

SELECTING AN ADEQUATE RESPIRATOR

In publication HSG53 'Respiratory protective equipment at work', HSE define an 'adequate respirator' as 'right for the hazard and reduces exposure to the level required to protect the wearer's health'. To determine if a respirator is adequate for use, various factors must be considered, and it may be necessary to consult several sources for information and guidance. Some key considerations include the form of the hazardous substance(s), whether the task will be carried out in an oxygen deficient atmosphere, relevant COSHH guidance from HSE and safety data sheets (SDSs) published by suppliers of hazardous substances.

ASSIGNED PROTECTION FACTORS

In some cases, COSHH guidance from HSE or SDSs for substances will detail the appropriate Assigned Protection Factor (APF) for protection against a hazardous substance. For example, HSE now state that an APF of 20 is required for woodworking. Where there is no protection factor stipulated by the HSE or advised by material suppliers, the appropriate APF must be identified by calculating the Required Protection Factor (RPF) using the equation shown below:

$$RPF = \frac{\text{Measured level of contamination}}{\text{Exposure limit for contaminate}}$$

First the level of hazardous substance must be measured. The measured value is then divided by the Workplace Exposure Limit (WEL) for that contaminate to determine the RPF.

Workplace Exposure Limits (WELs) are set nationally for many substances and are published in EH40/2005 Workplace exposure limits which is available for free download on HSE's website.

In the example below, the WEL is 50mg/m³ and the measured level of contamination is 900mg/ m³
RPF = 900mg/m³ ÷ 50mg/m³
RPF = 18

There are only a select number of APFs in the UK: 4, 10, 20, 40, 2000. For adequate protection, a respirator with an APF of at least the RPF or higher is required. This



means in the example given respiratory protection with an APF of 20 is required.

The form of the hazardous substance must also be taken into account; a particulate respirator will not protect against a gas/vapour hazard, nor can a half mask with gas/vapour cartridges filter dusts. Some tasks can create multiple forms of hazardous substance at once. For example, using power tools with MDF creates fine wood dust requiring particulate protection but also releases formaldehyde vapours as friction heats up the glues within the material. Protection for MDF work with power tools therefore requires ABEK1P3 filters for high efficiency particulate filtering and the gas/vapour element necessary to protect against formaldehyde.

Safety data sheets from substance suppliers give details on the forms of substances. The Filter Types table on page 45 also helps to explain the different forms of respiratory hazard encountered in the workplace. Other considerations include oxygen deficiency, in which case specialist guidance and equipment should be sought.

The information required to select an adequate respirator for example on the left, assuming the hazard is a particulate contaminant, would be: protection against particles with APF of 20. In order to determine the appropriate type of RPE, suitability factors need to be considered.

SELECTING A SUITABLE RESPIRATOR

HSG53 defines a 'suitable respirator' as 'right for the wearer, task and environment, such that the wearer can work freely and without additional risks due to the RPE'. In order to assess the suitability of a respirator it is necessary to consider factors relating to the wearer as well as those relating to the work task and environment.

Suitability factors relating to the wearer include any medical conditions or allergies that could affect the selection or use of RPE, and whether the wearer requires corrective spectacles, contact lenses, or other PPE at work. The respirator must be compatible with any other PPE or spectacles required to be worn by the user or task. This can be achieved by using a combined unit or by ensuring that each piece of PPE is compatible with each other. If unsure about compatibility of PPE, contact the manufacturer for guidance.

Another important consideration is facial hair; this can determine whether tight-fitting RPE is an option. Tight-fitting RPE includes disposable respirators, half masks, and full face masks which rely on creating a seal with the face. Facial hair and stubble can compromise the fit by interfering with the seal and allowing inward leakage of harmful substances. For tight-fitting RPE, ensuring a good fit is also part of determining suitability. Face fit testing assesses how well RPE fits an individual, taking into account the compatibility of other PPE and prescription spectacles. See page 17 for more information on fit testing.

Factors relating to the task and environment are things such as wear time and work rate – how long does the RPE need to be worn continuously for and how hard will the wearer be working? Is the work in a tight or confined space? Temperature, humidity, movement and vision requirements are also important factors to consider.

For a respirator to be suitable, the wearer must not be impeded in any or way or put in danger as a result of the equipment selected. Impediment can range from a hose getting caught up in a confined space to a contact lens becoming lodged in a face mask valve, meaning all relevant factors need to be carefully considered.

