When selecting a respirator, there are a number of issues to consider. The basis for selection and performance of respirators in Australia is normally based on a number of documents with the relevant Australian Standards being paramount. These are:

- **AS/NZS1716 “Respiratory protective devices”** - this is the performance standard. It sets out the performance parameters and requirements for the different types of respirators. OH&S Regulators such as Workcover NSW and Victoria, Worksafe WA, etc normally expect respirators used in Australian workplaces to meet the requirements of this standard.

- **AS/NZS1715 “Selection, use and maintenance of respiratory protective devices”** provides users with the information they need to use appropriate respiratory protection systems. It gives them guidance on the selection factors and types of respirators available, their performance and their applications.

There are other regulations and codes of practice that specify the appropriate level of respiratory protection for specific applications e.g. for use when removing asbestos and when spraying paints containing isocyanates.

The airborne contaminants that may be present in a workplace can include:

- **“Nuisance” dusts** – small particles that, at high concentrations, clog up the airways of the lungs and create discomfort & breathing difficulty e.g. road dust, dirt.
- **Toxic dusts** – particles that are toxic to the body and can cause local or remote effects to the body after being inhaled into the lungs e.g. asbestos, silica.
- **Irritant gases** – gases that are water-soluble and cause irritation to the upper respiratory tract e.g. ammonia.
- **Asphyxiants** – gases that interfere with the supply of oxygen to the body. They can be simple, such as an inert gas like nitrogen that can dilute the oxygen in the air to a dangerously low level. Or they can be chemical asphyxiants like carbon monoxide or hydrogen cyanide, which are taken up into the bloodstream in preference to oxygen, causing the body’s organs to shut down due to lack of oxygen.
- **Anaesthetics** – many organic solvents e.g. petrol, ethanol, benzene, are readily absorbed from the lungs into the bloodstream. They are then carried around the body and can cause damage to organs like the brain and the liver. They can depress the central nervous system and can cause paralysis and death.
- **Sensitisers** – these can cause allergic asthma-type reactions, after an individual is exposed and is sensitised e.g. isocyanates, some timbers.

After identifying the type and level of the respiratory hazard, suitable respiratory equipment for these conditions should be identified. Normally there will be a number of options, depending on the local conditions, wear time, cost and other factors which will help to decide the appropriate equipment.
Filter Classifications
Under AS/NZS1716, filters used in respirators are required to meet certain performance levels to achieve a classification - this then allows determination of its suitability for use against specific contaminants at various concentrations as explained in AS/NZS1715.

Particle filters
Filters are tested for capture efficiency in the laboratory using a salt aerosol challenge agent. Under specified test conditions, the amount of these particles that break through the filter is measured which allows classification of the filter.

Under the Standard, there are three classes of particle filters. These are:

- **P1** - for mechanically generated particles eg dusts, flour, silica. These are suitable for the relatively "large" particles (>1 micron) released in mechanical operations like sanding, drilling, cutting, sawing, crushing etc.
- **P2** – for mechanically & thermally generated particles eg welding fume. This class of filters has a higher capture efficiency to be able deal effectively with smaller, thermally generated particles like welding fume sub micron size and. The P2 is also the class of filter recommended for specific infection control applications e.g. with SARS, TB or other infectious diseases, where they can capture biologically active airborne particles and aerosols under specified conditions.
- **P3** – for use with highly toxic materials and/or when a very high protection level* is required e.g. beryllium, radioactive particles.

*NOTE: To achieve these high protection levels, any P3 filter must be worn on a full facemask or as part of a head-covering respirator. If P3 filters are fitted to any half facemask, this combination is graded by AS/NZS1715 to perform only as well as a P2 rated filter on this mask. This is because the "weak point" of the half facemask respirator is the faceseal, not the filter performance i.e. in practice most leakage on a half facemask respirator will occur around the seal on the face, not through the filters. This means using a P3 filter on a half facemask provides no greater effective level of protection in practice than a P2 or P1 used against mechanically generated particles.

Gas & Vapour Filters
Gas/Vapour filters are produced specifically for use against various gases and vapours and are tested and marked accordingly. There are many different types:

- **A** Organic vapours with boiling points > 65°C
- **B** Acid Gases eg chlorine, hydrogen sulphide
- **E** Sulphur Dioxide
- **G** Low vapour pressure materials (< 1.3 Pa) – this includes many agricultural chemicals (pesticides, herbicides etc)
- **K** Ammonia
- **Hg** Mercury

There are also other gas filter types for other specified chemicals.
Filters - Types & Selection

All gas/vapour filters are also rated for their absorptive capacity. In increasing capacity there are Class Aus, Class 1, Class 2 and Class 3 filters. Therefore, for example, you can get an A1 filter or a B(Aus) or a multi-class A2B1. The higher the class, the higher and longer the concentration they are able to deal with when fitted on the right type of respirator.

By combining the two types of filters, we can get combination filters like A1P2, BAusP1 or A1B1E1K1P3.

For the employer or worker who is not familiar with the various factors and product features necessary to in choose the correct respiratory protection, 3M Australia operates a TechAssist Hotline (1800 024 464) that is available to purchasers/users of 3M products. Advice and guidance will be given to assist in providing the end user with the information needed to obtain appropriate respiratory protection for the task at hand.