



YARRABEE & CASTLEMAINE STONE

FIRE RATING OF NATURAL STONE



NATURAL STONE PAVING & WALLING

DISCLAIMER

This document is provided as a general guidance reference only. It does not constitute formal engineering or fire safety advice, and should not be relied upon as a substitute for independent professional assessment.

Yarrabee & Castlemaine Stone makes no representation that any specific product meets the requirements of any particular project without independent verification. Compliance with applicable Australian Standards and the National Construction Code (NCC) remains the responsibility of the specifier, builder, or relevant certifier. Requirements may vary depending on building class, location, construction type, and local authority. Always consult a qualified fire safety engineer or building certifier for project-specific advice.

INTRODUCTION

Natural stone is an inherently non-combustible material. Formed through geological processes over millions of years, it is composed of inorganic minerals with high melting points and no volatile organic content. It does not burn, does not contribute to fire spread, and does not release toxic fumes when exposed to heat.

These properties make natural stone one of the few building materials that can be used with confidence in fire-sensitive environments, from residential construction in bushfire-prone regions to high-rise facades subject to National Construction Code (NCC) non-combustibility requirements.

This document provides a general overview of natural stone's fire performance characteristics and its relationship to Australian fire safety standards. It is intended as a reference guide for architects, specifiers, builders, and building certifiers.

AUSTRALIAN FIRE SAFETY STANDARDS

Building materials used in Australia must comply with applicable fire safety standards and the NCC. Natural stone is recognised under several key frameworks:

Standard: AS 1530.1:1994

Title: Methods for Fire Tests on Building Materials, Products and Structures - Combustibility Test for Materials

Relevance to Natural Stone: Natural stone is classified as non-combustible under this standard.

Standard: AS 1530.3:1999

Title: Simultaneous Determination of Ignitability, Flame Propagation, Heat Release and Smoke Release

Relevance to Natural Stone: Natural stone does not ignite, propagate flame, or release smoke.

Standard: AS 3959:2018

Title: Construction of Buildings in Bushfire-Prone Areas

Relevance to Natural Stone: Natural stone is an acceptable material for use in high Bushfire Attack Level (BAL) construction.

Standard: NCC

Title: Deemed-to-Satisfy (DtS) non-combustible provisions

Relevance to Natural Stone: Natural stone is recognised as a deemed-to-satisfy non-combustible material under the NCC — no additional fire testing required.

Deemed-to-Satisfy Status

Under the NCC, a material classified as 'deemed-to-satisfy' (DtS) non-combustible is accepted for use in non-combustible construction without the need for project-specific fire testing. Natural stone meets this classification by virtue of its mineral composition and performance under AS 1530.1.

This means that when natural stone is specified as a cladding, paving, or walling material, it satisfies non-combustibility requirements under the DtS pathway of the NCC — subject to correct installation and any applicable project conditions.

FIRE PERFORMANCE CHARACTERISTICS

The following summarises the key fire performance properties of natural stone as they relate to Australian building and fire safety requirements:

Fire Performance Property: Combustibility

Natural Stone Behaviour: Non-combustible

Notes: Does not ignite or contribute to fire spread.

Fire Performance Property: Flame spread

Natural Stone Behaviour: Nil

Notes: No surface flame propagation.

Fire Performance Property: Smoke

Development/read

Natural Stone Behaviour: Nil

Notes: No toxic or smoke-generating combustion products.

Fire Performance Property: Structural integrity at elevated temperature

Natural Stone Behaviour: Generally retained below 600°C

Notes: Some surface discolouration or micro-cracking may occur at extreme temperatures. Structural load-bearing capacity is not typically affected in building fire conditions.

Fire Performance Property: Volatile organic content

Natural Stone Behaviour: Nil

Notes: Mineral-based composition; no organic compounds.

Behaviour at Elevated Temperatures

In standard building fire conditions (typically up to 600°C), natural stone retains its structural integrity and does not contribute to fire growth. At temperatures above approximately 600°C - which are rarely reached in typical structural fire scenarios - some stone types may exhibit surface discolouration or minor cracking due to thermal expansion of mineral crystals. These effects are cosmetic in nature and do not result in combustion or fire spread.

Stones with higher silicate content (such as granite) generally exhibit greater thermal stability than carbonate-based stones (such as limestone and marble), though all perform well within the range of temperatures encountered in most fire scenarios.

BUSHFIRE-PRONE AREAS

AS 3959:2018 sets out construction requirements for buildings in bushfire-prone areas, categorised by Bushfire Attack Level (BAL). Natural stone is recognised as a suitable material for construction across all BAL ratings, including BAL-FZ (Flame Zone), the most demanding category.

Its use in external cladding, walling, paving, and retaining structures is consistent with the intent of AS 3959:2018 to limit ignition risk from radiant heat and ember attack.

CONSIDERATIONS FOR SPECIFICATIONS

While the stone itself is non-combustible, specifiers should be aware of the following when designing systems that include natural stone:

- Adhesives, grouts, and sealers: Some installation products contain organic compounds. Specifiers should confirm that all ancillary materials used with natural stone cladding or paving also comply with applicable fire requirements, particularly for facade systems.
- Substrate and backing systems: In suspended or batten-fixed facade applications, the fire performance of the overall wall system (including cavity, insulation, and substrate) must be assessed independently. The non-combustibility of the stone face does not automatically confer non-combustibility on the full wall assembly.
- Installation method: Fire performance assessments should consider how the stone is fixed. Direct-adhesive applications over non-combustible substrates generally present the lowest risk profile.
- Project-specific assessment: Building certifiers and fire engineers may require system-level testing or assessment regardless of individual material classifications, particularly for high-rise or complex facade systems.

SUMMARY

Natural stone is a non-combustible material that meets the requirements of AS 1530.1:1994 and is recognised as a deemed-to-satisfy non-combustible material under the National Construction Code. It is suitable for use in bushfire-prone areas under AS 3959:2018 and does not ignite, propagate flame, or produce toxic smoke.

For project-specific fire engineering queries, detailed system assessments, or product availability, please contact our team.