




Guidance on the Use of Respiratory Protective Equipment

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1.0 Purpose of the Guidance

Respiratory Protective Equipment (RPE) is a term used to describe respirators or facemasks which protect the wearer from hazardous airborne substances such as dusts or vapours which could cause health problems if inhaled.

If correct RPE is selected, if it fits properly to the users face and if it is looked after carefully, it will provide the necessary protection. However, if the wrong type is chosen, if it does not seal to the users face or if there is a failure to store it correctly or maintain it, then the RPE could provide little or no protection.

The following guidance should be used by Schools and Support Services wherever RPE is provided for use by a member of staff or by students.

2.0 Scope of Guidance

This guidance document applies to all activities which present a risk of airborne contaminants entering the nose, mouth or lungs. This applies to all staff, student and visitors who engage in this type of activity.

3.0 Definitions / Acronyms

Term	Definition
RPE	Respiratory Protective Equipment
PPE	Personal Protective Equipment

4.0 Should RPE be Used?

RPE should be used only when it is not reasonable to control exposure of the hazardous substance by other means. The "other means" are controls such as use of a fume cupboard or other form of local exhaust ventilation. In addition, always consider if the substance could be provided in a different physical form. For example using granules or tablets instead of a powder would greatly reduce the amount of airborne dust. Purchasing made-up solutions instead of making-up your own can also reduce or eliminate exposures. Also remember a point which should be obvious but which is often forgotten: RPE protects only the wearer. Consider others in the room or nearby who are not wearing RPE. What are they being exposed to by the activities of the person who is wearing the RPE?

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5.0 Types of RPE

5.1 Face Masks

Face masks are disposable respirators which have a particulate filter, this is usually referred to as an FFP1, FFP2 or FFP3 mask. There are differences in the level of protection that each type offers:

FFP1	<p>FFP1 masks may be used with contaminant concentrations up to 4 times the workplace exposure limit (WEL).</p> <p>The total leakage of an FFP1 mask is a maximum of 22%. At least 80% of contaminants are filtered out of the inhaled air.</p> <p>Common applications for an FFP1 mask are environments with low levels of dust that is not harmful to health.</p>
FFP2	<p>FFP2 masks may be used with contaminant concentrations up to 10 times the workplace exposure limit (WEL).</p> <p>The total leakage of an FFP2 mask is a maximum of 8%. At least 94% of contaminants are filtered out of the inhaled air.</p> <p>Common applications for an FFP2 mask include handling soft wood, metal, plastics (not PVC) and oil mist.</p>
FFP3	<p>FFP3 masks may be used with contaminant concentrations up to 20 times the workplace exposure limit (WEL).</p> <p>The total leakage of an FFP3 mask is a maximum of 2%. At least 99% of contaminants are filtered out of the inhaled air.</p> <p>Typical applications for an FFP3 mask are for example handling heavy metals, hardwood, brake dust, radioactive substances, pathogens such as viruses, bacteria and fungal spores as well as stainless steel welding.</p>

These masks cover the nose and mouth and they protect the user against airborne hazards such as dust, mists, liquids and some fumes – but not gases or vapours. A face mask will only be effective if a tight seal is formed with the face, this may be difficult to achieve if the user has facial hair.

A face mask would **not** be suitable if:

- Contaminant concentrations are dangerous to health, unknown or exceed exposure levels
- Toxic gases or vapours are present
- There is not a tight seal against the face
- There is an oxygen deficient atmosphere



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5.2 Respirators

You can use either a full face or half face respirator depending on your need. The half face respirator covers the lower half of the face and filters (either disposable or fixed) as positioned towards the bottom of the respirator.

A full face respirator covers the whole face, including the eyes, nose and mouth. The bottom half covering the nose and mouth is sealed off from the upper half to prevent the visor from steaming up and obstructing your view. Full face respirators protect the eyes from dust and gases. Like half face respirators, filters are positioned towards the bottom of the respirator.

There are different types of filters which can be used with full and half face respirators. The user needs to identify what the hazard is and which filter will provide adequate protection. A respirator will only be effective if a tight seal is formed with the face, this may be difficult to achieve if the user has facial hair or if they wear glasses.



5.3 Air Fed Respirators

Air fed masks or hoods are battery powered and a belt is usually worn on the users waist, air is sucked into the respirator unit, is passed through a filter and then passed into the hood via a hose. The air then passes down across the users face.

With air fed respirators, or positive pressure respirators, the pressure inside of the respiratory inlet exceeds the ambient pressure outside the respirator. Air fed respirators are an effective way of delivering fresh, filtered air to the user whilst protecting them from harmful fumes and gases. As they work by delivering a flow of fresh air over the users face, the mask does not need to be tight fitting so can be suitable for those who are unable to use a fitted respirator. As they do not rely on a tight fitting seal they can also be more comfortable for users who have to wear them for long periods.



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6.0 Selection of RPE

When selecting respiratory protective equipment there are a number of factors what you need to consider, including the work environment and what type of hazard (s) you are being exposed to. You must also note that Personal Protective Equipment (PPE) is the lowest form of protection, always consider other controls first.

There is a wide range of RPE for many different applications, and this guidance may not be directly applicable to your specific situation, it is recommended that the University Safety Advisers be consulted for advice if there is any doubt about the selection and use of RPE. Do not assume that RPE which has been purchased for a particular application (for example where protection against dust is required) will be suitable of another application (for example where protection against a different type of dust or a volatile chemical is needed).

7.0 Use of Filters

There are different types of filters which can be used with full and half face respirators. The user needs to identify what the hazard is and which filter will provide adequate protection.

Filters that are being used must be replaced at least every 6 months, it may need to be replaced sooner than this as the usable life and replacement schedule varies depending on:

- the concentration of contaminants in the air
- the rate of inhalation
- how the filter has been stored when not in use

If a respirator becomes more difficult to breathe thorough then this is an indication that the filter may be full of contaminants and at the end of its useable life.

If you can smell a contaminant through the respirator then you are being exposed to the contaminant and must stop work immediately. You will need to check that the respirator is fitted correctly (there is a tight seal against your face) and may need to change the filters.


7.1 Selecting the right filter

The table below gives advice on which filters can deal with which hazard types, it is essential that you check with the manufacturer of the filter that the hazard will be appropriately controlled and that it is compatible with your type of respirator.

Hazard Types	Types of Filter Needed	Things to Consider
<ul style="list-style-type: none"> - Mechanically generated particles - Silica dust - Chrysotile 	P1	A P1 particulate filter will not provide protection against anything more than
<ul style="list-style-type: none"> - Solid and liquid particles that do not contain oil - Non-toxic dusts from sanding, grinding, sawing and insulating particles e.g. rockwool - Non-toxic household cleaners and disinfectants 	P2	P2 particulate filter - Mechanically and thermally generated particulates
<ul style="list-style-type: none"> - Solid and liquid particles, including those containing oil - Mist droplets from spraying - Dusts, mists and fumes from sanding, grinding, cutting, drilling metal 	P3	P3 particulate filter – All particulates including highly toxic materials
<ul style="list-style-type: none"> - Agricultural chemicals such as pesticides and herbicides with a low vapour pressure 	GP1	<ul style="list-style-type: none"> - Filter Type G – Organic compounds with vapour pressures less than 1.3 Pa at 25°C - P1 particulate filter – Mechanically generated particulates
<ul style="list-style-type: none"> - Non-toxic particulate matter such as dust from sanding, sawing, grinding and sweeping - Non-toxic particulate matter such as odours from solvents, degreasers and paint thinners 	Carbon layer odour reduction respirator with a GP2 filter	<ul style="list-style-type: none"> - Filter Type G - Organic compounds with vapour pressures less than 1.3 Pa at 25°C - P2 particulate filter - Mechanically and thermally generated particulates - A GP2 filter is used in non-toxic oil and non-oil environments
<ul style="list-style-type: none"> - Organic vapours with a boiling point greater than 65°C - Organic solvents such as toluene and xylene - Paint thinners, lacquers and glues 	A1 / A2	<ul style="list-style-type: none"> - Filter Type A – Organic gases and vapours - Class 1 filter – Low to medium absorption capacity filter - Class 2 filter – Medium absorption capacity filters - A2 filter provides protection against the same chemicals as A1 filter. A2 is used when persons are exposed to higher concentrations
<ul style="list-style-type: none"> - Ammonia - Methylamine 	K1	<ul style="list-style-type: none"> - Filter Type K - Ammonia and organic ammonia derivatives - Class 1 filter – Low to medium absorption capacity filter

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<ul style="list-style-type: none"> - Low boiling point organic vapours (boiling point less than 65°C) - Highly volatile solvents such as methanol and 1,3-Butadiene 	AXP3	<ul style="list-style-type: none"> - Filter Type AX – Low boiling point organic compounds (boiling point is less than 65°C) - P3 particulate filter – High absorption capacity filter
<ul style="list-style-type: none"> - Organic vapours with a boiling point greater than 65°C - Solvents and / or acid gases such as toluene, chlorine, sulphur dioxide and hydrochloric acid 	A1B1E1	<ul style="list-style-type: none"> - Filter Type A – Organic gases and vapours - Filter Type B – Inorganic gases and vapours - Filter Type E – Sulphur dioxide and other acid gases and vapours - Class 1 filter – Low to medium absorption capacity filter
<ul style="list-style-type: none"> - Organic vapours with a boiling point greater than 65°C - Inorganic vapours and acid gases - Acid gases - Chlorine - Hydrogen chloride - Sulphur dioxide - Hydrogen fluoride - Hydrogen sulphide - Ammonia - Methylamine - Formaldehyde 	A1B1E1K1	<ul style="list-style-type: none"> - Filter Type A – Organic gases and vapours - Filter Type B – Inorganic gases and vapours - Filter Type E – Sulphur dioxide and other acid gases and vapours - Filter Type K – Ammonia and organic ammonia derivatives - Class 1 filter – Low to medium absorption capacity filter
<ul style="list-style-type: none"> - Organic vapours with a boiling point greater 65°C - Mercury vapours - Chlorine gas and particulates 	A1HgP3	<ul style="list-style-type: none"> - Filter Type A – Organic gases and vapours - Filter Type Hg – Metallic mercury - Class 1 filter – Low to medium absorption capacity filter - P3 particulate filter – All particulates including highly toxic materials
<ul style="list-style-type: none"> - Organic vapours with a boiling point greater than 65°C - Chlorine - Hydrogen chloride - Sulphur dioxide - Hydrogen fluoride - Hydrogen 	A2B2E2K2P3	<ul style="list-style-type: none"> - Filter Type A – Organic gases and vapours - Filter Type B – Inorganic gases and vapours - Filter Type E – Sulphur dioxide and other acid gases and vapours - Filter Type K – Ammonia and organic ammonia derivatives - Class 2 filter – Medium absorption capacity filter - P3 particulate filter – All particulates including highly toxic materials

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8.0 Face Fit Testing

Where RPE is used to protect the wearer from inhalation of a hazardous substance, it must be fit tested to confirm it provides a tight fit to the wearer's face. If there is not a tight fit, there could be leakage of airborne contaminants which will then be inhaled by the user. Even a slight leak can greatly reduce the protection afforded by the RPE. Face fit testing of RPE is not optional. It is a legal requirement.

Fit testing can be carried by several companies in Aberdeen which specialise in providing this service. Advice on which companies should be used for fit testing can be obtained from the University Safety Advisers. In essence, a test involves the wearer putting on the RPE, harmless airborne particles are introduced into the space on the outside the mask and the tester checks the extent of penetration to the inside of the mask. There are a number of different techniques for doing this. When booking tests you should ask for quantitative tests (using equipment such as a particle counting device which provide a numerical measure of the fit) unless the test provider considers that qualitative tests (using the taste-test method) are more appropriate for the type of face mask.


University staff / students who undergo face fit testing should have a repeat test if there are significant changes to the shape of the face - for example, if they undergo any substantial dental work or develop facial changes such as scars or moles around the face seal area. Regardless of this, face fit tests should be repeated every 5 years. When face fit tests are booked, the test provider should be told that certificates of test should be issued with a validity of 5 years. (Some companies have, in the past, issued certificates which show a validity of 2 years. These can be regarded as having a validity of 5 years from the date of test.)

Any facial hair such as beard, stubble or moustache in the region where the RPE seals to the face will cause leakage and will result in failure of the fit test. It might be possible to provide those with facial hair with an alternative type of RPE which does not rely on a tight seal to the face.

8.1 Pre Use Checks

Perform the following checks before each use:

- Ensure the mask / respirator fits well
- Masks and half face respirators must cover the nose and mouth, full face respirators must cover the eyes, nose and mouth
- Facial hair, even just one day's growth, can negatively affect the performance of the mask / respirator
- Adjustable straps of the mask / respirator should hold it tight against the face
- Ensure the mask / respirator forms a tight seal on the face
 - o To test the seal, cover the filter(s) and block them with your hands and inhale. If the respirator / masks pulls tight against your face from the negative pressure created by inhaling, then a seal has been achieved
- If a seal has not been achieved, adjust the straps and repeat

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9.0 Care and Maintenance

All RPE must be checked for correct functioning before each use. The RPE manufacturer's guidance should be followed.

Disposable RPE (or single use RPE) is intended to be used for no more than one day. It should be thrown away after use. It should not be kept for use on a subsequent day.

RPE which is intended for reuse must be stored in a manner in which it will be free from contamination. If the inner surface of the RPE becomes contaminated, the wearer will inhale the contamination next time the RPE is worn.

RPE which is intended for reuse must be maintained, examined and tested at least once per month. Records must be kept.

10.0 Training

Wearers of RPE must be trained in the following:

- Why RPE is needed
- The protection afforded and the limitations of that protection
- Why formal face fit testing is required
- How to wear it and check it each time it is used
- How to clean it and where to store it
- What maintenance is required and when

11.0 References

Document Number	Document Name
HS-PO-002	Control of Substances Hazardous to Health Policy