

Bushfire Respiratory Protection

Tech Update.

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 carbon monoxide, formaldehyde and acrolein.

Smoke is defined in AS/NZS1715:2009 as – carbon or soot particles or tarry droplets less than 0.1 micrometre in size and suspended in air, which results from the incomplete combustion of carbonaceous materials such as wood, coal, oil or paper. Normally, the combustion process that produces smoke also produces gases.

Respirators for Bushfires

Only SCBA (Self Contained Breathing Apparatus) is suitable for all 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

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 9320A+, P2 and 9322A+, P2. Various products within Australia may be rated as N95. This is a US rating which is equivalent to P2 and would also be suitable for thermally generated particulates.
- 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 9923V (P2 with nuisance organic gas/vapour carbon) and 9926 (P2 with nuisance acid gas carbon) 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.

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- Another option is to use a half facemask like the 3M™ 6000, 6500QL 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 6000 or FF-400 series 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, 6500QL or 7500 series. If concentrations are very high (unlikely in a bushfire scenario), then SCBA is an option or a full facepiece (6000 or FF-400 series) fitted with organic vapour/acid gas/ particle capability (6057/5925 filter combination).

* Nuisance levels are those levels below the Safe Work Australia exposure standards

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 escapes 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










Disposable Respirators

XA010017854	3M™ Aura™ Particulate Respirator 9322A+, P2, Valved	
XA010017847	3M™ Aura™ Particulate Respirator 9320A+, P2	
70071623162	3M™ Cupped Particulate Respirator 8322, P2, valved	
70071623147	3M™ Cupped Particulate Respirator 8320, P2	
WX700901902	3M™ Cupped Particulate Respirator 9923V, P2, with Nuisance Level* Organic Vapour Relief, valved	
WX700900169	3M™ Cupped Particulate Respirator 8247, GP2, with Nuisance Level* Organic Vapour Relief	
WX700900318	3M™ Cupped Particulate Respirator 9926, P2 with Nuisance Level* Acid Gas Relief, valved	
WX700900151	3M™ Cupped Particulate Respirator 8246, P2, with Nuisance Level* Acid Gas Relief	





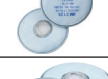





Reusable Respirators

XA007709323	7501 Small for use with 3M™ 6000, 2000 & 5000 Series Filters	
XA007709331	7502 Medium for use with 3M™ 6000, 2000 & 5000 Series Filters	
XA007709349	7503 Large for use with 3M™ 6000, 2000 & 5000 Series Filters	

Reusable Respirators *continued*

70071668134	6501QL Small for use with 3M™ 6000, 2000 & 5000 Series Filters	
70071668142	6502QL Medium for use with 3M™ 6000, 2000 & 5000 Series Filters	
70071668159	6503QL Large for use with 3M™ 6000, 2000 & 5000 Series Filters	
XA007702633	6100 Small for use with 3M™ 6000, 2000 & 5000 Series Filters	
XA007702658	6200 Medium for use with 3M™ 6000, 2000 & 5000 Series Filters	
XA007702674	6300 Large for use with 3M™ 6000, 2000 & 5000 Series Filters	
70070709046	6700 Full Face Small for use with 3M™ 6000, 2000 & 5000 Series Filters	
70070709053	6800 Full Face Medium for use with 3M™ 6000, 2000 & 5000 Series Filters	
70070709186	6900 Full Face Large for use with 3M™ 6000, 2000 & 5000 Series Filters	

Filters – For use with 6000, 6500QL and 7500 series half face respirators and 6000 series Full face respirator

CR180811885	6035 P2/P3 Particulate Rectangular White Filter	
CR180811893	6038 P2/P3 Particulate Rectangular with Nuis. OV/AG	
70071486180	2125 P2 Particulate Disc Filter	
70071486206	2135 P2/P3 Particulate Disc Filter	
70071486198	2128 GP2 Particulate, Ozone & nuisance level*OV/AG Disc Filter	
70071486214	2138 GP2/GP3 Particulate, Ozone & nuisance level*OV/AG Disc Filter	
TI551152299	5925 P2 Particulate Filter for use with 6000 series gas/vapor cartridges	
TI551152356	5935 P3 Particulate Filter for use with 6000 series gas/vapor cartridges	
AT010561416	501A Filter Retainer for 5925/5935 Particulate Filter to attach to 6000 series gas/vapor cartridges	
UU006790354	6057 A1B1E1 Organic Vapour/Acid Gas Cartridge	

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Kits – Complete with both respirators and filters in a storage container

AT010623406	6528QL - The kit comes complete with the 3M™ Half Face Reusable 6500QL Respirator with 2 x 2128 GP2 Particulate, Ozone & Nuisance Level* OV/AG Disc Filter. Size Small	
AT010623414	6528QL - The kit comes complete with the 3M™ Half Face Reusable 6500QL Respirator with 2 x 2128 GP2 Particulate, Ozone & Nuisance Level* OV/AG Disc Filter. Size Medium	
AT010623422	6528QL - The kit comes complete with the 3M™ Half Face Reusable 6500QL Respirator with 2 x 2128 GP2 Particulate, Ozone & Nuisance Level* OV/AG Disc Filter. Size Large	
AT010601592	7535S - The kit comes complete with the 3M™ Half Face Reusable Respirator 7500 Series and 2 x 6035 P2/P3 particulate filters. Size Small	
AT010601600	7535M - The kit comes complete with the 3M™ Half Face Reusable Respirator 7500 Series and 2 x 6035 P2/P3 particulate filters. Size Medium	
AT010601618	7535L - The kit comes complete with the 3M™ Half Face Reusable Respirator 7500 Series and 2 x 6035 P2/P3 particulate filters. Size Large	
AT010614199	6835S -The kit comes complete with the 3M™ Full Face Reusable 6000 Series Respirator and 2 x 6035 P2/P3 particulate filters. Size Small	
AT010614207	6835M - The kit comes complete with the 3M™ Full Face Reusable 6000 Series Respirator and 2 x 6035 P2/P3 particulate filters. Size Medi	
AT010614215	6835L - The kit comes complete with the 3M™ Full Face Reusable 6000 Series Respirator and 2 x 6035 P2/P3 particulate filters. Size Large	

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