

Aerial Firefighting Products Fact Sheet

Frequently Asked Questions

What are Aerial Firefighting Products?

The principal objective of firebombing a bushfire is to reduce fire intensity or slow fire spread to a point which allows access to the fire edge by ground firefighting resources. All firebombing aircraft in the CFS fleet have the ability to drop water with aerial firefighting product additives. Aerial Firefighting Products are added to the water in the aircrafts tank to increase the effectiveness of firebombing drops, and may be divided into three (3) classes: foam suppressants, water enhancers and long-term retardants.

Why does the CFS use aerial firefighting products and not just water?

Water dropped from firebombing aircraft without the addition of an aerial firefighting product is actually a very inefficient suppressant for a number of reasons, including:

- Under extreme weather conditions (i.e. high air temperature, low relative humidity, high wind) water will evaporate rapidly allowing potential rekindle of a fire edge;
- Water has a high 'surface tension', which means it does not effectively penetrate and cool the burnt fuels it is dropped onto, which may also lead to rekindle of a fire edge; and
- Water when dropped from an aircraft at altitude and speed is susceptible to the effects of wind, causing drift and decreased drop accuracy.

CFS therefore uses aerial firefighting products which will:

- Improve drop characteristics and reduce the effects of wind drift;
- Reduce the surface tension of the water allowing it to penetrate and cool the fuel more efficiently;
- Increase the evaporation time and adherence capability of the water to the fuel on which it is dropped, allowing more time for ground resources to undertake suppression; and
- In the case of retardant, remain effective even after the water has evaporated.



The Erickson Airplane S-64E dropping fire suppressant foam' on a fire edge to support ground firefighting resources.

What aerial firefighting products does the CFS currently use?

CFS uses aerial firefighting products from all 3 classes. The decision on what product to use and when is made by an on-scene Air Attack Supervisor, and determined by a variety of factors including fire behaviour, the firefighting strategies and tactics being employed, and the type and number of aircraft being used.

CFS **will only** use products that have been approved by the United States Department of Agriculture (USDA). The USDA maintains a highly specialised, comprehensive laboratory and field testing program (the 'Wildland Fire Chemical System'), which tests products for human and environmental toxicity, handling safety, biodegradability, corrosion of aircraft components, and effectiveness prior to their qualification and approval for use.

The following approved aerial firefighting products are used by CFS:

- Phos-Chek WD 881 – Class A fire suppressant foam
- Thermo-Gel, Blaze Tamer 380 and Phos-Chek Insul-8 water enhancers
- Phos-Chek LC-95A and MVP-F long-term retardants.

What does the products CFS use actually contain and how do they work?

All of the products used by CFS are of low toxicity. It should also be noted that each of the products used are also diluted significantly as they are mixed with water prior to loading and dropping by aircraft.

Fire Suppressant Foam

Fire suppressant foams are 99% water and 1% surfactant and foaming agents similar to those used in shampoos and dish detergents. Foam when added to water improves suppressive effectiveness through increased retention and penetration of vegetation fuel surfaces and reduced evaporation.



Fire suppressant foam as it would look on the ground after a firebombing drop

Water enhancers

Water enhancers consist of 95-98% water and 2-5% thickeners, stabilisers and other minor ingredients. The water enhancer products used by CFS contain either a super-absorbent polymer similar to those used for soil conditioning in nurseries and disposable nappies, or a modified-linear polymer, the base of which is sometimes used in the food/medical industry.



Water enhancer 'droplets' adhering to the surfaces of elevated vegetation fuel.

Water enhancers (often referred to as 'Gels') increase the viscosity, adherence ability, cooling time and wetting capability of water dropped onto vegetation by aircraft. These products can also improve firebombing drop accuracy through reduced wind drift.

Long-term Retardant

The long-term retardant used by CFS is essentially 85% water, 10% fertiliser (ammonium polyphosphate often referred to as the 'salt') and 5% other minor ingredients such as thickeners (gum and clay) and corrosion inhibitors (for aircraft safety). A red coloured pigment, made from iron oxide or 'fugitive' dye (a dye which will fade on exposure to UV light to an earthy tone), is also added so that pilots can see their drops on vegetation from the air. The salt in the retardant residue is designed to retard ignition of vegetation. Fire retardants also works by binding to the plant material (cellulose) and preventing combustion. They are designed to be laid on fuels ahead of a fire in order to reduce or halt its spread.



Phos-Chek LC-95A retardant covering vegetation surface (or litter) fuels.

Are the aerial firefighting products used by CFS biodegradable?

Yes. All products are biodegraded and broken-down over time through exposure to environmental factors such as rain, ultra-violet light, and soil fungus/bacteria.

Is there any adverse health effects associated with aerial firefighting products used by CFS?

No. Risk assessments carried out in the United States and Australia has demonstrated that the risk of health effects is very low, even to people who are accidentally exposed to aerial firefighting products during their application. The products may however be mildly irritating to eyes, skin and the respiratory tract. As a precaution, if you are inadvertently exposed to any of the products, wash off with cold water and mild soap as soon as practicable.

Are the aerial firefighting products used by CFS harmful to plants and vegetation?

No. There has been no evidence of long-term adverse effects on vegetation or plants associated with any of the products. As a precaution, any garden produce (e.g. fruit and vegetables) inadvertently exposed to aerial firefighting products should be washed thoroughly before being consumed.

Are the aerial firefighting products used by CFS harmful to domestic or farm animals?

No. There is no evidence of any adverse effects to domestic or farm animals if they eat small amounts of foliage covered with aerial firefighting products. As a precaution, pets that have been exposed to residues of any products should be shampooed and rinsed thoroughly to prevent any potential drying of their skin.

The ammonium polyphosphate salts within the retardant used by CFS should not be confused with the effects of nitrogenous fertilisers which may be harmful to cattle and livestock when ingested.



What should I do if my house or car is covered with aerial firefighting product residues?

If any aerial firefighting product residue is present on your house and/or cars, use a mild detergent with water and brushes to scrub and dilute the dried residue and flush it from the surfaces. Rinse with clean water. A follow-up with pressure washing may assist but should not replace scrubbing to remove the residue. Gloves and non-slip shoes should be worn as the work area may become slippery.

What should I do if aerial firefighting product residues enter my rainwater tank?

Aerial firefighting products may unintentionally be deposited on house and building roofs during firebombing operations. Residues of these products may then be washed into rainwater tanks when water is hosed on to the roof as part of fire protecting activities, or when it rains after the bushfire.

The recommended concentrations of the commonly used aerial firefighting products should not present a risk to health, but they may affect the taste and potability of the water. Foam products also contain detergents that may cause the water in the rainwater tank to froth.

As a precaution, if you believe that aerial firefighting chemicals of any type have entered your rainwater tank, the tank should be drained and cleaned with the first flush of water discarded. The tank can then be allowed to refill with clean rainwater or fill with water provided by a water carter.

In all cases, the water in the tank before draining and cleaning can still be used for purposes other than drinking such as irrigation and firefighting.

Further Information

For further health and safety information on aerial firefighting products used by CFS, including relevant material safety data sheets, visit the following websites:

Phos-Chek WD 881 - www.phos-chek.com.au

Thermo-Gel - www.thermogel.com.au

Blaze Tamer 380 – www.biocentral-labs.com

Phos-Chek Insul-8 - www.phos-chek.com.au

Phos-Chek LC-95A - www.icl-pp.com

Phos-Chek MVP-F - www.phos-chek.com.au

