

Use of charred timber cladding in Bushfire-Prone Areas

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About me



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Presentation Overview

What is charred timber? How has the cladding been modified?

Why might there be potential compliance concerns when using charred timber cladding in Bushfire Prone Area (BPA)?

How does charred timber perform in terms of durability, fire safety, and maintenance requirements, and how do these compare to unmodified timber?

Does charred timber meet the relevant Standards at the time of installation, and in the short and long term?

Should post-installation inspections be implemented for buildings in Bushfire Prone Areas (BPAs), and how can they be effectively monitored and arranged?

Overview of Global Bushfire

Bushfire / Wildfire situation in Australia and globally

Major fires in 2025 and 2026:

Australia

Victoria & NSW bushfires (Jan 2026)
Deep Creek fire, SA (Feb 2026)

South America

Patagonia wildfires, Chile & Argentina (Feb 2026)

USA

Los Angeles wildfires (Jan 2025)
Dragon Bravo Fire, Arizona (Jul-Sep 2025)
Forsyth Fire, Utah (Jun 2025)
South Rim Fire, Colorado (Jul 2025)

Europe

Limassol wildfires, Cyprus (Jul 2025)
Corbières Massif wildfire, France (Aug 2025)
Langdale Moor wildfire, UK (Aug 2025)

Locations	Key Standards / Codes	Requirements examples
USA	International Wildland-Urban Interface Code (IWUIC); NFPA1144.	Fire-resistant roofs, siding, decks...; 9–30 m defensible space; and Ember protection (vent screens, spark arrestors).
Europe	National building codes; Eurocodes; EN 13501.	Fire-resistant cladding/roofing in wildfire zone; Forest setbacks, firebreaks, and Emergency vehicle access.
Canada	National Building Code; Provincial wildfire guidelines.	Fire-resistant roofs, siding, vents; Defensible space and landscaping requirements; Ember and flame protection.
South America	Regional standards, e.g. in Chile, Argentina	Fire-resistant materials, Setbacks from forests, firebreaks around structures, and Water and access.

Comparing Bushfire Mitigation Standards Around the World

- ❑ Construction standard;
- ❑ Defendable space / Setbacks;
- ❑ Water and Access;
- ❑ Ember and Flame protection.

What about in Australia?

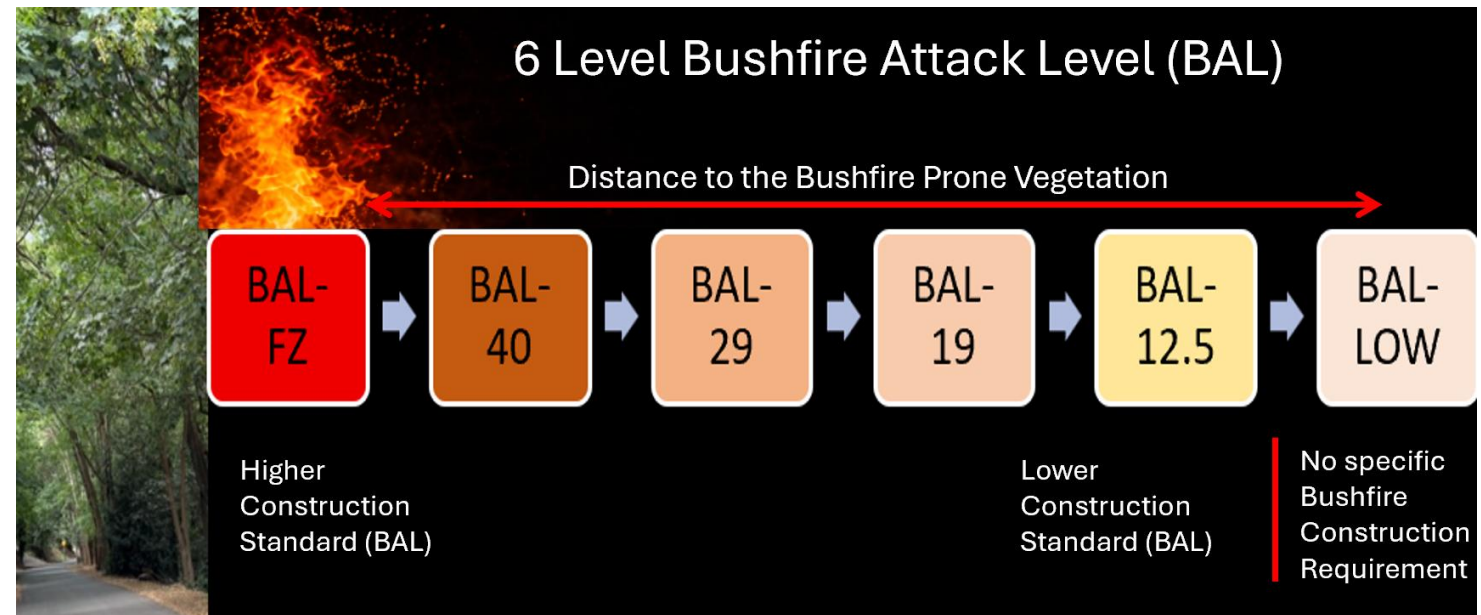
Construction standards for buildings located within BPA are governed by the Bushfire Attack Level (BAL).

The BAL assessment applies to the individual buildings.

The Australian Standard AS3959 outlines the requirements of building design and materials for individual buildings.

The BAL ratings range from BAL-12.5 to BAL-FZ

Bushfire-Resisting Timbers listed in Appendix F are used in buildings up to BAL 29.



What is the architectural charred timber?

- ❑ A traditional Japanese method of preserving wood from insect attack;
- ❑ Well-known as Shou Sugi Ban or Yakisugi;
- ❑ Exposing the timber surface to a controlled flame or fire;
- ❑ Creating a charred layer on the timber surface;
- ❑ Produces a unique texture and appearance;
- ❑ A popular construction material for domestic external cladding or the termite zone.



F1 GENERAL

Bushfire-resisting timber is timber that is in solid, laminated or reconstituted form and has been tested and is deemed to be acceptable to withstand exposure up to a BAL—29 condition.

Timber may be ‘bushfire-resisting’ by means of one or more of—

- (a) the inherent properties of the material itself;
- (b) being impregnated with fire-retardant chemicals; or
- (c) the application of fire-retardant coatings or substrates.

F3 ACCELERATED WEATHERING

Where accelerated weathering is required before testing to AS/NZS 3837, external fire-retardant-coated substrates shall be subjected to the ASTM D2898 Method B weathering regime, with the water flow rate modified to be the same as that within ASTM D2898 Method A.

NOTE: Accelerated weathering does not account for mechanical wear and tear within trafficable areas and care should be exercised when using coating material.

F4 BUSHFIRE-RESISTING SPECIES

The species listed in Table F1 have been tested and have met the requirements of Paragraph F2.

AS3959 Appendix F –
Bushfire – Resisting Timber

F2 TESTING

The following applies:

- (a) To satisfy the requirements for bushfire-resisting timber, timber shall be tested in accordance with AS/NZS 3837 and shall meet the following criteria:
 - (i) The maximum heat release rate shall be not greater than 100 kW/m².
 - (ii) The average heat release rate for 10 minutes following ignition shall be not greater than 60 kW/m² when the material is exposed to an irradiance level of 25 kW/m².
- (b) Where the timber has been altered by chemicals, the test samples shall be subjected to the regime of accelerated weathering described in Paragraph F3 except that where the timber is protected from the weather, as described in the AS 1684 series (for example, cladding protected by a veranda), accelerated weathering of the test samples is not required before being tested to AS/NZS 3837.

External timbers are deemed to be protected if they are covered by a roof projection (or similar) at 30 degrees or greater to the vertical and they are well detailed and maintained (painted or stained and kept well ventilated).

NOTE: The purpose of testing is to assess timber performance rather than to simulate a bushfire. The irradiance set for the test is not to be considered to be correlated to the BAL.

TABLE F1
BUSHFIRE-RESISTANT SPECIES

Standard trade name	Botanical name
Ash, silvertop	<i>Eucalyptus sieberi</i>
Blackbutt	<i>Eucalyptus pilularis</i>
Gum, red, river	<i>Eucalyptus camaldulensis</i>
Gum, spotted	<i>Corymbia maculata</i>
Ironbark, red	<i>Eucalyptus sideroxylon</i>
Kwila (Merbau)	<i>Intsia bijuga</i>
Turpentine	<i>Syncarpia glomulifera</i>

Key research areas

1. Does charred timber perform as expected in terms of durability, fire safety and required maintenance?
2. Does charred timber meet BAL standards from installation to the entire life?
3. Can a post-installation inspection and monitoring system improve long-term compliance?

1. Does Charred Timber Perform as Expected? (Cont...)

Durability and fire safety:

- ☐ No conclusive evidence that charring improves fire resistance or durability in the short or long term.
- ☐ Test results are inconsistent and highly dependent on specific conditions and methodologies.
- ☐ Limited evidence applicable to bushfire scenarios, particularly in BPA.
- ☐ Performance varies between timber species, with hardwood generally performing better than softwood.

1. Does Charred Timber Perform as Expected? (Cont...)

Common issues in Timber cladding:

- ☐ Timber is vulnerable to pest attack, rot, and decay; moisture movement can cause cupping or bowing.
- ☐ Cracking may occur in timbers due to UV exposure and environmental conditions, including charred timber.
- ☐ The charred surface layer is often the weakest part of the material after the charring process.
- ☐ Surface cracks may reduce the protective function of the building and create pathways for ember penetration.



1. Does Charred Timber Perform as Expected?

Maintenance is required:

- ☐ Timber, including charred timber, requires ongoing maintenance throughout its service life.
- ☐ Without maintenance, performance can gradually decline due to environmental exposure.
- ☐ Protective paint or coating helps retain internal moisture and improves resistance to decay, weathering, and UV exposure.
- ☐ Consistent maintenance can enhance durability and extend the lifespan of charred timber.



2. Does Charred Timber Meet BAL Standards? (Cont...)

Potential BAL Compliance Concerns

- ❑ Limited laboratory testing of charred timber against BAL requirements within BPA.
- ❑ Uncertainty in behaviour under bushfire conditions, including its response to radiant heat and ember attack.
- ❑ Heat penetration through charred layers and potential cracking or gaps required to be calculated.
- ❑ Charring alters the moisture content and surface condition that may reduce the reliability of the material.
- ❑ Potential risks to overall building performance and compliance due to material modification.



2. Does Charred Timber Meet BAL Standards? (Cont...)

Maintenance Risks

- ☐ Maintenance coatings are generally required for charred timber products, typically every 3-5 years.
- ☐ These Coatings are essential and help preserve appearance and reduce cracking or bending.
- ☐ Limited guidance on how coatings affect fire safety in BPA.
- ☐ CUTEK and WOCA Exterior Oil are recommended by the manufacturer, but they are combustible and flammable.
- ☐ They may add combustible fuel load during a bushfire, increasing fire risk compared to untreated or water-based materials.



2. Does Charred Timber Meet BAL Standards?



Post-installation Compliance

- ☐ Not formally required to be inspected after occupancy for BAL compliance.
- ☐ Limited public awareness and unclear guidance on maintenance and inspection.
- ☐ Over time, defects or performance issues may go undetected.
- ☐ Increased risk of non-compliance and building vulnerability in BPA.
- ☐ Weathering, ageing, and environmental exposures may further degrade performance over time.

Checking and inspecting charred timber:

- ☐ Regular inspections help ensure buildings continue to meet original design standards or BAL over time.
- ☐ Inspections should be carried out by qualified professionals throughout the building's lifecycle.
- ☐ Charred timber cladding in BPA requires maintenance every 3–5 years in line with manufacturer recommendations.
- ☐ Non-combustible or water-based paints may be a better option for maintaining charred timber in BPA.

3. Can a post-installation inspection and monitoring system improve long-term compliance? (Cont...)



3. Can a post-installation inspection and monitoring system improve long-term compliance?



Centralised Monitoring System

- ☐ Introduce a centralised data recording platform for registering charred timber buildings in BPA with the local council.
- ☐ Automated notifications could be sent to owners or the local council when inspections are due.
- ☐ A similar approach may be adopted from the Victorian pool and spa barrier inspection system, which requires inspections every four years and submission of results to the local council.
- ☐ Future development could include a fully integrated online system incorporating new technologies such as photographic assessment, virtual inspections, drones, and 3D scanning to enable faster, safer, and more accurate monitoring.

Who will benefit from the project



Architects, designers, and builders

Gain valuable insights and considerations from the design phase through to installation.



Inspectors, building surveyors, and regulatory authorities

Benefit from proposed registration and monitoring strategies to ensure long-term compliance.



Suppliers and manufacturers

Use the findings to understand maintenance expectations, develop better solutions, and provide clients with accurate information.



Resident, Owner and the public of the property

Benefit from a safer living environment in BPA while gaining a better understanding of building performance over time.

Future directions

- ❑ Conduct laboratory testing to assess compliance with BAL requirements under bushfire conditions.
- ❑ Investigate the performance of charred surfaces against ignition and ember attack.
- ❑ Explore effective maintenance methods for charred timber in BPA.
- ❑ Develop a digital tracking system with scheduled maintenance reminders.
- ❑ Establish post-installation inspection frameworks for BAL-rated buildings in BPA.

Thank you for listening

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Any questions?