' health in a variety of ways. This can range from immediate and short-term problems – such as throat irritation and nausea – to serious, long-term and eventually fatal damage to the lungs which can take many years to develop. The health problems include asthma from inhaling substances like wood dust, metalworking fluid mist, solder fume and flour dust; mesothelioma, a fatal lung cancer caused by inhaling asbestos fibres, such as when cutting into asbestos-containing materials in a building; and silicosis, an irreversible and sometimes fatal lung disease caused by exposure to silica dust created by cutting materials such as concrete, bricks, mortar and sandstone.

As a result, UK employers are required under laws such as the Control of Substances Hazardous to Health Regulations 2002 (COSHH) to take all reasonably practicable measures to prevent – or adequately control – exposure to hazardous substances to protect the health of their employees.

Under COSHH, employers must first try to prevent exposure to the hazardous substance or process altogether if it is reasonably practicable to do so – for example, by using water-based rather than solvent-based products. However, if it is not reasonably practicable to prevent

> **“A range of tasks can lead to harmful substances contaminating the air.**

Some facts and numbers

135,000

people who have ever worked in Britain report suffering from breathing or lung problems they believe were caused or made worse by their work

17,000

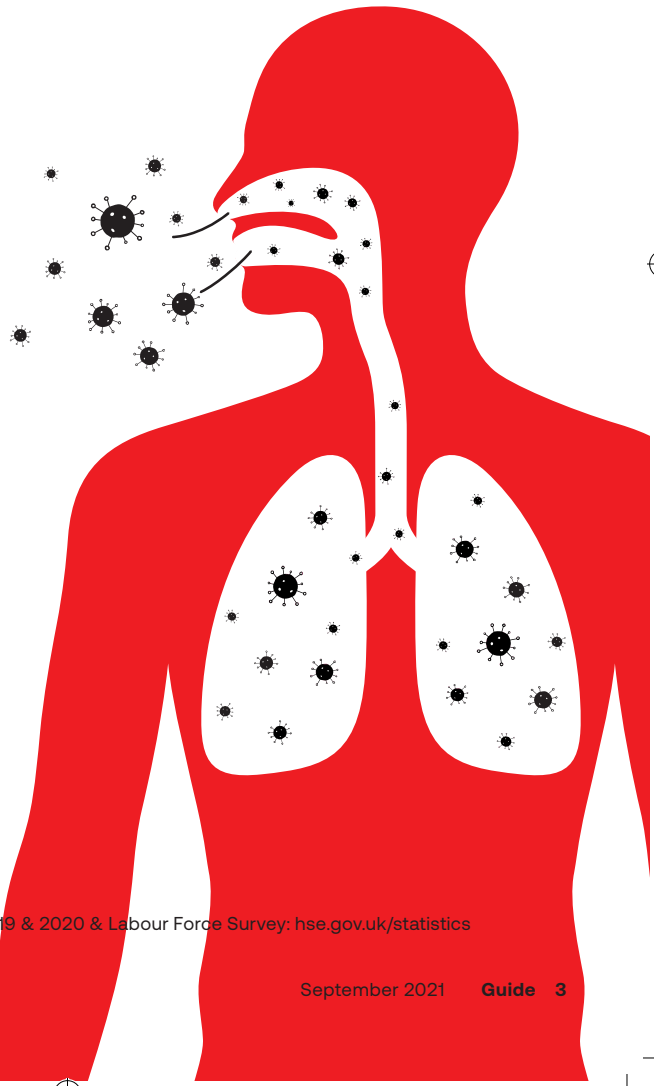
estimated new cases of self-reported breathing or lung problems caused or made worse by work in Britain every year

5,000

asbestos-related disease deaths per year currently in Britain, including mesothelioma, lung cancer and asbestosis

12,000

lung disease deaths each year in Britain estimated to be linked to past exposures at work



Source: HSE Health and Safety Statistics 2019 & 2020 & Labour Force Survey: hse.gov.uk/statistics

Respiratory Protective Equipment

RPE must only be used after all other reasonably practicable ways of controlling exposure have been tried.

exposure, employers must adequately control it, following a hierarchy of measures. In order of priority, this means:

- Using a safer form of the product or substance – such as avoiding or minimising the creation of dust by specifying materials such as powders in pellet, paste or tablet form or in sealed, pre-packed bags, rather than weighing them out by hand;
- Changing the process to emit less of the substance – for example, reducing the temperature of a process to reduce the amount of vapour that gets into the air
- Enclosing the process or activity to prevent or minimise the release of the harmful substance – such as using sheeting or temporary screens to prevent dust escaping during tasks such as soft-strip demolition
- Extracting emissions of the substance near the source – for example, using local exhaust ventilation equipment
- Keeping the number of workers at risk to a minimum – such as limiting the number of people near the work
- Providing suitable personal protective equipment (PPE), such as gloves, coveralls and respirators.

Therefore, one of the measures employers may need to adopt to prevent or control exposure to hazardous substances by inhalation is to provide employees with respiratory protective equipment (RPE), such as respirators and breathing apparatus. Respirators filter the air to remove harmful substances to prevent them being breathed in while breathing apparatus provides the user with a supply of clean air to breathe.

However, it is vital to understand

that health and safety legislation, such as the COSHH Regulations, requires employers to always first attempt to prevent or control employees' exposure to hazardous substances through other methods and steps, before considering issuing employees with RPE.

This guide provides some basic advice on the correct selection, use and maintenance of RPE for protection against hazardous substances (such as dusts and fumes), in non-healthcare work – such as construction and engineering tasks. It is based on advice from the Health and Safety Executive (HSE), primarily from its guidance booklet, *Respiratory protective equipment at work: A practical guide* (HSG53). See: bit.ly/3gDoo8G

This guide is therefore not designed to provide detailed guidance on the 'technical' aspects of correctly selecting, using and maintaining RPE. Employers who require detailed information and advice about the correct selection, use and maintenance of RPE should refer to the guidance from organisations such as HSE and/or seek competent advice.

This guide also does not provide advice on the selection and use of RPE in health and social care workplaces and work settings to protect workers against the risk of being infected by – or transmitting – coronavirus. Detailed guidance on the use of PPE and RPE in health and social care work to protect workers against Covid-19 can be found on the websites of HSE and the various governments in the UK. For HSE's guidance see: bit.ly/2Wk1Nr3.

HSE, and the governments for England, Northern Ireland, Scotland and Wales, have also published detailed guidance for businesses on how to reduce the risk of workers and others (such as customers who visit their premises or come into contact with their staff), from being infected with or transmitting Covid-19. HSE's guidance, along with links to the government guidance for each UK country, is at: hse.gov.uk/coronavirus

Although there some differences in the guidance and rules on how to control the spread of Covid-19 at work and in public sites from one UK country to another, HSE generally stresses the importance of measures such as ensuring adequate ventilation of enclosed areas of the workplace; sufficient cleaning to remove any traces of coronavirus; and ensuring employees and others practice good handwashing and/or use hand sanitiser to remove any traces of coronavirus that could infect themselves or others. .

In its guidance at bit.ly/3gCQyAN HSE says "PPE for protection against Covid-19 is generally only required for certain healthcare activities". Also, the government for England says employers should "not encourage the precautionary use of PPE to protect against Covid-19 unless you're in a clinical setting or responding to a suspected or confirmed case of Covid-19" – see: bit.ly/38H6FsV

In some workplaces, and during some work activities in the various countries of the UK, it is either recommended – or a legal requirement – that workers (and others such as members of the public), wear a face covering to help prevent

the spread of Covid-19. A face covering is something that securely covers the nose and mouth, such as a cloth face covering or a disposable face mask. When worn correctly, a face covering can reduce the risk to others and the wearer from Covid-19 by covering the nose and mouth, which are the main sources of transmitting coronavirus. Face coverings can also reduce contamination of surfaces, objects and belongings with coronavirus by limiting the amount of the virus that is released by the wearer.

HSE, and the four UK governments, have published guidance on when and how to wear face coverings in workplaces and settings such as indoor public places and crowded and enclosed spaces. HSE's guidance provides links to the advice and/or rules on wearing face masks in England, Scotland and Wales – see: bit.ly/3kuKM5k The rules and guidance for Northern Ireland are at: bit.ly/3sTh51Q

However, HSE makes clear that face coverings are a public health protection measure largely intended to help protect others from being infected by Covid-19 from an infected person. They are not classified as PPE as they do not protect people from work-related hazardous substances and are therefore not covered by health and safety legislation. For more details see: bit.ly/3mTaGCR

What is RPE?

RPE is designed to protect the wearer from breathing in hazardous substances which might be present in the workplace air. These include dusts, mists, vapours, gases, fumes, smoke and fibres such as asbestos. RPE can also protect workers when the concentration of a hazardous substance in the air could be life-threatening and in environments where oxygen levels are, or could become, low. Examples might include confined spaces – like trenchs, silos and tanks.

There are two main types of RPE – respirators and breathing apparatus.

Respirators (filtering devices) use filters to remove contaminants from the air before it is breathed in by the wearer. They can either be:

- **Non-powered respirators** – which rely on the wearer's breathing to draw air through the filter; or
- **Powered respirators** – which use a motor to pass air through the filter to provide a supply of clean air.

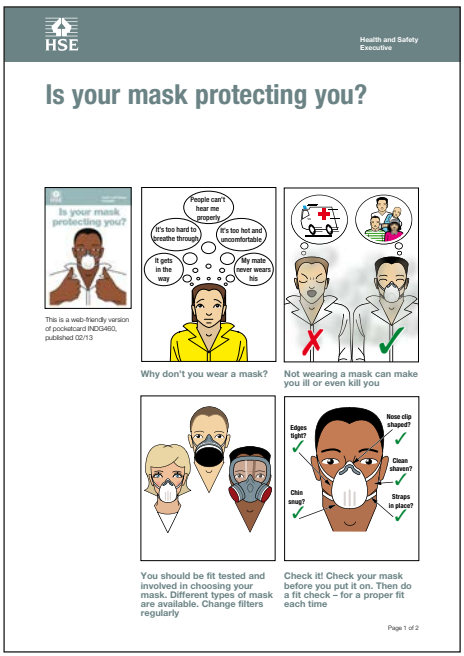
Breathing apparatus, meanwhile, provides the wearer with a supply of breathing-quality air from an independent source, such as a compressed air cylinder. It can be used against a range of airborne hazards and in different atmospheres.

Respirators and breathing apparatus are available in a range of styles, divided into two main groups:

- **Tight-fitting facepieces (often referred to as masks)**. These rely on having a good seal with the wearer's face, and a face fit test should be carried out to ensure the mask will properly protect the wearer (see the 'fit testing' section of this guide). Tight-fitting facepieces (masks) are available as both non-powered and powered respirators and as breathing apparatus.

Free guidance:

Organisations such as BOHS, BSIF, HSE and No Time to Lose offer free guidance on the correct selection and use of RPE.



HSE's guidance is at:
bit.ly/3knEcNV

- **Loose fitting facepieces**. These rely on enough clean air being provided to the wearer to prevent contaminant leaking in. They are only available as powered respirators or breathing apparatus and examples include hoods, helmets, visors and whole suits.

It is important to note that HSE guidance makes clear that respirators should never be used in oxygen-deficient atmospheres, and suitable breathing apparatus should be used instead.

HSE also warns that employers will generally need to obtain specialist advice on the correct selection and use of RPE in oxygen-deficient atmospheres.

Respiratory hazards

As stated, RPE can protect against a range of hazardous substances, and it is essential employers understand what these substances are, the forms they take and the ill health conditions they can cause so they can select adequate and suitable RPE to protect their workers.

Common respiratory hazards for which RPE may be required include:

- Vapours arising from solvent-containing materials, such as certain paints, thinners and glues; and from substances such as petrol
- Gases such as chlorine, carbon monoxide and engine exhaust gases
- Dusts – such as silica dust from cutting and working on stone, rocks, sand, clay, bricks and concrete; wood dust; lead dust; and flour dust from food manufacturing
- Fumes arising from welding, soldering

and burning metals
- Fibres such as asbestos dust created by disturbing asbestos-containing materials found in buildings
- Mists and sprays arising from tasks such as paint or pesticide spraying or the use of metalworking fluids
- Bacteria and viruses.

What the law says

As stated, the main law covering the provision and use of RPE at work is the COSHH Regulations 2002.

Under COSHH, employers must prevent, or adequately control, exposure to hazardous substances to protect the health of their workers and others who could be put at risk, such as contractors.

This means carrying out an assessment of the health risks from hazardous substances and then seeking to prevent or adequately control employees' exposure to the hazardous substances through the use of appropriate control measures.

Under COSHH, PPE – including RPE – must only be provided and used once the employer has taken all other reasonably practicable measures to prevent or control exposure. In short, employers should – in order of priority:
- Eliminate the use of the harmful product or substance
- Use a safer form of the substance
- Change the process to emit less of the substance
- Enclose the process so the substance does not escape into the workplace air
- Extract emissions of the substance near the source
- Minimise the number of workers exposed
- Minimise the length of time each worker is exposed
- Provide PPE, such as RPE, clothing, eye protection and gloves.

COSHH also requires employers to ensure:
- Reasonable steps are taken to ensure that any measures and equipment provided to prevent or control employees' exposure to hazardous substances – including PPE and RPE – are properly used by employees
- Employees are provided with suitable and sufficient information, instruction and training on issues such as the health risks arising from exposure to hazardous substances and the precautions to take to protect themselves from exposure – including the correct use of any PPE and RPE
- Equipment provided to prevent or control employees' exposure to hazardous substances – including PPE and RPE – is maintained in good working order and in a clean condition
- PPE, including RPE, is checked at suitable intervals to ensure it continues to provide adequate protection
- PPE, including RPE, is properly stored in a well-defined place
- Defective PPE, including RPE, is repaired or replaced before its re-use
- PPE, including RPE, that is contaminated by a substance hazardous to health is removed on leaving the working area and kept apart from uncontaminated clothing

and equipment
- PPE, including RPE, that is contaminated by a substance hazardous to health is decontaminated and cleaned, or, if necessary, safely disposed of.

All PPE and RPE issued to employees to protect their health and safety must be provided free of charge by their employer.

There are also other regulations that cover the provision and use of RPE:

- **The Control of Asbestos Regulations 2012** – this requires employers to take steps to prevent or reduce employees' exposure to asbestos fibres whenever work liable to disturb the substance is carried out – including by providing suitable RPE in certain circumstances
- **The Control of Lead at Work Regulations 2002** – this requires suitable PPE, such as RPE and clothing, to be provided to employees working with lead if the risk of harmful exposure cannot be controlled via other means.

Also, the Approved Code of Practice (ACOP) on the Confined Spaces Regulations 1997 states employers should consider supplying and using suitable PPE and RPE when appropriate for work in confined spaces – such as if the concentration of a harmful substance in the air could be life-threatening.

Guidance on the correct selection and use of RPE for work with asbestos and lead, and in confined spaces, is available from HSE and other reputable sources.

Assessing the risks

As stated, HSE has published a guidance booklet on the selection, use and maintenance of RPE, known as HSG53.

The HSE booklet states the information provided supports the advice in the relevant ACOPs on laws such as COSHH and the Asbestos Regulations. The booklet says it "contains practical guidelines to help [employers] select the correct RPE and manage its use in [the] workplace to ensure effective protection".

As stated, this British Safety Council guide summarises some of the general, non-technical advice from HSE's HSG53 booklet. However, this guide only provides a basic overview of some of the simpler aspects of selecting, using and maintaining RPE. Employers may therefore need to refer to more detailed guidance from organisations such as HSE or obtain competent advice.

Before providing RPE, employers are required under laws such as COSHH to assess the health risks posed by exposure to hazardous substances; identify the appropriate control measures; put the controls into operation; and ensure the controls remain effective. The employer's COSHH risk assessment may therefore conclude that RPE is one of the appropriate control measures to adopt.

The first step in assessing, and eliminating or controlling, the health risks from hazardous substances is to identify the harmful substances workers may be exposed to, the activities involved and the possible routes of exposure. A decision can then be taken about whether the existing controls are adequate or if more precautions are required.

When assessing risks, employers

should consider both substances that have been supplied for use – such as chemicals in containers, lubricants and degreasers – and those that may be created by the tasks. The latter might include substances such as construction dusts, welding fumes, dusts from the use of abrasive wheels or baking processes and isocyanates from paint-spraying. All possible routes of exposure – inhalation, skin contact or absorption and swallowing – must also be considered.

If a substance is classed as 'dangerous for supply' – such as chemicals, solvents and paints – it will carry hazard warning symbols that provide an indication of danger. These can help when beginning to assess the health and safety risks it poses. The supplier of a substance classed as 'dangerous for supply' must also provide a safety data sheet giving information on the health and safety hazards it poses and ways of adequately controlling exposure to it. This may include advice on the type of RPE that should be worn while using the product or substance. The data sheet can therefore sometimes provide help when deciding on the most suitable exposure controls to ensure the safe use of the substance.

To help employers to identify ways of controlling exposure to hazardous substances, HSE has developed *COSHH Essentials*. This is a free webtool that provides general advice on the most appropriate control measures for certain hazardous substances and tasks – such as chemicals, solvents, isocyanates, dusts, welding and solder fume and vehicle exhaust fumes. Employers can either follow 'direct advice sheets' for specific processes for their industry or enter information about the substance they are working with to identify a generic exposure control guide to follow.

COSHH Essentials advice sheets may also suggest the appropriate type of RPE to use for the task. However, even if the advice in a *COSHH Essentials* guidance sheet is fully relevant to the specific task and risk, employers must ensure they have properly assessed *all* the risks to employees' health from the hazardous substance and that the planned measures will adequately control exposure to protect their workers' health.

Employers also need to ensure the RPE is the correct type for the hazardous substance; reduces exposure to the level required to protect the wearer's health; and is suitable for the individual wearer, the task and the work environment.

The RPE selection process

There are a number of reasons why RPE must be the last choice of protection against inhaling hazardous substances.

For a start, RPE only protects the person wearing it, while control measures at the point where the hazardous substance is produced – such as an enclosure and equipment to contain and extract contaminated air – will protect everyone working in the area.

Also, if RPE is used incorrectly or poorly maintained, it is unlikely to provide the required protection. RPE can also be uncomfortable to wear, which can lead to workers using it incorrectly; and it

can provide a false sense of protection, especially if it is not worn in accordance with the manufacturer's instructions.

HSE says that, in general, employers should only select and use RPE:

- When employees may still breathe in contaminated air, despite the introduction of all other reasonably practicable exposure controls – such as local exhaust ventilation
- While other control measures are being put in place
- For short-term or infrequent exposure, where the risk assessment shows that using other exposure controls is not reasonably practicable – for example, during certain maintenance tasks
- For emergency work or when there is a temporary failure of exposure controls and suitable RPE is the only practicable way of re-establishing adequate control of exposure to the hazardous substance – for example, during a plant failure
- To provide safe exit in an emergency – for example, from an area where hazardous substances could be released if the control systems fail
- When emergency rescue by trained personnel is necessary.

If an employer decides RPE is required to control exposure to a hazardous substance, they must take a number of steps to ensure the equipment is suitable and is used correctly. HSE says in general this means ensuring the RPE:

- Adequately controls inhalation exposure to provide the wearer with effective protection (i.e. the equipment reduces exposure to the level required to protect the wearer's health)
- Is the correct equipment for the hazardous substance, the task, the wearer and the environment in which it will be worn
- Is used by properly trained workers who are adequately supervised to ensure they use the RPE in accordance with the training given and the manufacturer's instructions
- Works with any other PPE the user needs to wear, such as safety glasses
- Is properly stored, cleaned and checked regularly to ensure it remains effective
- Is maintained in accordance with the manufacturer's instructions.

HSE's HSG53 RPE guidance booklet provides advice on selecting RPE based on the assumption the employer has identified the need for RPE based on the results of their COSHH risk assessment.

In particular, the booklet explains how to select RPE that is adequate for the hazardous substance and will reduce the individual's inhalation exposure to the substance to the level required to protect their health. For example, there is advice on how to select the correct filter for a respirator to prevent exposure to particles – such as dusts and welding fume – and to gases/vapours, such as solvent vapours.

These more 'technical' aspects of the RPE selection process are not covered in this British Safety Council guide. For detailed guidance on these matters employers should refer to the appropriate guidance and/or seek competent advice.

Employers also need to ensure the

RPE is suitable for the individual wearer, the tasks they are doing and the working environment. This includes ensuring the selected RPE is of the right size and correctly fits the wearer. HSE adds that employers should aim to ensure that the selected RPE allows the worker to work freely and without creating any additional risks from wearing it.

HSE's HSG53 guidance booklet provides guidance on the factors to consider to ensure RPE is suitable for the wearer, the task and the environment. Some of these are summarised here.

For the task, some of the factors to consider, based on HSE's advice, include:

- **Wear time** – unpowered tight-fitting masks are uncomfortable to wear for long periods and wearers may therefore be tempted to loosen or remove the RPE, putting themselves at risk of harmful exposure to a substance. HSE therefore recommends the maximum continuous wear time for tight-fitting unpowered RPE should generally be one hour, after which the user should take a break. If a worker needs to wear RPE continuously for long periods, HSE says a powered respirator or breathing apparatus with an airline (for example, a loose-fitting facepiece such as a hood or helmet), will generally be better options.
- **Vision** – if a worker needs to see fine details when using RPE but doesn't need to protect their eyes from the airborne hazard, RPE that includes face protection – such as full-face masks, visors and hoods – may not be ideal because these types can be prone to scratching, misting and surface contamination. In these situations, HSE says employers should consider steps such as issuing half-mask RPE or choosing RPE designs that resist scratching and internal misting. For example, powered respirators or airline breathing apparatus are more resistant to misting.
- **Communication** – all RPE will affect the user's ability to communicate. Therefore, if the work requires clear and precise communication, the employer may need to consider providing RPE that incorporates communication devices – such as a radio intercom system.

Meanwhile, some of the factors relating to the working environment that may need to be taken into account include the temperature and humidity. For example, in hot or humid conditions, wearing RPE is likely to increase the user's heat stress, sweating and discomfort. If this is the case, HSE says using powered respirators or breathing apparatus with air supplied from an airline may help to minimise these problems.

Employers may also need to consider a variety of factors relating to the individual wearer to ensure the selected RPE is appropriate for the individual's needs.

For example, the performance of RPE with a tight-fitting facepiece relies on achieving a good contact between the wearer's skin and the face seal of the facepiece. However, if the worker has facial hair – such as a beard or stubble – in the area where the face mask seals,

this will make it impossible to get a good seal of the mask to the face. As a result, contaminated air will leak in around the edges of the mask, causing the worker to breathe in the dirty air, potentially putting their health or life in danger.

HSE says if a worker does have facial hair, the employer should consider providing them with loose-fitting facepieces, which do not rely on a tight seal in this region.

Also, facial markings in the face seal area – such as deep cuts or scars, wrinkles, moles and warts – can prevent a face mask sealing to the face, which again will cause contaminated air to leak in. If a worker has facial markings that could affect the RPE's face seal, HSE again recommends considering a loose-fitting facepiece that does not rely on a tight seal in this region.

Employers must also ensure that any RPE is compatible with other types of PPE that needs to be worn – such as eye goggles and safety helmets.

For instance, different forms of head-worn PPE – such as eye, ear and head protection – can potentially interfere with RPE, preventing one or more of the components from working correctly. If this is the case, HSE recommends considering selecting PPE where the different forms of protection are combined or integrated. One example would be the eye, face, head and respiratory protection provided by a powered helmet respirator.

It is also important to note that some pre-existing medical conditions – for example, breathing disorders such as asthma, skin allergies or even heart problems – may restrict or prevent some workers wearing any RPE, or certain types of RPE. The employer should therefore ensure that workers are fit to wear the RPE that is selected and required.

Employers must also remember that, under UK health and safety law, they are required to consult their employees – or employee representatives – on anything in the workplace that could substantially affect employees' health and safety.

There are several subjects that employees, or their representatives, must be consulted on. These include the introduction of any measure that could substantially affect employees' health and safety – such as the introduction of new equipment and new systems of work.

HSE says that when selecting RPE and planning for its use at work, employers must therefore consult their employees. HSE says involving workers in the selection of RPE will help to ensure the most suitable equipment is chosen.

In fact, the COSHH ACOP makes clear that consulting workers on the selection of PPE will help to ensure employees have the most comfortable equipment that is best suited to them. In turn, the ACOP argues, the PPE is more likely to be worn and used correctly by the workers.

HSE says it is often best to give wearers a choice of several adequate and suitable types of RPE so they can choose the one they find most comfortable.

Employers must remember that all RPE used at work must be manufactured in accordance with the Personal Protective Equipment Regulations 2002; or by of a

type approved by HSE, or conform to a standard approved by HSE.

In practice, this means employers must select and use 'CE-marked' equipment. The CE mark confirms the equipment has been designed and tested to meet at least the minimum legal requirements set out in law. RPE may now also now have UKCA marking, a new product marking that is being used for goods in Britain following the UK leaving the European Union. UKCA marking also shows the equipment has been certified as meeting the legal requirements for product safety.

However, employers must remember that CE or UKCA marking does not indicate the RPE is automatically adequate and suitable for a task. They must still carefully select the appropriate RPE for the task, the substance, the work environment and the individual.

Fit testing RPE

One of the dangers when using RPE is a poor-fitting facepiece causing contaminated air to leak into the mask. This can put the wearer's health or life in danger by causing them to inhale the hazardous substance.

The performance of RPE with a tight-fitting facepiece depends on achieving a good contact between the wearer's skin and the face seal of the facepiece. This makes it essential that a tight-fitting facepiece matches the individual wearer's facial features and seals adequately to their face to ensure there are no gaps where contaminated air could leak in. Also, people's faces vary significantly in shape and size so it is unlikely that one particular type or size of tight-fitting facepiece will fit everyone.

Therefore, if an employer intends to provide RPE with tight-fitting facepieces, they must ensure each wearer undergoes a fit test by a competent person to check the specific model and size of tight-fitting facepiece the person will be wearing matches their facial features and seals adequately to their face.

A fit test is designed to ensure that RPE with a tight-fitting facepiece is suitable for the individual wearer. It will also help identify unsuitable tight-fitting facepieces that should not be used.

Tight-fitting facepieces are often referred to as masks and generally mean any facepiece or mask that relies on having a good seal against the wearer's face to ensure its effectiveness. Tight-fitting facepieces are available as both powered and non-powered respirators and as breathing apparatus, and feature either a half mask or a full face mask.

It is also important to note that tight-fitting powered or constant flow airline breathing apparatus under positive pressure also requires fit testing as studies have shown that during heavy exertion inward leakage is possible.

However, powered or constant-flow airline breathing apparatus RPE with loose-fitting hoods and helmets do not require fit testing.

A fit test should be carried out as part of the initial selection of the RPE. HSE says this will allow the individual user to be given a choice of adequate models of RPE.

If tight-fitting facepieces are issued on an individual basis HSE recommends the wearer is fit tested using their 'own' individually assigned and issued facepiece. If this not practicable – or pooled RPE is used – the test should be carried out using a test facepiece that exactly matches the wearer's 'own' facepiece.

If the employee wears more than one type of tight-fitting facepiece, then each type of facepiece must be fit tested.

Following a successful fit test, the employer must ensure that the make, model, type and size of facepiece that the individual wore during the test is made available for their use.

The fit test should be repeated whenever there is a change to the RPE type, size, model or material or a change to the circumstances of the individual wearer that could alter the fit of the facepiece. This includes if the wearer:

- Loses or gains weight
- Undergoes substantial dental work
- Develops any facial changes – such as scars, moles or the effects of ageing – around the face seal area.

HSE guidance says it is also good practice to ensure repeat fit testing of RPE is carried out on a regular basis. HSE says this is especially important if RPE is frequently used as the primary means of preventing exposure to hazardous substances. For example, guidance contained in the Approved Code of Practice on the Control of Asbestos Regulations 2012 suggests that annual fit testing might be appropriate for workers involved in licensed asbestos removal work who wear tight-fitting facepieces.

As stated, facial hair – such as stubble and beards – in the region where a tight-fitting facepiece seals to the face, will make it impossible to get a good seal of the mask to the face. This will cause contaminated air to leak through gaps at the edges of the mask.

Therefore, the wearer needs to be clean shaven around the mask seal to achieve an effective fit when wearing a tight-fitting facepiece at work. As explained, if workers have beards, or are unable to be clean-shaven – for example, for religious reasons – a tight-fitting facepiece will not be suitable so an appropriate loose-fitting form of RPE, that does not rely on a tight fit to the face, should be chosen.

The individual wearer of a tight-fitting facepiece should therefore also be clean shaven around the face seal while undergoing the fit test.

RPE fit testing must be carried out by a competent person and the employer must ensure the person who conducts the fit test is appropriately trained, qualified and experienced and provided with appropriate information to undertake each particular test.

The British Safety Industry Federation (BSIF) has established a voluntary scheme designed to confirm the competency of people performing and offering face-fit testing for tight-fitting facepieces.

To be accredited as competent under the 'Fit2Fit' scheme, a face fit tester must pass a formal assessment process. This includes passing an industry recognised

examination and demonstrating they know to correctly carry out a fit test in practical circumstances. The Fit2Fit website provides a list of all accredited fit testers, including the method of fit test they can carry out.

The Fit2Fit scheme was developed by the BSIF in partnership with industry stakeholders and is supported by HSE. However, it is not compulsory for employers to use a fit tester from the Fit2Fit scheme.

HSE adds that fit testing can also be a useful training tool to remind wearers about the important steps to take to ensure the correct use of RPE.

For example, the fit test could be used as an opportunity to teach or remind the wearer how to put on their RPE facepiece correctly. It could also be used to remind workers how wearing poor fitting RPE and using the equipment incorrectly can negatively affect the protection it offers.

Training for RPE users

Everyone involved in the selection, use, storage and maintenance of RPE must be given suitable information, instruction and training so they understand how to use and maintain the equipment correctly.

HSE's main guidance booklet on RPE, HSG53, says an appropriate training programme could cover:

- Why RPE is needed
- The hazards, the risks and effects of exposure to any harmful substance
- The RPE that is being provided
- How RPE works
- Why fit-testing for wearers of tight-fitting facepieces is required (if relevant)
- How to wear and check the RPE
- Fit checking before use
- Any maintenance that is required and when it should be carried out
- Where and how RPE should be cleaned and stored
- How to report or tackle any problems with the equipment
- Employee and employer responsibilities for the equipment
- The use and misuse of RPE.

HSE adds that, where appropriate, training should also be used to inform workers who use tight-fitting RPE facepieces that they need to be clean-shaven around the face seal of the facepiece to achieve an effective fit and to prevent leakage of contaminated air into the facepiece.

RPE suppliers can provide information on the training required to use and maintain their products.

It is also important to remember that under legislation such as the COSHH, employees themselves have a legal duty to correctly use any control measures provided by their employer to control exposure to harmful substances, including RPE. Employees also have a legal duty to take all reasonable steps to return control equipment – such as RPE – to the accommodation provided after using it. They also have a duty to promptly report any defects with the controls – such as to their RPE – to their employer.

HSE says users should also check their RPE every time they use it. A 'pre-use' check needs to cover a variety of things,

depending on the type of RPE, and HSE says employers should therefore ensure users follow the RPE manufacturer's instructions for the pre-use check.

However, in general, common things that users might need to look out for during a pre-use check include ensuring:

- The nose bridge on disposable RPE is adjusted to ensure a proper seal
- All the straps on the RPE are used
- Any hoses are connected properly
- Battery-powered RPE is full charged.

For RPE with a tight-fitting facepiece, the user should also carry out a 'fit check' of the seal against their face when the device is first put on and before entering the hazardous environment or starting the work. Again, the RPE manufacturer's instructions will provide details of how to correctly perform a fit check.

HSE says that, for RPE to provide effective protection, employers must integrate its use into their normal workplace activities. As a result, it says employers must take steps to ensure all control measures designed to protect workers and others from exposure to hazardous substances – including equipment such as RPE – are properly used by employees and are not made ineffective by bad working practices, inadequate training or improper use.

Employers must therefore take all reasonable steps to ensure employees use all the necessary exposure control measures, including RPE, in accordance with the manufacturer's instructions and the training provided. This involves supervising workers to ensure they are using the provided RPE in the correct way.

It may also be appropriate to designate areas where RPE is required and compulsory as 'RPE zones' – for example, using instruction notices and signs.

Maintaining RPE

Employers must establish an effective system to ensure RPE is properly stored, cleaned, checked and where necessary maintained and tested at appropriate intervals to ensure it continues to provide the necessary level of protection.

In its HSG53 booklet, HSE says that all *reusable* RPE (i.e. other than single-use disposable equipment), will require maintenance by properly trained people. In general, HSE says employers should follow five key principles when maintaining RPE. These are:

- Follow the manufacturer's instructions
- Ensure a competent person carries out the maintenance
- Keep records
- Ensure the intervals for maintenance are appropriate
- Ensure the maintenance programme reflects the complexity of maintaining the RPE.

HSE says thorough maintenance, examination and, where appropriate, tests of re-usable RPE should be carried out at least once a month. However, if the RPE is used only occasionally, an examination and test should be carried out before each use, and, in any event, the interval should not exceed three months.

HSE adds emergency escape-type RPE should be examined and tested in

accordance with the manufacturer's instructions. By law, records of the examination and testing, including any repairs, must be kept for at least five years.

HSE says that key maintenance tasks for reusable RPE might include:

- Changing any replacement filters
- Cleaning the device
- Maintaining and replacing the valve
- Checking the straps for damage
- Checking the battery charge and flow rate on powered devices.

HSE guidance states that ideally, any parts that need to be replaced on the RPE should be sourced from the original manufacturer. This will ensure that the replacement parts continue to allow the equipment to operate as originally intended and to provide the standard of protection stated by the manufacturer.

Reusable RPE facepieces will also have to be cleaned to remove contamination, moisture build-up and microbes. The manufacturer should provide advice on how to clean and inspect the RPE, including the appropriate cleaning materials and disinfectants to use.

All RPE, including re-usable and disposable (single use) items, must be stored in a suitable and clean location, both before and after use. In its HSG53 booklet, HSE says, as a general guide:

- RPE should be stored in accordance with the manufacturer's instructions in order to prevent contamination, damage and deterioration
- RPE should be cleaned before being stored to prevent the storage area becoming contaminated
- The storage or accommodation provided should be easily accessible so the RPE can be safely stored during work breaks.

HSE also reminds employers that the air supplied to breathing apparatus – for example, from a compressor system – must be clean and safe to breathe and must meet the minimum recommended quality requirements. The quality of air supplied to breathing apparatus must therefore be tested at suitable intervals. HSE says a decision on the frequency of the tests should be based on the employer's risk assessment. However, HSE guidance says the quality of air supplied to breathing apparatus should be tested at least every three months, or more often if more frequent tests are considered necessary to ensure the safe quality of the air supplied to the equipment.

Finally...

Although RPE is widely used throughout UK workplaces, it must only be used as a last resort measure. However, if a risk assessment shows that respiratory equipment is a suitable control measure, employers must ensure it is suited to the demands of the job, fits the wearer correctly, is used by competent and trained people and is properly cleaned and maintained.

By following steps such as these, employers can protect their most valuable asset – their staff – from the risks of severe illness, serious diseases and even death.

Recommended reading

Health and safety toolbox
hse.gov.uk/toolbox

Occupational disease: HSE microsite
bit.ly/2KCLWNS

Working with substances hazardous to health: A brief guide to COSHH
hse.gov.uk/pubns/indg136.pdf

COSHH Essentials (webtool)
hse.gov.uk/coshh/essentials/index.htm

COSHH Approved Code of Practice
hse.gov.uk/coshh/further/publications.htm

Construction dust
hse.gov.uk/pubns/cis36.htm

Clearing the air: a simple guide to buying and using local exhaust ventilation (LEV)
hse.gov.uk/lev

EH40/2005 Workplace exposure limits
hse.gov.uk/pubns/books/eh40.htm

Asbestos essentials. A task manual for building, maintenance and allied trades of non-licensed asbestos work
www.hse.gov.uk/asbestos/information.htm

Personal protective equipment at work. Guidance on regulations
hse.gov.uk/pubns/priced/l25.pdf

Respiratory protective equipment – HSE guidance webpages
bit.ly/2Y08NtB

HSE guidance on using PPE at work during the coronavirus pandemic – for non-healthcare work and health and social care work
hse.gov.uk/coronavirus/ppe-face-masks/index.htm

Fit testing face masks to avoid transmission during the coronavirus (COVID-19) pandemic
bit.ly/2XUfmO9

Respiratory protective equipment at work. A practical guide
hse.gov.uk/pubns/books/hsg53.htm

A guide to the introduction and use of RPE (HSE DVD)
bit.ly/3sOtV13

RPE employee toolbox talk (HSE)
bit.ly/3jfSd0O

Is your mask protecting you?
hse.gov.uk/pubns/indg460.htm

Using disposable respirators: pre-use checks (HSE poster)
hse.gov.uk/pubns/disposable-respirator.pdf

RPE selector tool (Healthy Working Lives Scotland)
bit.ly/3lTUOxo

Fit2Fit guidance on RPE fit testing
fit2fit.org

Breathe Freely – lung disease prevention (BOHS)
www.breathefreely.org.uk

Welding Fume Control Selector Tool (BOHS)
www.breathefreely.org.uk/WST/

HSE safety alert on change in enforcement expectations for mild steel welding fume
bit.ly/36H26fm

Welding fume guidance (HSE)
hse.gov.uk/welding

Clean air? Take Care! BSIF campaign resources
bsif.co.uk/clean-air-take-care

Occupational health toolkit (IOSH)
bit.ly/2JhSDEq

No Time to Lose (IOSH work cancer campaign)
notimetolose.org.uk

Further information

BOHS (British Occupational Hygiene Society)
Professional body for occupational hygienists. These professionals specialise in preventing work-related ill health caused by exposure to hazardous substances and agents, such as chemicals, noise and vibration. Website contains a directory of consultants who can provide advice to employers.

bohs.org

Breathe Freely
BOHS (British Occupational Hygiene Society)-led campaign that aims to prevent cases of occupational lung disease in the UK manufacturing and construction industries. Website features free guidance on how to prevent exposure to harmful substances, including through the selection and use of local exhaust ventilation and RPE during welding and construction work. So offers a free online tool on selecting the correct exposure controls for welding work.

breathefreely.org.uk

British Safety Industry Federation (BSIF)
Trade body that represents PPE manufacturers and suppliers. The BSIF strives to ensure high standards in the supply and use of all forms of PPE. It also runs the 'Clean Air – Take Care!' campaign, which aims to raise awareness among RPE users, employers, fit testers and advisors on the correct selection and use of RPE. The campaign offers free online guidance on the correct use of RPE.

bsif.co.uk

Fit2Fit RPE Accredited Fit Test Providers scheme
A scheme from the BSIF designed to confirm the competence of people who offer fit testing services for tight-fitting RPE facepieces. Under the voluntary scheme, individuals can be accredited as a competent provider of RPE fit testing services if they pass a formal assessment process overseen by Fit2Fit. The website provides a list of accredited RPE fit test providers in the UK.

fit2fit.org

GOV.UK
Government website providing guidance for employers and business owners on topics such as protecting workers and the public from coronavirus. Also see the websites of the Scottish, Welsh and Northern Ireland governments.

gov.uk

Health and Safety Executive (HSE)
Responsible for enforcing health and safety law at most industrial workplaces in Great Britain. HSE offers a wide range of online guidance and advice on managing a variety of health and safety risks.

hse.gov.uk

Health and Safety Executive for Northern Ireland
Enforces health and safety law in Northern Ireland. Also offers guidance for employers.

hseni.gov.uk

Healthy Working Lives (Scotland)
Free health and safety advice service for Scottish employers of all sizes. The service also offers a free online RPE selector tool, which was jointly developed by HSE, NHS Health Scotland and Healthy Working Lives.

healthyworkinglives.scot

bit.ly/3zlIADm

Healthy Working Wales
Free health and safety advice service for employers and employees in Wales. Website provides a variety of guidance to help employers improve the health, safety and welfare of their employees.

www.healthyworkingwales.wales.nhs.uk/home

No Time to Lose
IOSH campaign aimed at encouraging and helping businesses to prevent cases of occupational cancer. Website provides guidance on how to reduce exposure to carcinogenic substances and hazards, such as asbestos, diesel exhaust emissions, silica dust and solar radiation.

notimetolose.org.uk

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