

# Sparking Change

Considerations for Windows & Doors in Bushfire Prone Areas



## Introduction

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The 2009 Black Saturday bushfires in Victoria were Australia's worst on record. In the fires, 173 people died and over 2000 houses were destroyed<sup>1</sup>. Immediately following Black Saturday, the Australia Standards AS3959 Construction of Buildings in bushfire-prone areas was updated with significant changes. These changes, adopted by all states, affect the construction of any homes to be built in the future. The standards apply to a broad range of construction elements.

Two of the most important elements to come in to consideration are windows and external doors, as many homes lost to bushfires survive the main fire, only to fall victim to embers floating through shattered windows or doors.



## Understanding the Australian Standards and Bushfire Attack Levels

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AS3959 was rebranded as AS3959-2009 after the updates made following Black Saturday. AS 3959-2009 specifies requirements for the construction of buildings in bushfire prone areas in order to improve their resistance to bushfire attack from burning embers, radiant heat, flame contact, or as a combination of all three<sup>2</sup>. AS3959-2009 was adopted by the BCA (Building Code of Australia) on May 1 2013<sup>3</sup>.

The minimum construction requirements are determined by a buildings' Bushfire Attack Level (BAL). The assessment on the BAL for a proposed property takes into account six factors: construction type, radiant heat performance, proximity to out buildings, slope of the land, vegetation type and shielding from the fire.<sup>4</sup>

There are six BAL's that are used to determine the appropriate construction to be applied to a development: BAL-LOW (no threat or construction changes needed), BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ (Flame Zone – Extremely High Danger)<sup>5</sup>. The number after the BAL is based on heat flux exposure thresholds in kW/m<sup>2</sup>.

As BAL-FZ is considered an extremely high danger, approval for building in these areas may be difficult to obtain. The range of BAL-FZ approved products are also limited, with windows and doors requiring accompanying bushfire shutters<sup>6</sup>. As such, BAL-40 rated products are considered the highest rated products for most habitable areas.

## Ember Attacks and the Importance of BAL-rated Products

An ember attack is the most common way houses catch fire during bushfires<sup>7</sup>. Ember attacks occur when twigs and leaves are carried by wind and land on or around houses, with high winds playing a great part in causing ember attacks and increasing the severity of bushfires.

Ember attacks can occur over distances greater than 100 metres from the fire front<sup>8</sup>, and can happen before during or after the bushfire. Embers collect most commonly in areas such as gutters, window frames and doorways, making it imperative these elements are up to the Australian Standards.

**“Ember attacks are the most common way houses catch fire during bushfires”**



## Ember Attacks and the Destruction of Houses During 2003 ACT Bushfire

Six years prior to the events of Black Saturday, Canberra experienced its worst ever bushfires. The fires led to several deaths, over 490 injuries and the destruction of more than 500 homes<sup>9</sup>.

The worst of the destruction was seen in the Canberra suburb of Duffy, where approximately 200 homes were destroyed. The bushfires in Duffy, which is located on the urban fringe on Canberra, were especially notable for the generation and transport of large amounts of embers. The embers, which generated in surrounding bushland, were carried by strong winds across the main road and landed on the houses and surrounding vegetation.

An in depth 2006 study by the CSIRO concluded that the major lesson to be taken from the massive house destruction in Duffy was the great necessity to develop effective and efficient tools for protecting the built environment at the urban interface from the attack of bushfire, and especially the embers generated, to lessen or eliminate the dangers they pose<sup>10</sup>.



## Improvements in Bushfire Rated Construction

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Urban expansion combined with a desire to be close to nature has seen a steady increase in the bush/urban interface of Australia. This has seen an increase in the potential for serious bushfire consequences, with recent research concluding that the number of human lives lost as well as damage to property and natural resources are increasing<sup>11</sup>. It has also seen an increase in the need for better fire protection across every element of a home.

Following the Canberra bushfires the Australian government asked the CSIRO to work with companies

### Retrofitting

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Whilst not mandatory, retrofitting a building to the AS3959 requirements will help protect against the impact of embers and radiant heat in the event of a bushfire. The same BAL classifications apply to retrofitting a building, and a range of BAL rated products are available for all construction elements including floors, walls, roofing, vents, gutters, windows and external doors.

### Energy Efficient Windows

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Whilst resistance to fire is the most important factor to consider when it comes to windows for new and existing buildings in bushfire prone areas, the energy efficiency of the windows must also be taken in to serious consideration.

The energy efficiency of a window has influence on a number of factors including the comfort of the residence, the value of the property, the contribution to greenhouse gas emissions and of course, the cost of energy bills.

### The Window Energy Rating Scheme (WERS)

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Much like the BAL ratings for fire resistance, a windows energy efficiency also has its own government supported rating scheme. The Window Energy Rating Scheme (WERS) was introduced in Australia by the Australian Windows Association in 1995.

WERS rates a windows cooling and heating performance separately on a scale of 0 to 10 stars, the more stars awarded the better. The stars indicate the

at looking at ways to develop products to meet the bushfire rating of BAL-40. Trend Windows & Doors worked with the CSIRO in 2004/2005 in development and testing, and were the first window and door company to be tested for aluminium products to meet BAL-40.

Since then Trend Windows & Doors have continued researching, developing and testing products to meet new regulations and changes in standards.



Homes with low or non-rated windows can see up to 40 per cent of heat leak out during winter, in addition to the heat gain during summer being up to 100 times greater. These factors can add up to 25 per cent to a home's heating and cooling bills<sup>12</sup>. With household electricity prices rising 14 per cent in the year to 30 June 2013 and expected price increase of 3 per cent annually until June 2015<sup>13</sup>, it has never been more of an important issue for Australian household owners.

effect the window will have on the energy performance of the entire house. Manufacturers participating in WERS may also offer custom rated high performance products. WERS is approved by the AFRC (Australian Fenestration Rating Council) – the only recognised body in Australia for energy rating windows and doors.

## Trend Windows & Doors

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*Founded in 1968 and with over 40 years' experience, Trend Windows & Doors is a wholly owned Australian manufacturer of residential, architectural and commercial windows and doors.*

### Trend and Bushfire Protection

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Trend's Xtreme Windows & Doors product range have been tested and rated to BAL-40 and are fully compliant to Australian Bushfire Standards AS3959-2009 and the Building Code of Australia. Trend's Xtreme window and door system uses toughened single glazed or a double glazed unit combined with designed Pyro- Protec seals. The Pyro- Protec sealing system act to protect the home against wind, water, noise, dust and bushfire penetration. The Xtreme range of doors have been tested to BAL-40 without screens, the window range require a stainless steel screen on the operable window only. The Xtreme Quantum Architectural Range of windows includes awning, casement, sliding and fixed. The range of doors includes sliding, sliding stacker, bifold and hinged.



### Trend and Energy Efficiency

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Introduced in 2011, the Trend Thermal hybrid window and door systems increase the energy benefits and comfort elements of buildings. Trend Thermal is ideal for buildings that require thermal energy efficiency and higher WERS ratings.

The system combines the strength and security of aluminium with Extruded Rigid Polymer internally, which incorporates a number of innovative properties. Along with 24mm doubled glazed unit helps achieve these higher ratings and can significantly reduce energy costs.

Trend thermal is available with over 60 glazing options to suit any situation or climate zone in Australia. Trend thermal is available in awning, casement, fixed windows, sliding, sliding stacker, bifold and hinged doors.

The Trend thermal range is also available with Trend's Xtreme Bushfire Protection, tested by CSIRO to BAL-40, under Australian Standard AS1530.8.1.



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