

(C) Suitable for individual user

- ◆ In using RPE with tight-fitting facepiece, it is important to achieve good fitness (i.e. face-seal) between the face of the user and the facepiece. Inadequate fitness will cause air leakage into the facepiece, thus significantly reducing the protection provided to the user. To ensure adequate fitness, a fit test with the intended RPE should be conducted for the user. There are two types of fit test methods - qualitative and quantitative.

Sweet or bitter liquid aerosols are sprayed into the breathing zone of the user undertaking a qualitative fit test for a particulate respirator.



Qualitative fit test

- A testing agent of a particular taste or odour is introduced into the breathing zone of the user wearing the RPE.
- If no taste or odour is detected by the user, the RPE is considered fitting the user's face.

Quantitative fit test

- A harmless aerosol is introduced into the surrounding of the user.
- The concentration of the aerosol in the air inside and outside the facepiece is then measured to determine the fitness.
- This test method gives more accurate and detailed information on fitness of RPE.



A user performing a quantitative fit test.

- ◆ If good fitness cannot be achieved due to facial features of the user, loose-fitting type respirators should be considered.
- ◆ A choice of light and comfortable RPE is preferred as long as the level of protection is not compromised.

(D) Conforming to recognized standards

- ◆ RPE should attain recognized national or international standards to ensure its performance. In general, markings are displayed on the package of RPE to indicate attainment of relevant standards. Some examples of common markings for disposable particulate respirators are given in the following table:

Marking	Features
NIOSH Approved: N95	<ul style="list-style-type: none">● The filter is approved by NIOSH (National Institute for Occupational Safety and Health, US), Class N95.● The filter has at least 95% filtration efficiency against particulates free of oil.
EN149:2001 FFP2	<ul style="list-style-type: none">● The particulate respirator meets the requirements of the European Standard EN 149:2001, category FFP2.● The filter has at least 94% filtration efficiency against the test aerosols in accordance with the Standard.

(E) Fulfilling specific legal requirements

- ◆ Employers should follow relevant legal requirements and codes of practice in selecting RPE.
- ◆ The Factories and Industrial Undertakings (Asbestos) Regulation and the Factories and Industrial Undertakings (Confined Spaces) Regulation specify the provision of approved RPE for asbestos work and confined space work respectively.

Enquiries

For enquiries about this leaflet or advice on occupational health and hygiene matters, please contact the Labour Department's Occupational Safety and Health Branch through:

Telephone : 2852 4041
Fax : 2581 2049
Email : enquiry@labour.gov.hk

Information on the services offered by the Labour Department and on major labour legislation can also be found on our website at <http://www.labour.gov.hk>.

Complaints

If you have any complaints about unsafe workplaces and practices, please call the Labour Department's occupational safety and health complaint hotline on 2542 2172. All complaints will be treated in the strictest confidence.

Respiratory Protection Series 2. Proper Selection of Respiratory Protective Equipment (RPE)



Respiratory Protection Series

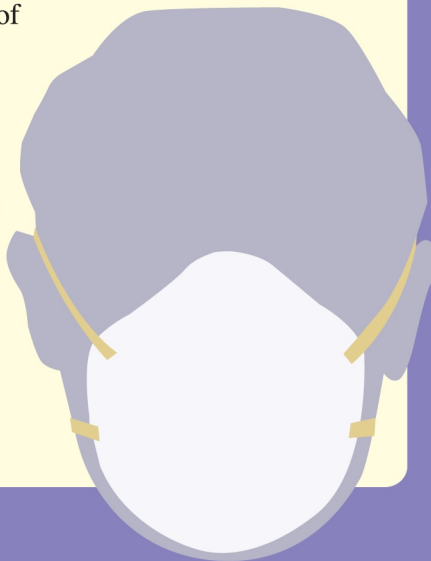
2. Proper Selection of Respiratory Protective Equipment (RPE)

Introduction

Selection of Respiratory Protective Equipment (RPE) is never a simple task. A wrong choice of RPE could be dangerous. This leaflet is intended to help employers and employees better understand the basic concepts on RPE selection.

Employers should seek advice from RPE manufacturers/suppliers or occupational hygiene/safety professionals in complicated circumstances, particularly if they themselves have limited technical knowledge and information on RPE selection.

This leaflet is the second one in the series of publications on respiratory protection. Employers and employees are recommended to read this leaflet in conjunction with first leaflet on proper use of RPE and the third one on proper wearing and maintenance of RPE.



Preparation for RPE Selection

Before selecting RPE, a number of factors must be carefully considered, particularly the risk of exposure to air contaminants. A proper risk assessment of the work process should be conducted to acquire essential information including:

- ◆ air contaminants to which the user will be exposed;
- ◆ nature, properties and hazards of the air contaminants;
- ◆ exposure level and risk involved;
- ◆ characteristics of the working environment (e.g. possibility of oxygen deficiency); and
- ◆ presence of other risk factors which may endanger the health and safety of the user.

Other relevant information including the work method, work duration, work requirements and user's personal factors should be considered. Besides, detailed product specifications of RPE are also required for determining whether a particular model of the equipment can fully meet the requirements.

Requirements for RPE

Some important basic requirements that a selected RPE should meet are as follows:

(A) Providing adequate protection

- The RPE selected should match with the hazard and the anticipated maximum exposure so as to provide adequate protection. The following should be noted:
- ◆ Air-purifying respirators **MUST NOT** be selected for use in a working environment where oxygen is deficient or the levels of contaminants are very high. Only air-supplying RPE should be used in these circumstances.
 - ◆ The filter should match with the hazard. Particulate filters should not be used to guard against vapours or gases.
 - ◆ The RPE should have an Assigned Protection Factor indicating that there is adequate protection for the user even at the anticipated maximum exposure to the contaminants.

What is "Assigned Protection Factor" (APF) of RPE?

In simple terms, APF is the level of respiratory protection that can realistically be expected to be achieved in the workplace by using a properly functioning and correctly fitted RPE. A RPE with an APF of 10 indicates that the equipment, if used properly, can provide adequate protection to the user in an atmosphere having a concentration of up to 10 times the Occupational Exposure Limit for that contaminant. The following table shows the APF of different types of RPE.

APF of various types of RPE against particulates

Type of RPE	APF
Disposable half-face particulate respirator	5-10
Half-face respirator (with particulate filter)	10
Powered air-purifying, loose-fitting helmet or hood respirator	25
Full-face respirator (with particulate filter)	50
Self-contained or compressed air line breathing apparatus, with full facepiece and in positive-pressure demand mode	>1,000

B) Suitable for the work situation

- ◆ Long wearing time (e.g. more than one hour), fast work rate or hot environment will increase the stress on the RPE user. Powered air-purifying respirators or loose-fitting type respirators cause less fatigue and discomfort to the user.
- ◆ RPE will affect the user's verbal communication with others. Some RPE, such as full-face respirators, may decrease clarity of vision. These factors should be considered in RPE selection, particularly for work which requires clear verbal communication and vision.
- ◆ For work involving high mobility or being performed in a congested work area, compact RPE are more appropriate.

