

# Bushfire Ember Protection Screens for Evaporative Air Conditioning Units

## Key Points

- Unscreened evaporative air conditioning units are a potential bushfire hazard.
- DFES recommends that residents in bushfire prone areas install ember protection screens to their evaporative air conditioning units.
- DFES recommends that the screens are constructed of corrosion-resistant steel, bronze or aluminium and with a maximum mesh aperture of 2mm.

## Definitions

- A bushfire prone area is any area that may be subject to a bushfire attack. This attack can be by embers, direct flame contact or radiant heat.
- Ember attack is where the bark and fine vegetation material is set alight, becomes airborne and is carried forward of the fire.

Figure 1.  
An evaporative air conditioning unit burnt during a bushfire.

**If you live near bushland and have a roof mounted evaporative air conditioning unit, your home may be at risk from bushfire ember attack.**

Burning embers from bushfires can travel relatively long distances from the actual fire through the air. If the embers land on or near your home and there is fuel available to burn, they can start a fire. Embers can get into your house through gaps (greater than 2mm) in the roof, walls, windows, doors and evaporative air conditioning units.

Evaporative air conditioner filter pads made from cellulose material are a potential source of fuel for travelling embers. If air conditioners draw in embers and the filter pads ignite, the unit may collapse into the roof and the fire may spread throughout the house (Figure 1).

To prevent embers entering your evaporative air conditioning unit and to protect your home from the effect of bushfires, DFES recommends that you install ember protection screens.



## Evaporative Air Conditioners

Evaporative air conditioners consist of a fan or blower that draws in outside air and passes it through a filter pad, which may or may not be entirely wet. As hot, dry air moves through the filter, water evaporates, cooling and humidifying the air. The cool air is then blown through the house.



**Figure 2.**  
Roof mounted  
evaporative air  
conditioning unit.



**Figure 3.**  
Cellulose filter pad  
exposed to ember  
attack (during testing).

## Ember Protection Screens

An ember protection screen is designed to prevent embers entering the unit and igniting the filter pads. DFES commissioned the University of Western Australia to test the effect of a screen on the functionality of a unit, and the effectiveness of a screen in preventing filter pad ignition. The study concluded that an ember screen did not significantly affect the performance of the cooler or cause any stalling within the normal operating range. The screens did protect the air conditioner from igniting.

There are a number of possible screen designs and a range of evaporative air conditioning units on the market and therefore, DFES is unable to provide a screen design to fit all units. However, DFES have provided three examples of ember protection screen designs that will provide varying degrees of ember protection; a unit cover, an external screen and an internal screen.

The external screen is the most effective option. A sheet metal contractor can design and fit screens for your unit. Alternatively, you can build and fit the screens yourself.

Regardless of which design you choose, it is important to note that the screen must not have any gaps greater than 2 mm through which embers may enter the air conditioning unit and ignite the potentially flammable filter pads.

## Design 1. Unit cover

A unit cover is a screen built to fit over the entire air conditioner. The unit cover should seal around the bottom of the unit to ensure adequate protection from ember attack. The unit cover must eliminate all possible ember entry points. The advantage of the unit cover is that it may be easily removed when necessary.

**Figure 4.** The unit cover pictured does not enclose the bottom of the air conditioner and therefore does not adequately protect it from ember attack.



## Design 2. External Ember Screen—most effective option

External screens can be securely fitted over each of the air intake panels (Figure 7). Handles can be attached to the external screens to allow easy removal of the air intake panels (Figure 5). Screens should fit snugly to the unit. A fire resistant foam or sealer can be used to fill any small openings, ensuring that gaps are not greater than 2mm (Figure 6).

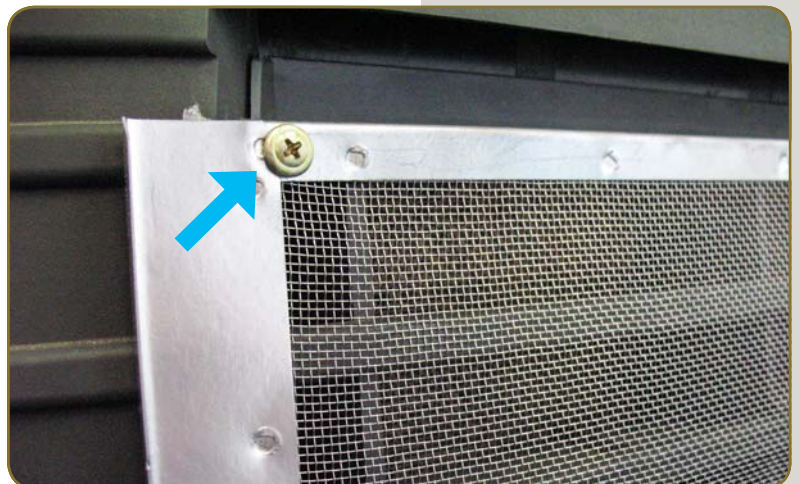
**Note:** The gap sealer should be in-line with products endorsed by AS 3959-2009 *Construction of buildings in bushfire prone areas*.

**Figure 5.** External Ember Screen with handles.



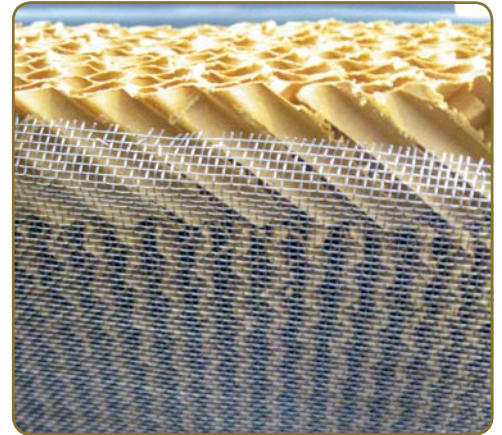
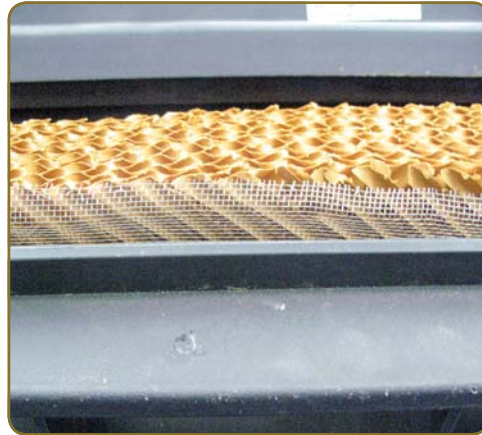
**Figure 6.** A sealant is used to fill any gaps.

**Figure 7.** An external screen is securely attached with screws.



## Design 3. Internal Ember Screens

Screens can be fitted between the air intake panels and the filter pads. Internal ember screens are often more aesthetically pleasing than a unit cover or external screen (Figures 8 & 9). However, **internal screens do not offer the same level of ember protection**. If embers land on a ledge of the air intake panel, they may generate enough heat to ignite the filter pads through the screen or ignite the external PVC cover of the air conditioner (Figure 10).



Figures 8 and 9. A screen is fitted between the filter pad and air intake panel.

In some unit designs, filter pads are secured to the panels with a pin or clip inserted from the outside. DFES discourages the use of the internal ember screen design for these units as the hole in the screen, generated by the clip, may create a gap larger than 2 mm and allow embers to reach the filter pads (Figure 11).

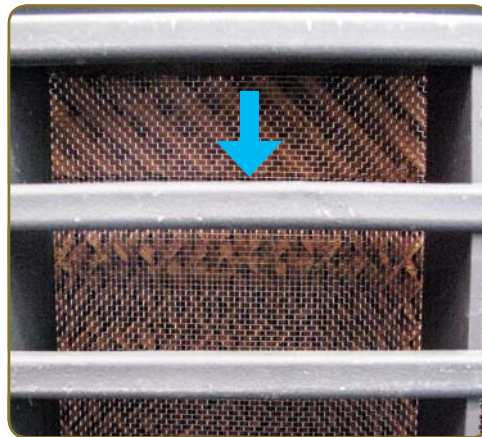


Figure 10.  
Embers may land on the ledge of the panel.

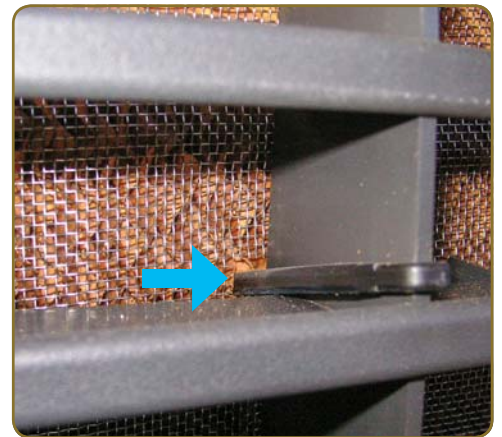


Figure 11.  
The hole in the screen generated by the clip is unacceptable as it leaves a gap larger than 2 mm, exposing the filter pads to embers.

 For more information contact the Environmental Protection Branch on 9395 9300, email: [environment@dfes.wa.gov.au](mailto:environment@dfes.wa.gov.au) or visit [www.dfes.wa.gov.au](http://www.dfes.wa.gov.au)