

# Bushfire Respiratory Protection



*Bushfires are part of life in Australia. These fires can produce vast amounts of smoke, off-gases and ash and there is a need to consider the most appropriate ways of providing respiratory protection for those exposed to these contaminants.*

Fire decomposes or breaks down materials. The composition of these breakdown products will vary depending on:

- The composition of the burning materials—this can be from many sources
- The ventilation conditions - poor ventilation reduces the available oxygen and changes the makeup of the decomposition products.
- The temperature of the fire.
- Burning produces particles as well as gases and vapours. The gases can often include irritant gases like hydrogen chloride and acrolein.

Smoke is defined in AS/NZS1715:1994 as “particles of low vapour pressure suspended in the air. Smoke is made from the solid and liquid products of combustion. Smoke particles settle slowly under gravity. Normally, the combustion process that produces smoke also produces gases”.

Respirators for Bushfires

Only SCBA (Self Contained Breathing Apparatus) is suitable for all of the possible contaminants that can be released by fires in all situations. Metropolitan fire fighters use SCBA routinely because the contaminants and their concentrations are unknown in most of their applications. However, SCBA is normally considered unsuitable for bushfire fighting because:

1. The air in the cylinders does not last long enough to effectively fight bushfires.
2. The cylinders are too heavy for use in high temperatures for long periods with a heavy workload.
3. Outfitting and training hundreds of volunteers with SCBA would be too costly and difficult to organise.
4. Maintenance – supplying hundreds or thousands of air cylinders when staff workloads are stretched and transport is difficult would be a logistics nightmare

## Bushfires

### Air Filtering Respirators for Bushfires

Respirators with filters will remove some but not all of the fire products from the air. There is no filter capable of filtering every substance. Some considerations when using air-filtering respirators for bush fire fighters include:

- Are people to be protected from the occurrence of potentially lethal atmospheres e.g. high levels of carbon monoxide or oxygen deficient conditions? If so, only SCBA (Self contained breathing apparatus) should be used.
- If the aim is protection from inhaled particulate contaminants only, use of a P2 rated filter is recommended for thermally generated particles (AS/NZS1715). This includes types that are light and comfortable like the 3M™ Disposable Respirators 9320, P2 and 9322, P2.
- If comfort and reduction of irritation is the primary concern, there is a variety of disposable and reusable air filtering respirators. Each type has advantages and disadvantages in specific applications e.g. when the fire produces low levels of organic vapours and/or irritant acid gases. Disposable masks for low gas/vapour concentrations help reduce irritation and respirators like the 3M™ Disposable Respirators 8514, P2 and 9926, P2 have been used for bushfire fighting. By capturing the smoke particles and some of the off gases, irritation from smoke inhalation can be significantly reduced.
- Another option is to use a half facemask like the 3M™ 6000 or 7500 series fitted with 3M's 2000 series or 6035/6038 filters. The 2125 filter is P2 rated, suitable for smokes and fumes, while the 2128 GP2 is the same particle filter with an added layer of carbon to help absorb nuisance levels of organic vapours and acid gases. Using a 3M™ Full Face Respirator 6800 with the 2135 (P3) or 2138 (GP3 with added carbon) filters will provide even higher levels of respiratory and eye protection. The 6035 (P3) and 6038 filters (P3 with nuisance level acid gas/organic vapour capacity) provide an enclosed filter for greater protection and durability.
- Is rated gas/vapour and particle protection required? If concentrations of gas/vapours are significant, AS/NZS1716 rated gas/vapour filters can be used fitted to a half facemask like the 3M™ 6000 or 7500 series. If concentrations are very high (unlikely in a bushfire scenario), then SCBA is an option or a full facemask (6000 or 7800 series) fitted with organic vapour/acid gas/particle capability (6057/5925 filter combination).



3M™ Disposable Resoirotor 9320. P2



3M™ Disposable Respirator 9926, P2



3M™ Half Face Respirator 7500 Series



3M™ Full Face Respirator 6000 Series

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***Respirators that are easy to use and maintain will help gain user acceptance:***

- Lightweight respirators are more comfortable.
- Exhalation valves help prevent heat build-up. They let the warm, moisture-laden breath escape quickly from inside the mask,
- Maintenance free or disposable products reduce the risk of using defective equipment. There is no spare parts inventory and no time resource required for maintenance.

**For more information please contact your 3M representative or:**

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