N.B. All information is presented as accurate and in good faith at the time of writing. 3M cannot be held responsible for any issues relating to changes to information occurring after the date of publish.
• Why respirators are needed

• How they should be selected

• How users should be trained to use them
• Step 1 – Identify possible hazards on site or workplace

• Step 2 – Assess risk and understand the effects of those hazards on the people working there

• Step 3 – If appropriate, select the correct Respirator

• Step 4 – Train people in the use of their Respirator
Before making your selection . . .

Be sure to understand the possible health effects of the hazards on site.

• Are they short or long term?

• If gases or vapours, can they be easily and safely detected by smell or taste?

• Is it possible to eliminate the problem by other means (engineering out or local exhaust ventilation), separation or substitution of less harmful materials?
Remember that respirators should be considered **as a last resort** when it is not practical to use alternative methods and when all other control measures have been adequately considered.
What is the Permitted Exposure Limit?

Most substances have an assigned limit that allow control measures to be assessed.

These limits are called **Workplace Exposure Limits** (WELs).

WELs are listed in EH:40 (published by HSE and generally revised annually).
Dusts - Describes a range of small dry particles
**Mists** - Describes tiny liquid droplets formed from liquid materials either by atomisation or condensation processes.
**Fume** - Describes a fine aerosol which can be chemically or thermally generated (e.g., Welding)
The body has natural defences to airborne particle hazards

- Nasal hair
- Mucus
- Coughing/sneezing

When the dust particles are small enough or the concentration is large enough, these natural defences can be overcome leading to problematic health effects.
With good lighting it is just possible to see a particle 50 microns in diameter at a distance of 10 inches (250cm).

Particles of between 3 microns and 0.5 micron can reach the alveoli and settle there.

Particles as small as these are invisible to the naked eye.

It is very difficult to persuade people to protect themselves from particles they cannot see!
Gases

Substances similar to air in their ability to diffuse or spread freely throughout a container or area. Examples of gases include oxygen, carbon monoxide, carbon dioxide, nitrogen and helium.
Vapours

The gaseous state of substances that are either liquids or solids at room temperature. Formed when solids or liquids evaporate.

Examples include petroleum, paint thinners and degreasing solvents.
The body can only detect hazardous gases if they have good warning properties e.g.

- Taste or Smell

If these warning properties cannot be detected at non-hazardous levels, there may be serious consequences!
Select by considering the following things:

- Type - based on hazard
- Protection Factors - Max. Use Limitations
- Wearer Factors
- Workplace Factors
- Maintenance
- Comfort
- User preference
Examples of Wearer Factors

• Is it suited to the job **AND** the wearer?

• Is it compatible with other PPE?

• For non-disposable RPE consider maintenance implications

• Is the chosen respirator wearer acceptable? Do they like wearing it?
Assigned Protection Factors (APF)

- APFs have **REPLACED** Nominal Protection Factors (NPFs) when selecting RPE.

- APFs are generally significantly **LOWER** than NPFs and are a more realistic measure of respirator performance.

- APFs are listed in HSE book – HSG53
Example

The mean daily personal exposure of carpenters in a wood working shop is 55 mg/m³ (softwood only).

- Softwood dust WEL = 5 mg/m³ 8 hour TWA
- Level of Respiratory Protection = \[
\frac{55 \text{ mg/m}^3}{5 \text{ mg/m}^3} = 11 \times \text{WEL}
\]

Therefore RPE to select needs an APF >11, so evaluate FFP3.
Air Filtering – Negative Pressure Respirators

Particulate Respirator - APFs

Hazard level x WEL

APF = 4
FFP1

APF = 10
FFP2

APF = 20
FFP3

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Examples of APFs

**FFP3 device**
- NPF = 50
- APF = 20

**Full Face mask + P3**
- NPF = 1000
- APF = 40

**Airsuit**
- NPF = 2000
- APF = 200

**Air-Supplied Visor**
- NPF = 200
- APF = 40

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Disposable Facepieces
- the whole mask area is the filter.
- Standard - EN149.
- 3 classes: FFP1, FFP2 and FFP3

Reusable filters
- Filters are attached to a facepiece
- Facepiece can be a half mask or a fullface mask or Powered Respirator
- 3 Classes P1, P2 and P3.
Selecting Gas & Vapour Filters

for Reusable Respirators

\[ A = \text{Organic Vapours (Boiling point > 65}\,\text{oC}) \]
\[ B = \text{Inorganic Vapours} \]
\[ E = \text{Acid Gases} \]
\[ K = \text{Ammonia & Derivatives} \]
\[ AX = \text{Organic Vapour (Boiling point < 65}\,\text{oC}) \]

Check colour coding on filters as above.

Gases/vapours should also have good warning properties.
Step 4: RPE Training

- Hazard Awareness
- RPE Use
- Fit
- Maintenance
- Storage
- Emergency