

Respiratory Protective Equipment

INTRODUCTION

In today's world there are multiple concerns surrounding our lungs and general respiratory health, and in a work environment it is necessary for many people to wear respirators or breathing apparatus to protect their health. In simple terms, respirators work to prevent harmful substances from in the air being inhaled. Most types of respirator work by filtering the air whilst some types provide a supply of clean air to breathe.

This simple guide has been developed to provide an overview of the key points you need to consider when selecting Respiratory Protective Equipment (RPE) and explain the differences between respirator types. It will help you to shop the RS range so you can quickly and effectively find the products and parts you need to keep your staff safe in the workplace.



WHY BUY FROM RS?

As industry experts we offer a wide range of respiratory protective equipment for most requirements and environments, from professionally-approved RS products, to those from the global market leader 3M, so you can find all the products you need from one source, with next-day delivery, competitive-pricing and bulk discounts.

WHEN IS RPE REQUIRED?

Some work activities can cause harmful substances to contaminate the air in a variety of forms, for example:

- **Dust** – airborne solid particles are present
- **Mists** – minute droplets are present (due to condensation or processes such as paint spraying)
- **Metal fumes** – airborne particles of metals that have vaporised and condensed (e.g. through welding processes)
- **Gases** – can be odourless and/or invisible and spread quickly
- **Vapours** – from the evaporation of solids or liquids at room temperature
- **Oxygen deficient atmospheres** – oxygen has been displaced or diluted, resulting in a risk of asphyxiation

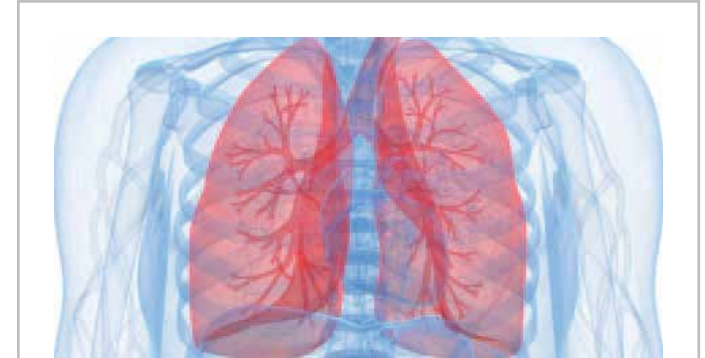
WHY IS RPE REQUIRED?

National health and safety regulations commonly set out the requirements for minimising hazardous risks in the workplace.

RPE should ONLY be used where ALL attempts have been made to remove or reduce the levels of hazard, for example by installing extraction equipment, or by putting up physical barriers before even considering the use of RPE.

National health and safety regulations generally require that employers should:

1. Identify the hazard
2. Assess the concentration of the hazard
3. Provide only CE approved PPE/RPE
4. Establish a documented training program for all employees that are required to use RPE to ensure correct use, fitting and maintenance – which should include cleaning, replacement and storage



“Thousands of people die from work-related lung diseases every year, in many cases due to exposures that took place many years before. Breathing in certain dusts, gases, fumes and vapours in the workplace can cause serious, long-term lung damage.”

Health and Safety Executive (HSE)

IMPORTANT NOTE

Respirators MUST NEVER be used in oxygen deficient atmospheres. Specialist breathing apparatus is required that is not covered in this guide.



STEP-BY-STEP GUIDE TO PROVIDING PROTECTION

Selecting adequate and suitable RPE can appear daunting at first. With so many factors to consider, plus such a variety of options, it can be difficult to know where to start.

1 IDENTIFY THE HAZARDS

- a At a high level, there are three types of respiratory hazard:
 - Particulate Hazards:** e.g. mists, fumes, dusts or fibres
 - Gas and Vapour Hazards:** e.g. solvent vapours or acidic gases
 - Oxygen Deficient Atmospheres:** e.g. often found in confined spaces and/or where oxygen is consumed by materials or combustion
- b You need to understand the types of hazards that your workers encounter before you can make a decision on suitable RPE for the work environment.

Consider the type of work that is undertaken and identify:

- a. **Process Generated Hazards** e.g. dust from sanding wood or gases released in a reaction. Some work activities, such as heating or cutting materials, could generate harmful substances which contaminate the air in the form of mists, dusts, fumes or gases.
- b. **Bought-in Hazards** e.g. bottled gases, solvents or chemicals. Any product that is classed as 'Dangerous for Supply' will come with a Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) which should provide information on:
 - health hazards (on product labelling)
 - forms of the substances contained in the product
 - the type of RPE required for its use

2 ASSESS THE RISK

To ensure the RPE you select is adequate to protect your workers against any harmful substances in the air around them, you need to understand the amount in the air and the form it takes (e.g. vapour or particles), to effectively assess the concentration of the hazard.

There are various types of respirator and breathing apparatus available and the protection they offer depends on a number of things, including the protection factor. To help you, each type and class of RPE is categorised by a protection factor which takes the form of either a Nominal Protection Factor (NPF) or an Assigned Protection Factor (APF). More information on this can be found on page 46.

Things to check:

- a. Check MSDSs of bought-in hazards – do they provide guidance on the required APF?
- b. Does the substance have a prescribed Occupational Exposure Limit (OEL)? If there is no advice on the required APF in the MSDS, you can calculate the required protection level using the OEL and quantity of substance in the air.
- c. If there is more than one hazard present, e.g. dust and gas, you will need to find out the protection factor for each and choose appropriate RPE based on the highest protection factor required.

For more information about NPF, APF and OEL see page 46.



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STEP-BY-STEP GUIDE TO PROVIDING PROTECTION

3 PROVIDE CE APPROVED RPE/PPE

Now you have identified the hazards and assessed the risks you understand what protection factor you need. Next you need to consider what type of device is right for your organisation, its environment and the individuals who work there.

Here is an overview of the main respirator types, detailing the features and benefits of each type:

**Disposable Respirators**

In general, disposable respirators only protect the wearer from particulate hazards.

Features of disposable respiratory products:

- Different moulded shapes to suit individuals
- Valved or unvalved options – valved respirators reduce exhalation effort so they are cooler to wear and reduce misting of eyewear
- Most disposable respirators feature adjustable nose clips for added comfort

Benefits of using disposable respirators:

- Easy to use – no maintenance is required
- Hygienic – discard after use
- Cost-effective and versatile

**Reusable Respirators**

Available in full and half-mask options, reusable respirators protect the wearer from particulate and/or gas and vapour hazards depending on the filter type selected.

Features of reusable respiratory products:

- Wide variety of sizes, styles and filter types available to suit individual requirements
- Full and half-mask options – full face respirators also protect the eyes
- Hypoallergenic options also available

Benefits of using reusable respirators:

- Versatile; filters can be changed to protect from multiple hazards
- Can be recorded and used as part of the health and safety regulations relating to reusable RPE monthly inspection and maintenance records

**Powered Respirators**

One of the main benefits of using powered (or supplied air) over disposable or reusable respirators is that they don't require fit testing to be carried out. They use a battery powered fan and motor to draw contaminated air through a filter. The filter captures certain contaminants and clean air is fed to the wearer.

- Suitable for use over long shifts – no increase in breathing resistance
- Can offer integrated head, eye and face protection
- Allows the wearer to walk freely around without any trailing tubes

✗ Cannot be used to protect against substances with poor warning properties (taste/ smell)

✗ Must not be used in conditions that are oxygen deficient or immediately dangerous to life or health (IDLH)

**Air-fed Respirators**

Like powered respirators, airfed respirators don't require fit testing as the products are classed as loose fitting. They use breathable quality air supplied from a compressor via a tube. The compressed air is regulated to a gentle flow and fed to the wearer.

- Can be used to protect against substances with poor warning properties (taste/ smell)
- Can offer integrated head, eye and face protection
- Suitable for use over long shifts – no increase in breathing resistance

✗ Must not be used in conditions that are oxygen deficient or immediately dangerous to life or health (IDLH)

4 TRAIN IN FITTING AND USE

If RPE is not worn correctly it will not provide the required protection, so it is vital that you integrate RPE use into normal workplace activities and provide adequate training. It is often best, if possible, to give a choice of several adequate and suitable RPE to wearers so they can select the most comfortable.

All people involved in the selection, use, storage and maintenance (if necessary) of RPE require training. Ideally this needs should cover:

- Why RPE is necessary
- Hazards and their risks and effects
- The type of RPE being provided
- How it works
- Why fit testing is required (if relevant)
- How to wear and check equipment correctly
- Fit checking before use
- Details of maintenance required/when
- How to clean and store
- What to do if there's a problem with any RPE
- Responsibilities of both employer and employees
- RPE use and misuse

Fit testing

Face piece fit testing is a way of checking that a tight-fitting face piece (typically disposable and reusable respirators, although this can include half and full face masks, including those that form part of an air-fed or powered respirator) fits the wearer's facial features and forms an adequate seal. Fit testing of all tight fitting respirators is mandatory in the UK. In certain other countries, fit testing of tight fitting respirators is mandatory in certain industries. Further information about Fit Testing can be found at www.fit2fit.org – the UK Fit2Fit accreditation scheme for testers.

NOMINAL AND ASSIGNED PROTECTION FACTORS

What are NPFs and APFs?

Nominal Protection Factors (NPFs) and Assigned Protection Factors (APFs) are simply a numerical rating indicating how much protection a device can offer. NPFs are derived exclusively from laboratory measurements, whilst APFs are derived from workplace measurements and represent the minimum protection factor that a trained wearer will achieve wearing the respirator in the workplace.

Unfortunately, there is not a standard approach to using NPFs and APFs across Europe. Some countries stipulate that NPFs should be used, whilst others like the UK, France and Germany stipulate that APFs should be used. Furthermore, some countries have different APF values for the same

class and type of respiratory protective device.

Therefore, it is always important to check and be familiar with national regulations and requirements when selecting and using respiratory protective devices.

Example: So wearing RPE with an APF of 10 will reduce exposure to the wearer by at least a factor of 10 (as long as RPE is used correctly). In the simplest terms, the RPE wearer will breathe in one-tenth or less of the amount of substance present in the air.

Nominal Protection Factors and Assigned Protection Factors used in different countries		NPF	3M Stated max. PF	APF UK	APF France	APF Germany	APF Italy
EN149 (Filtering Facepiece)	FFP1	4	4	4	4	4	4
	FFP2	12	12	10	10	10	10
	FFP3	50	50	20	10	30	30
EN12941 (Powered air Turbo with loose fitting headtop)	TH1	10	10	10	5	5	5
	TH2	50	50	20	20	20	20
	TH3	500	500	40	40	100	200

OCCUPATIONAL EXPOSURE LIMITS

What are OELs?

An Occupational Exposure Limit (OEL) is a predetermined upper limit on the acceptable concentration of a hazardous substance in workplace air.

OELs are normally determined by workplace sampling and reviews of historical exposures and workplace health statistics. OELs are typically determined by competent national authorities

and enforced by legislation to protect workplace health and safety. Like APFs described above, OELs for any given chemical, material or class of material can vary from country to country across Europe, so it is important to also check and be familiar with national OELs when implementing a respiratory protection programme.



FILTER TYPES

Main Respiratory Hazards Level 1	Sub-hazards Level 2	Sub-hazards Level 3	Examples	Typical Risks
Particulates (a suspension of particulates in air is called an aerosol)	Dusts	Dust	(Respirable Crystalline Silica from cutting concrete block)	Acute through to Chronic health effects, Explosion / Fire
		Metal fumes	Welding fume	Acute through to Chronic health effects
		Fibres	Asbestos	Acute through to Chronic health effects
		Bioaerosols	Moulds, bacteria, viruses	Acute health effects (sensitisation), Infection
	Mists	Mists	Fine mists from spray painting	Acute through to Chronic health effects, Explosion / Fire
Gases & Vapours	Gases		Sulphur Dioxide, Ammonia, Carbon Monoxide	Acute through to Chronic health effects, IDLH exposures - toxic / asphyxiation, Explosion / Fire
	Vapours		Mercury, Formaldehyde	
Oxygen Deficiency	Oxygen Deficient Atmospheres		<19.5% Oxygen	IDLH - asphyxiation