



RESPIRATORY PROTECTION

4

Selecting the correct protection

The selection of Respiratory Protection follows a basic four-step method:

- Identify the Hazards – dust, metal fume, gas, vapour
- Assess the Hazards – assess the hazard level/other protection – skin and eye
- Select the proper Respirator – disposable, half mask, full face, powered, airline
- Training in fitting and use – to optimise respiratory protection

RESPIRATORY HAZARDS



Dusts – produced when solid materials are broken down into finer particles, the longer the dust remains in the air the easier it is to inhale.



Mists – tiny liquid droplets formed by atomisation and condensation processes such as spraying. Mists are often combinations of several hazardous ingredients.



Metal fumes – occur when metals are vaporised under high heat. The vapour is cooled quickly and condenses into very fine particles that float in the air.



Gases – airborne at room temperature. Able to diffuse or spread freely, can travel very far very quickly.



Vapours – gaseous state of substances that are liquids or solids at room temperature. Formed when substances evaporate in the way water vapour evaporates from water.

Legislation Update Amended Standard - EN 149:2001+A1:2009

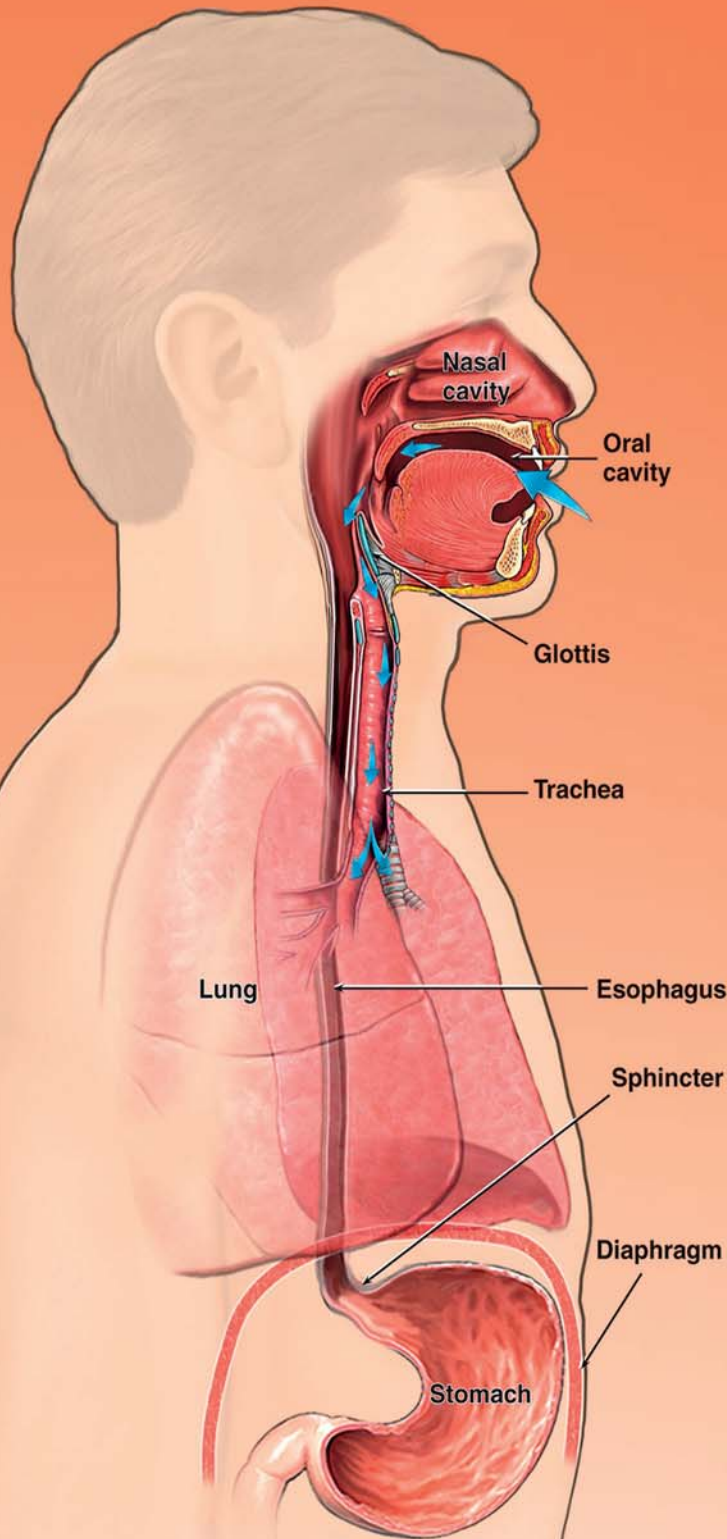
EN 149:2001 was superseded by an amended version, EN 149:2001+A1:2009 (EN 149+A1) in July 2009.

Changes included the introduction of two usability classifications for disposable respirators; single shift only devices (non reusable shown through marking "NR") and reusable devices (marked 'R').

The amended European Standard EN 149:2001+A1:2009 states that all reusable devices (marked 'R') must withstand being cleaned and disinfected using a method provided by the manufacturer. This change, along with new performance requirements, is intended to give the user further confidence in respirators providing continuous respiratory protection in hazardous environments.

All particle filtering half masks featured fully conform to EN 149:2001+A1:2009

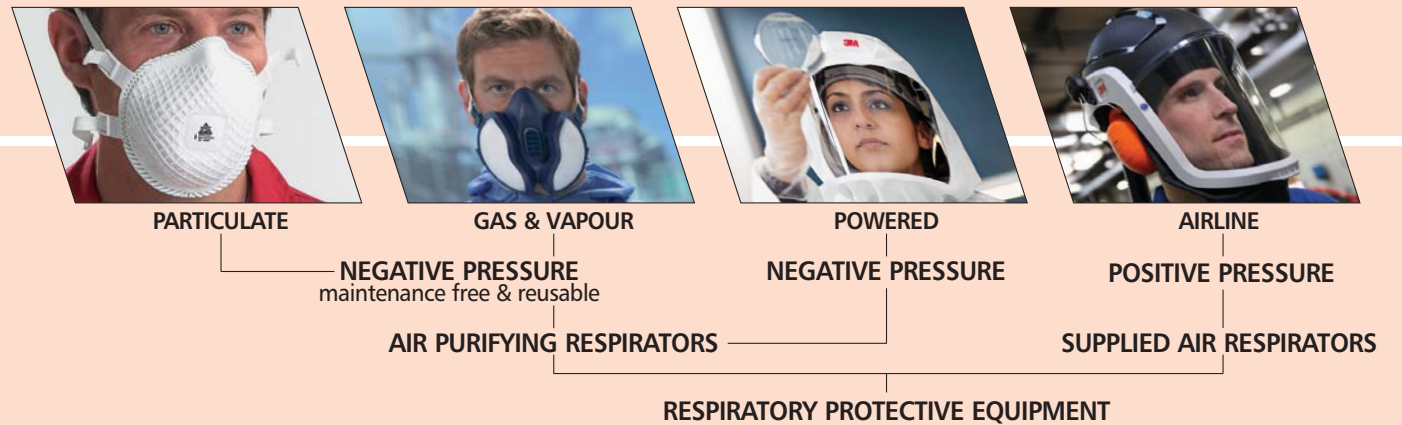
Disposable respirators that have passed the optional Dolomite clogging test have a suffix 'D' listed in their conformity standards.



Respirators must be worn

TYPES OF RESPIRATORY PROTECTIVE EQUIPMENT (RPE)

Each type of RPE has specific limitations which dictate the types of application for which it may be used. RPE is tested to relevant European Standards which determines the product performance.



RESPIRATORY TERMINOLOGY

Workplace Exposure Limit (WEL)
Airborne concentration of a Hazardous Substance, averaged over a specified time period referred to as a Time Weighted Average (TWA).

WEL Time Periods

There are two reference periods for which WELs may be set; 8 hour Time Weighted Average (TWA) and 15 minute Short Term Exposure Limit (STEL). A substance may be assigned WELs at either one or both reference periods.

- 8 hour TWA – some adverse health effects can occur after prolonged or accumulated exposure. The 8 hour TWA is set to restrict the total intake by inhalation over one or more shifts.
- 15 minute STEL – Some adverse health effects may be seen after short exposures. 15 minute STEL may be applied to control these effects.

Immediately Dangerous to Life or Health (IDLH)

The IDLH concentration of a substance is defined as “that which poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment”. The IDLH value represents a maximum concentration from which a worker would escape within 30 minutes without any impairing symptoms or irreversible health effects.

Odour Threshold

The concentration of a substance at which the majority of individuals can smell or taste it.

FIT TESTING OF RPE FACEPIECES

From November 2002 the CoSHH regulations and associated ACOP require employers of wearers of tight fitting facepieces to conduct a fit test to assess the degree of face seal leakage of that respirator to the wearer.

Tight fitting facepieces include disposable particulate respirators, half and full face masks with filters. A fit test should also be conducted on powered and airfed respirators which include a tight fitting facepiece.

If a full facepiece is being used the HSE recommend a Quantitative fit test be conducted. This is usually carried out by a suitably qualified outside agency or competent person. If any other device is used, e.g. filtering facepieces FFP1/2/3 or half face mask respirators fitted with a particulate or combined filter, a Qualitative test can be conducted, which is normally carried out ‘in-house’.

For further information, please read the HSE document ‘Fit Testing of Respiratory Protective Facepieces HSE 282/28’.

RPE SELECTION CALCULATION

Personal Air Monitoring information, when compared to the relevant WEL for that hazardous substance, helps to more accurately determine the required level of respirator protection factor.

For example: Woodworking

- ➊ Measured Levels (Wood Dust) = 60mg/m³ over 8 hours TWA.
- ➋ Workplace Exposure Limit (WEL) for wood = 5mg/m³.
- ➌ Divide ➊ by ➋ = $\frac{60}{5} = 12$.
- ➍ This figure of 12 is the level at which the hazard is above the WEL, i.e. the Hazard Level is 12xWEL.
- ➎ Assuming all other control measures have been considered, including the eight new principles of good practice, select a respirator with an Assigned Protection Factor (APF) greater than 12 (e.g. 3M 9332 which has an APF of 20).
- ➏ Ask yourself the further question ‘Do I need to lower levels as far below the WEL as is reasonably practicable?’ i.e. is this substance one of the group of substances that can cause cancer, sensitisation or heritable genetic change? In this case, wood dust is a carcinogen and therefore levels should be lowered as far below the WEL as is reasonably practicable. Therefore, if all other control measures have been considered, an even higher performing respiratory protection product should be contemplated. However, always remember that RPE should be the last resort and that one of the main principles of RPE selection should be that it is “suitable to the job and the wearer”.

EUROPEAN STANDARDS

Respirators are tested to the relevant European Standards and CE marked. All respirators carry the CE mark plus the European Standard and performance category markings.

- EN149 – Filtering facepiece and particulate respirators
- EN405 – Valved filtering half mask respirators for gases and/or particulates
- EN140 – Halfmask facepieces
- EN136 – Full facepieces
- EN137 – Self-contained open-circuit compressed air breathing apparatus
- EN143 – Particulate filters
- EN146 – Powered Respirators – Hoods & Helmets
- EN147 – Powered – Full Face Masks
- EN270 – Heavy Duty Supplied Air
- EN371 – Gas and/or combined filters for use against low boiling organic compounds
- EN402 – Escape Apparatus. SCBA with full face mask or mouthpiece assembly
- EN529 – Respiratory selection, use and care
- EN1146 – Compressed air escape apparatus with hood
- EN1835 – Light Duty Supplied Air
- EN12941 – Powered Respirators – Hoods and Helmets
- EN12942 – Powered Respirator Full Face Masks
- EN14387 – Gas & vapour filters

FILTER MARKINGS

For use against	Filter Type	Colour Code	Main Applications
Gas and Vapour (EN 14387 and EN 405)	A	Brown	Organic Vapours with boiling point greater than 65°C and good warning properties
	B	Grey	Inorganic gases and vapours, e.g. Chlorine (not Carbon Monoxide)
	E	Yellow	Acid gases and vapours, e.g. Sulphur Dioxide, Hydrogen Chloride
	K	Green	Ammonia and organic ammonia derivatives
	P	White	Particulate
Particles (EN 143 and EN 149)	P1	White	Protection against particulates
	P2	White	Protection against particulates
	P3	White	Protection against particulates
Gas and Vapour (EN 371)	AX	Brown	Certain organic compounds with boiling points less than 65°C & good warning properties

