Severe weather events dominate Australian summers. 2012/2013 was marked by extreme heatwaves and catastrophic bushfire conditions across many parts of Australia.

Dubbed the Angry Summer, temperature records were broken all over the country and major fires raged in parts of Tasmania, New South Wales and Victoria, leading to widespread devastation of land and property. Now climate experts are calling on communities and authorities to prepare for the likelihood of increasingly severe and frequent extreme weather in future.

For the many thousands of Australians living and working in bushfire prone areas, these events were a stark reminder of the risks and need to be prepared. As the population in these areas increases, so too do the risks to our homes.

All new houses built in bushfire-prone areas need to comply with the updated Australian Standard for the Construction of buildings in bushfire-prone areas (AS 3959 2009/Amdt 2011), but there are many myths surrounding which products actually comply.

This paper will look at:

- The main threats to homes from bushfire
- If you’re installing a gutter guard, what you need to do to comply with the Australian Standard for building in bushfire-prone areas.
- How Blue Mountain Mesh meets all of the Standards and helps you achieve the highest level of protection for your home.

Bushfire threatens parts of Australia at all times of year, putting people and property at risk of fire.

The issue affects hundreds of thousands of Australians who live and work in bushfire-prone areas.

All new houses built in bushfire-prone areas need to comply with the updated Australian Standard for the Construction of buildings in bushfire-prone areas (AS 3959 2009/Amdt 2011)

Choosing a gutter guard that also meets the updated Australian Standard for ember guards offers the greatest level of protection against spreading fires.
KNOW THE RISKS AND BE PREPARED

In his 15 years as a South Australian Country Fire Service volunteer, Mannum CFS Captain Peter Wilkinson has seen many homes destroyed by fire.

The bushfires in Cherryville, South Australia, in May 2013 provided just one happy ending against a backdrop of tragedy for others, either overcome by the conditions or who haven’t prepared their homes adequately for fire.

How CFS saved the McCallum’s green oasis from Cherryville fire

FEARING for their safety and their home as the Cherryville bushfire took hold, Chris and Susannah McCallum packed their bags and fled. When they heard reports the fire was burning uncontrollably through Blockers Rd at Basket Range in the Adelaide Hills, they were sure their property would not survive.

That was until they returned on Sunday to find “a little green oasis surrounded by black” and a note from Country Fire Service, left under a gumboot near the dog house reading: “Your house was saved by Mannum and Nuriootpa CFS. Sorry about the trees. Good sprinkler system. Leaf matter in house gutters. All the best, Mannum captain.”

The fire, which started near Cherryville on Thursday, burned about 600 ha and destroyed one house and several sheds. (news.com.au, May 2013)

“That was a good outcome,” said Mr Wilkinson when asked about the fire. “It wasn’t so good for others up there during that time.”

The CFS Captain said he mentioned the leaf litter in the McCallum’s gutters in his note to remind people in bushfire-prone areas not to become complacent.

“Some people have got things right – have cleared their property well – but so many don’t understand the danger they’re putting themselves.

“In some areas, the thick vegetation and size of trees makes the risks greater. In others, it’s the steep hills or condition of the roads can make it difficult for fire trucks to get through.”

In all cases, the CFS Captain urged people to prepare their home well in advance and do everything they can to help themselves and their homes. The CFS itself warns there is no guarantee a fire truck will get there.

“I’ve seen it lots of times a fire will get in under the eaves and spread through the roof. Making sure gutters are clear is a part of a whole bigger picture of things people can do to protect themselves. The more steps you take, the better your chances will be,” he said.

CFS Captain Peter Wilkinson said he mentioned the leaf litter in the McCallum’s gutters in his note to remind people in bushfire-prone areas not to become complacent.
BUSHFIRE IN AUSTRALIA: A REAL AND CONSTANT DANGER

Australia is considered the most fire prone country in the world. As such, bushfires are an intrinsic part of Australia’s environment. Natural ecosystems and landscapes are shaped by, and rely on, patterns of fire. But as human settlements encroach further into bushland and fire prone areas, fire poses a threat to people in nearly all parts of the country at different times of year as different weather patterns come into play.

When are the bushfire seasons?
+ Most of southern Australia: Summer and Autumn
+ NSW and Southern Queensland: Spring and early Summer
+ Northern Australia: Winter and Spring

The impact of extreme fire weather varies greatly within these regions, depending on the proximity to built-up areas, and in some cases the type of fire that occurs.

Where are the worst fires?

The areas facing the most severe bushfires are usually in the south-eastern corner of Australia, south of a line from Sydney to Adelaide, where hot, dry, strong winds are most common. This area has the tallest forests and heavy fuel loads which produce some of the most intense and devastating fires. Large parts of Victoria, the ACT, South Australia (Adelaide Hills), Tasmania, WA (Perth Hills) and NSW (Blue Mountains, Southern Highlands, Gosford/ Hunter Valley and Wollongong) are key bushfire affected areas.

In terms of the total area burnt, the largest fires are in the Northern Territory and northern areas of Western Australia and Queensland. However, the closer fires get to regional towns and urban centres anywhere, the potential for significant loss increases. Sadly, this often includes loss of homes, businesses and, tragically loss of life.

Australia’s recent history has been marked by many terrible bushfire events. In February 2009, Victoria was devastated by the worst bushfires in Australian history. 173 people lost their lives, 2,000 homes were lost in 78 communities. Entire towns were left unrecognisable as the fire burnt 411,000 hectares of land.
UNDERSTANDING BUSHFIRE: HOW HOUSES BURN

House fires start in the same way as bushfires – small ignitions that progress slowly at first, then speed up to burn the whole house. There are three main ways a house can ignite during a bushfire - radiant heat ahead of the fire front, burning debris and embers falling on the building and direct flame contact. While radiant heat is the principle cause of loss of life in bushfires, it rarely causes homes or buildings to catch fire.

Research has shown that the main cause of house fire during a bushfire is from ember attack.

Ember attack is where sparks and embers landing on or near your home and trigger a fire well before and for hours after the bushfire has passed. Sparks and embers enter a home wherever there is a gap, such as under roofing tiles, under the floor in crevices, through broken windows (which may have exploded due to radiant heat), cracked sills and vents; and under verandas. (SA Country Fire Service 2013)

Many thousands of Australians enjoy living in rural communities. Many more are choosing to build homes on the fringes of towns and cities, close to bushland areas. As a result of this, many areas in regional and urban fringe towns and cities in Australia and a growing number of Aussie homes are susceptible to house fires that start from ember attack. This is because embers can be carried by winds ahead of the actual fire – sometimes several hundred metres ahead. Even homes with well-cleared land can still be at risk of fires starting in this way, depending on how close they are to bushland or neighbouring properties that haven’t taken the same precautions.

WHAT IS AN EMBER ATTACK?

Embers are burning twigs, leaves and pieces of debris
Ember attack occurs when twigs and leaves are carried by the wind and land on or around houses
Ember attack is the most common way houses catch fire during bushfires
Embers can land on top of debris in your gutters and set fire to your house
Ember attack can happen before, during and after the bushfire.
(CFA Victoria n.d.)

Lessons learned from the past

“There was a widespread community belief, reinforced by the news media, that bushfires moved at the speed of express trains, that houses exploded into flames and burnt down in minutes, and that there was not much that could be done to prevent this...

“Research has shown that the majority of houses destroyed in bushfires actually survive the passage of the fire front only to burn down in the following hours due to fire spread from ignitions caused by windborne burning debris.

“Showers of burning debris...may attack a building for some time before the fire front arrives, during its passage and for several hours after. This long duration of attack, to a large extent, explains why burning debris is a major cause of the ignition of buildings.”

(Leonard 2003)
WHY ARE GUTTERS SO IMPORTANT IN PREVENTING FIRES?

Gutters are important because they tend to collect leaves and other debris that can ignite easily and provide fuel for bushfires to spread and attack your home.

A gutter filled with leaves and debris is a dangerous source of fuel for bushfires. Research has shown that over 85% of fires that destroy homes during bushfire begin from ember attack, where burning parts of trees (e.g. twigs, branches, leaves) are carried by winds and lodge in gutters, under doorways, roof spaces or windows and start internal fires.

For a house to survive the widespread risk of sustained ember attack, it must be designed and maintained so that fire cannot spread by flaming embers. This means that gutters need to be cleaned regularly at all times of year, and during bushfire season in particular, to ensure they are free from leaves and other debris.

Gutter guard (also known as a gutter mesh) provides a long term solution by preventing debris from entering the gutter in the first place.

HOW GUTTER PROTECTION WORKS

Over-the-gutter systems that form a physical barrier to prevent leaves and debris from entering gutters offer a long term solution to minimise the risk of spot fires starting and spreading as a result of ember attack. Typically constructed using either steel or aluminium mesh, this form of gutter protection ensures year round low-maintenance protection that keeps gutters from accumulating leaves, twigs or any other matter that could provide fuel for a bushfire.

The ski-slope design of over-the-gutter gutter protection systems ensures that leaves and debris are blown off the roof through wind action whilst water is drawn through the mesh into the gutter. This form of gutter protection is highly superior to other in-gutter systems (e.g. gutter coils, foam or brushes) which don’t stop debris from entering the gutter and can lead to a myriad of other problems (clogging, dislodging and risk of falls from DIY installation and need for more regular cleaning and maintenance).

Over-the-gutter systems that form a physical barrier to prevent leaves and debris from entering gutters offer a long term solution to minimise the risk of spot fires starting and spreading as a result of ember attack. Typically constructed using either steel or aluminium mesh, this form of gutter protection ensures year round low-maintenance protection.
### GUTTER PROTECTION AND THE ROLE OF BUILDING STANDARDS: TIMELINE OF CHANGES SINCE 2009

The Victorian bushfires of 2009 were subject to a Royal Commission, which handed down important recommendations to learn from these tragedies and protect more homes from bushfire in the future.

<table>
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<tr>
<td>Australian Standard: AS 3959-2009</td>
<td>Following the Victorian bushfires of February 2009 in which 173 people lost their lives, AS 3959–2009 (superseding AS 3959) was introduced by the Victorian state government and in May of 2010 was incorporated into the Building Code of Australia (BCA). AS 3959-2009 prescribes construction standards for residential buildings based on an assessment of Bushfire Attack Levels (BAL) linked to expected radiant heat exposure generated by site characteristics. There are now six levels of construction, replacing the previous four categories of Low, Medium, High and Extreme, which prescribe minimum construction requirements based on the Bushfire Attack Level (BAL) of a site. Regarding gutter protection specifically, the new Standard requires that, for homes in BAL zones 12.5 – FZ, any gutter protection products used must be non-combustible. This is different to the previous version of AS3959 which required gutter protection to have a flammability index not greater than 5.</td>
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<td>Australian Standard: AS 3959-2009/Amdt 2011</td>
<td>AS3959–2009 was amended again in 2011 when the Victorian Bushfire Commission decided that homes built in bushfire prone areas needed to increase their ability to resist an ember attack. This amendment required that any gaps around the house greater than 3mm needed to be sealed. For homes situated in designated bushfire-prone areas, 2mm gutter mesh (steel, bronze or aluminium for BAL 12.5 – BAL 29 and steel or bronze for BAL-40 and BAL-FZ) is able to be installed as an ember-guard solution. Other ember guard options include mineral wool and other non-combustible material that can fill the 3mm gap.</td>
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WHAT THE CHANGES MEAN FOR HOME OWNERS

The Standard (Australian Standard AS3959-2009 & AS3959-2009/ Amdt 2011: Construction of Buildings in Bushfire-Prone Areas), exists to provide property owners with clear direction on how to increase the protection of their homes in bushfire-prone areas, as part of good site preparation and risk management.

Regarding gutter protection specifically, where the previous Standard refers to a flammability index of not greater than 5, this no longer applies.

The new Standard requires, for homes in BAL zones 12.5 – FZ, any gutter protection products used must be non-combustible (refer Appendix for details). The use of products that only meet the previous Standard no longer complies. This means that if a gutter guard is installed, regardless of whether it is acting as a gutter guard or as an ember guard, it must be non-combustible. To prove that a gutter guard is non-combustible, it needs to meet one of the following testing standards:

+ **AS 1530.1** - Methods for fire tests on building materials, components and structures Part 1: Combustibility test for materials. Products/Materials which are not applicable to AS1530.1 are ‘products which are coated, faced or laminated’ or ‘materials that melt or shrink at the test temperatures’

+ **Building Code of Australia (BCA)** - Pre-finished metal sheeting that has a combustible surface finish not exceeding 1mm thickness and where the Spread-of-Flame Index (AS1530.3:1999) of the product is not greater than 0.

The changes to AS3959-2009 have also served to highlight the importance of fitting compliant ember guards to increase the level of protection for homes in bushfire prone areas. Anyone considering building, renovating or retrofitting their homes need to be aware of the changes relating to gutter guard and ember guard compliance and what level of protection their site needs according to their specific BAL rating to give themselves, their family and their property the best protection.

**GUTTER GUARD VS. EMBER GUARD: KEY DIFFERENCES EXPLAINED**

Under the new standards and building regulations all bushfire prone buildings need to be guarded by using an ember guard. Ember guards and gutter guards are two different things and are not interchangeable terms. Their reference is in regard to different applications and should not be confused in determining compliance with the Australian Standards and Building Code of Australia.

+ A Gutter Guard is designed to minimize the access of debris and leaf litter to the gutters of your home. In a bushfire-prone area zone, it is not mandatory, but if you are installing one it must:
  • be non-combustible
  • except for being non-combustible there is no other requirement of a gutter guard product

Builders have found that the benefit of installing 2mm mesh as an ember guard is it is able to act as a gutter guard as well as an ember guard ensuring gutters are kept free of leaves and debris whilst preventing ember attack.
An Ember Guard is designed to limit access of embers into areas of risk, like the roof cavity. It must:

- be non-combustible
- have a maximum aperture (or gap) of 2mm.
- be made of corrosion-resistant steel, bronze or aluminium in BAL 12.5 – BAL 29
- be made of corrosion-resistant steel or bronze in BAL 40 & BAL FZ

**HOW BLUE MOUNTAIN MESH COMPLIES**

An ember guard is not specifically designed to act as a gutter guard, but some gutter guards – e.g. Blue Mountain Mesh 2mm Super Fine Mesh, are not only a high quality steel gutter guard, but also meet the requirements to act as an ember guard for your gutters stopping access of embers to the roof cavity.

Blue Mountain 2mm Superfine All Steel Mesh has been specifically designed to meet the new Australian Standards requirements for the ember guard protection of sheet roofs for all Bushfire Attack Levels (BAL-12.5 clause 5.6.3; BAL-19 clause 6.6.3; BAL-29 clause 7.6.3; BAL-40 clause 8.6.3; BAL-FZ clause 9.6.3-2011).

The 2mm aperture is the prescribed opening to restrict burning debris from entering gaps and igniting buildings. The products have also undergone rigorous, independent testing by the CSIRO to certify that the materials used meet the definition of non-combustible prescribed in the Building Code of Australia, achieving Spread-of-Flame Index of ‘0’. (CSIRO,2009)

**THE RISK OF USING NON-COMPLYING GUTTER GUARDS**

The key feature of any leaf guard installed in bushfire prone areas is that it must be NON-COMBUSTIBLE. Some plastic gutter guard companies claim their product is fire resistant, that is, made with plastic that has been treated with flame retardant additives that will extinguish a burning ember. However, plastic is not fire proof like steel. It’s likely that there will still be a hole in the gutter guard where the ember has landed, making the gutter vulnerable to further ember attack. Any holes in the gutter guard will also affect how well it can keep leaves and other debris out of the gutter, reducing its effectiveness overall.

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**Plastic gutter guard goes up in flames**

Perth resident Alan Mayor thought he’d done the right thing by installing gutter guards at his North Beach home, until the plastic gutter guard system he’d installed almost cost him his home.

“Our house isn’t surrounded by bushland, but there is a nature reserve down the road. On this particular day, a fire had started in the reserve and a howling easterly wind was carrying embers hundreds of metres away,” recalled Alan.

The embers caused spot fires along his street, including one in Alan’s gutters. Here, they found plenty of fuel where the large holes in the plastic gutter guard he was using had failed to stop leaves from building up in the gutters.

“Luckily my wife woke me up. I ran outside and saw the gutters on the main house were on fire. The plastic gutter guard had actually ignited and the whole thing could’ve gone up had I not caught it in time.”

Alan later discovered that his ‘protected’ gutters were full of leaves, just sitting there waiting to burn. He has since replaced the plastic guard with a steel gutter guard and has been very pleased with its performance.

“Sure you can buy a roll of plastic gutter guard very cheaply but it will not protect your home. If the same thing happened to us again, the steel mesh gutter guard would prevent the embers from getting into the gutter, and there would be no leaves in there anyway, as they just blow off the roof. It’s well worth the investment,” he said.
BENEFITS OF INSTALLING A GUTTER GUARD FOR BUSHFIRE PROTECTION

There are other benefits to installing a compliant gutter guard as an ember guard (e.g. such as Blue Mountain Mesh). As well as preventing embers from entering the roof cavity and gutters, gutter guards keep gutters clear of leaves and debris, reduce gutter cleaning and maintenance and prevent native animals and pests entering the roof space (see BMM Information Guides – Pest Control or Household Savings).

Furthermore, gutter guards also help prevent blocked gutters that can also cause flooding and damage to the home in the opposite climate events – severe rain and storms (see BMM Information Guide – Storm Damage Protection). In cases where rain water collection systems are installed, the gutter protection also improves rain water quality by preventing leaves and debris from breaking down in the gutter.

Property owners can get all the benefits of gutter protection and ember guard protection by ensuring that the gutter guard they select meets the ember guard requirements.

Q & A

BUILDING IN A BUSHFIRE-PRONE AREA

What determines a bushfire-prone area; and how do I know if I live in one?

A bushfire prone area is an area of land that can support a bush fire or is likely to be subject to a bush fire attack (NSW Rural Fire Service 2013). Designated bushfire-prone areas are declared by local governments and certified by state fire services. Land maps have been prepared to identify these areas within council zones. Check with your local council to find out whether your property is in a designated bush fire area.

How do I find out my BAL rating?

A Registered Building Practitioner or suitably trained professional can help you determine the BAL for your site. You should also refer to the methodology in AS 3959 2009.

I’m not in a designated bushfire-prone area, but I live in a leafy suburb. Is there any advice for me about how to protect my home against spread of fire?

Even if your building work isn’t in a designated bushfire-prone area, you should make every attempt to increase the resistance of your home to bushfires by constructing to include some design requirements of the AS 3959 2009 to enhance the protection of your home against fire.

A registered building surveyor can advise on specific construction methods that can be included in the design of your home.

How can I retrofit my existing home?

Sealing around roofing and roof penetrations is one of the low cost retrofitting implementations the CFA, Victorian Government & Victorian Building Commission recommend for protecting existing homes in bushfire-prone areas.

There are various other measures that can be taken in the home and around the garden to protect your home. Refer to ‘A guide to retrofit your home for better protection from a bushfire’ for more information.

(My house was built before our area was designated as a bushfire-prone area. I am about to do some renovations. Do I need to comply?)

If you’re planning to upgrade your home and live in a designated bushfire-prone area (even if it was after your original home was built) you may need to comply with the requirements of the BCA and AS 3959 2009. Contact your local government to find out what planning and building approvals you may require.

Even if your building work isn’t in a designated bushfire-prone area, you should make every attempt to increase the resistance of your home to bushfires by constructing to the same requirements.

I’m looking at buying a house in a designated bushfire-prone area. Will I need to upgrade it in order to comply?

If you already have, or are thinking about buying an existing house in or near any bushland, whether it has or hasn’t been designated as bushfire-prone, it’s recommended you consider having a bushfire assessment carried out prior to making an offer. Building Standards and regulations are generally not retrospective, so while there may not be a regulatory requirement to upgrade to the new standards, it will help you make an informed decision on whether the house is adequately protected against bushfire attack and what you would need to do if you wanted to upgrade or rebuild. (WA Building Commission 2010)
IN SUMMARY

The reality of living in the most fire prone country on earth means that Australians are growing to understand the risks involved with living in bushfire-prone areas. New Australian Standards have been designed to increase the ability of our homes to withstand attack from bushfires, but it’s up to us to understand and comply with the requirements to make informed decisions and take action to make our homes safe.

Choosing the right gutter protection is an important consideration in reducing the risk of ember attack and spread of bushfires. If in doubt, choose a gutter guard that meets all the requirements of an ember guard and offers the best protection for your greatest assets: your home and the safety of your family.

HOW CAN THE RH INITIATIVE HELP?

The RH Initiative is an Australian company driven to help every person and every community make the most of their environmental assets.

We design, manufacture and wholesale high quality and sustainable water, environmental and trade products for Australian and international markets. We work with governments, retailers, distributors and consumers all over the world to find smarter, more innovative solutions to challenges created by our environment, and in doing so, create more sustainable futures.

Our Blue Mountain Mesh advanced gutter protection system offers homeowners protection from a range of environmental hazards, including flooding during storms and ember attack during bushfire.

ABOUT BLUE MOUNTAIN MESH

Born out of fire. The inspiration behind Blue Mountain Mesh’s all-steel gutter mesh came from the most tragic circumstances: watching a man trying in vain to save his family home from a savage bushfire, fuelled by an abundance of leaves and debris in the home’s gutters.

Blue Mountain Mesh products prevent leaves and debris from entering gutters and downpipes. The all steel, fire resistant gutter mesh minimises gutter maintenance and improves the quality of rain water collected for tanks. The proprietary hot dipped zinc coated and oven baked manufacturing process offers superior corrosion and heat resistance, providing superior protection for homes over the longer term.

We look forward to opportunities to help more Australians reduce risk and protect themselves and their greatest assets. For more information on our all steel, custom-made gutter protection products visit www.bluemountainmesh.com.au or call 1800 612 908.

WHY CHOOSE BLUE MOUNTAIN MESH?

+ Blue Mountain All Steel Gutter Mesh® is hot dipped galvanised, zinc coated steel which provides a corrosion resistant layer.
+ Our zinc coated corrosion resistant steel mesh is strong and durable and will stand the test of time.
+ Our entire range is bushfire compliant and conforms to the Australian Standard for the Construction of buildings in bushfire-prone areas (AS3959-2009) and the updated Australian Standard for the ember guard protection of sheet roofs (AS3959-2009/Amdt 2011).
+ Our unique steel profile ensures our steel mesh lies perfectly flat and means the finished product looks like a seamless addition to your roof.
+ Our mesh fits all gutter profiles and can be adapted for all roof types, custom made and available in a choice of over 30 colours.
+ We offer a 12 year warranty based on minimum performance that we expect from our product. Results from independent tests offer a far longer projected life span with 12 years being the most conservative estimate.
REFERENCES


APPENDIX 1


Gutter Guard: Relating to BAL-12.5, BAL-19, BAL-29, BAL-40, BAL-FZ respectively

Clause 5.6.7, 6.6.7, 7.6.7, 8.6.7 and 9.6.7: Gutters and downpipes

If installed, gutter and valley leaf guards shall be non-combustible.

Ember Guard: Relating to BAL-12.5, BAL-19, BAL-29 respectively

Clause 5.6.3, 6.6.3 and 7.6.3

Sheet roofs shall—

b) have any gaps greater than 3mm (such as under corrugations or ribs of sheet roofing and between roof components) sealed at the fascia or wall line and at valleys, hips and ridges by—

i. a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium; or

ii. mineral wool; or

iii. other non-combustible material; or

iv. a combination of any of items i, ii or iii above

Clause 5.6.1, 6.6.1 and 7.6.1

These clauses also state the following should apply to all types of roofs and roofing systems:

A) roof tiles, roof sheets and roof covering accessories shall be non-combustible

B) roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel, bronze or aluminium

Ember Guard: Relating to BAL-40, BAL-FZ

Clause 8.6.3 and 9.6.3

Sheet roofs shall—

b) have any gaps greater than 3mm (such as corrugations or ribs of sheet roofing and between roof components) sealed at the fascia or wall line and at valleys, hips and ridges by—

i. a mesh or perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze; or

ii. mineral wool; or

iii. other non-combustible material; or

iv. a combination of any of items i, ii or iii above

Clause 8.6.1 and 9.6.1

These clauses also state the following should apply to all types of roofs and roofing systems:

C) roof tiles, roof sheets and roof covering accessories shall be non-combustible

D) roof ventilation openings, such as gable and roof vents, shall be fitted with ember guards made of non-combustible material or a mesh perforated sheet with a maximum aperture of 2mm, made of corrosion-resistant steel or bronze.