IGNIS LABORATORY ASSESSMENT

BELGOTEX FLOORCOVERINGS (AUSTRALIA) PTY LTD
BJELIN COMPLIANCE ADVICE
NATIONAL CONSTRUCTION CODE 2022

Evaluation No. IGNE-260017-03R Issue 01 Revision 00

Date of Issue: 16 March 2026

1 Introduction

Ignis Labs has been engaged by Belgotex Floorcoverings (Australia) Pty Ltd to advise on the compliance of their Bjelin hardened timber flooring range and underlay configurations with the fire hazard property requirements of Specification 7 of the National Construction Code (NCC) 2022 Volume 1. The compliance has been determined by testing variations of the Bjelin range to AS ISO 9239.1-2003.

The Bjelin hardened timber flooring range includes the following products:

- Bjelin S
- Bjelin M
- Bjelin L
- Bjelin XL
- Bjelin XXL

The underlay configurations include:

- Adhesion via MAPEI ULTRABOND ECO S955 1K adhesive directly to the substrate.
- Adhesion via MAPEI ULTRABOND ECO S955 1K adhesive directly to Acoustamat underlay and adhered to the substrate.
- Floating on Belgotex Aqua Elite underlay.

Bjelin S and Bjelin XL have been tested to AS ISO 9239.1-2003 by Ignis Labs and reported in the test certificates IGNL-9319-05-01C and IGNL-9319-05-02C for each product respectively. The underlay variations have been tested indicatively with Belgotex's Khars Life Essentials Wide floor lining to determine the least-favourable underlay performance for the Belgotex timber flooring range. The compliance is determined in accordance with Specification S7C3 of the NCC 2022 Volume 1, which sets out the requirements for floor linings and floor coverings.

This advisory note is issued by Benjamin Hughes-Brown, Chartered Professional Engineer of Ignis Labs Pty Ltd, 3 Cooper Place, Queanbeyan, 2620, NSW for use under the Deemed-to-Satisfy requirements of the National Construction Code Building Code of Australia Volume 1 and Volume 2 2022 (BCA). Ignis Labs holds accreditation to AS ISO 9239.1-2003 with NATA, accreditation number 20534. This engineering advisory note serves as a certificate from an accredited lab and a professional engineer in accordance with Clause A5G3 (d) and (e) of the BCA.

2 AS ISO 9239.1-2003 Testing

Underlay Performance

Indicative AS ISO 9239.1-2003 testing was conducted by Ignis Labs on three underlay configurations for the purpose of determining the least-favourable underlay interaction with Belgotex's hardened timber flooring range. Khars Life Essential Wide is the thinnest Belgotex hardened timber flooring and as such was used as the floor lining for the indicative testing to maximise the impact of the underlay on the results. The results of the indicative tests are detailed in Table 1 below.

Table 1
Khars Life Essential Wide Underlay Configurations – Indicative Test Results

Underlay System	Flame Spread	Critical Radiant Flux	Smoke Development Rate
Adhesion via MAPEI ULTRABOND ECO S955 1K adhesive directly to the substrate	338 mm	6.6 kW/m^2	101.29 % x min
Adhesion via MAPEI ULTRABOND ECO S955 1K adhesive directly to Acoustamat underlay and adhered to the substrate	312 mm	7.2 kW/m^2	46.50 % x min
Floating on Belgotex Aqua Elite underlay	358 mm	6.2 kW/m^2	44.20 % x min

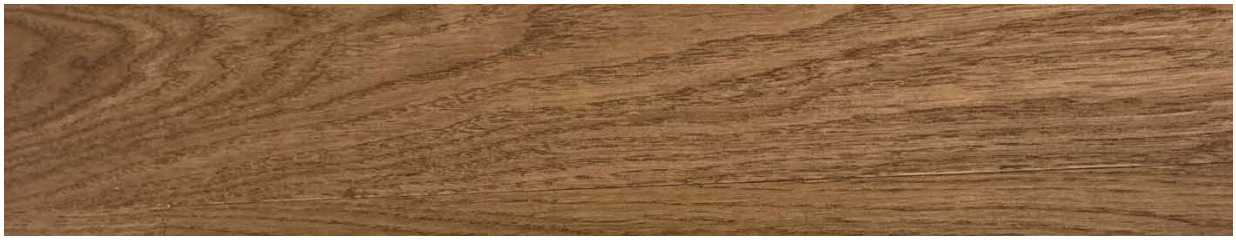
The underlay configuration with the flooring floating on Belgotex Aqua Elite underlay demonstrated the lowest critical radiant flux, and as such, was the worst performing of the three underlay configurations. The remainder of the testing was conducted with this underlay configuration to produce a worst-case result.

Floor Lining Performance

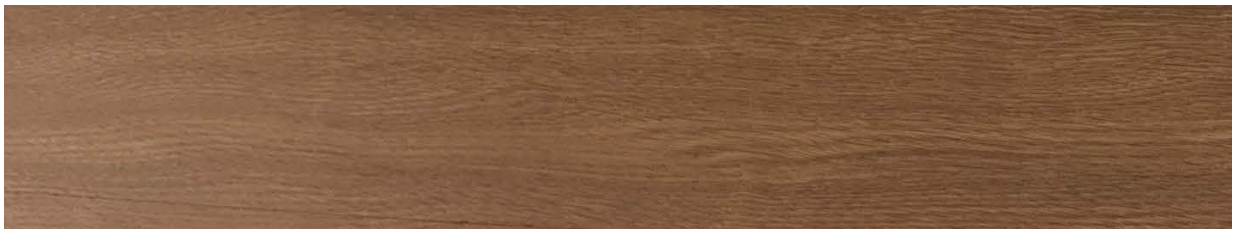
The Bjelin hardened timber flooring range is composed of core boards with a nominal density of 1000 kg/m^3. Bjelin S, Bjelin M, and Bjelin L have a nominal thickness of 9 mm, and Bjelin XL and Bjelin XXL have a nominal thickness of 11 mm. The fire hazard properties of the range of Bjelin floorings have been determined through the testing of the thinnest and thickest products. Bjelin S and Bjelin XL were selected for each category respectively.

FIGURE 1:

BJELIN S



BJELIN XL



The Bjelin hardened timber floorings were tested in accordance with AS 9239.1-2003 on Belgotex Aqua Elite underlay. The results of testing are detailed in Table 2 below.

Table 2
Bjelin Range – AS 9239.1 Test Results

Test Specimen	Flame Spread	Critical Radiant Flux	Smoke Development Rate
IGNL-9319-05-01C Bjelin S on Belgotex Aqua Elite underlay	273.33 mm	8.0 kW/m²	16.46 % × min
IGNL-9319-05-02C Bjelin XL on Belgotex Aqua Elite underlay	286.67 mm	7.6 kW/m²	40.31 % × min

The results of testing have been used to determine the performance of the range of Belgotex Bjelin flooring and its associated underlay systems. The tested materials represent key variations in thickness for the purpose of determining the least-favourable case. It is considered that the product variations, having widths and thicknesses within the bounds of the tested systems, would not exhibit worse performance if tested in accordance with AS ISO 9239.1-2003. Furthermore, it is considered that the product variations would not exhibit worse performance if tested in accordance with AS ISO 9239.1-2003 with the underlay systems other than the Belgotex Aqua Elite underlay.

The critical radiant flux and smoke development rate for the Bjelin range for the purposes of determining compliance with Specification 7 of the NCC 2022 Volume 1 for fire hazard properties are shown below in Table 3.

Table 3
Bjelin Range – Performance

Floor Lining	Underlay	Critical Radiant Flux	Smoke Development Rate
Bjelin S	MAPEI ULTRABOND ECO S955 1K or MAPEI ULTRABOND ECO S955 1K and Acoustamat underlay or Belgotex Aqua Elite	7.6 kW/m²	40.31 % × min
Bjelin M			
Bjelin L			
Bjelin XL			
Bjelin XXL			

3 National Construction Code Compliance

Specification S7C3 within the NCC 2022 Volume 1 specifies the requirements for floor linings and floor coverings.

FIGURE 2:

SPECIFICATION S7C3

S7C3 Floor linings and floor coverings

[2019: Spec C1.10: 3]

A floor lining or floor covering must have—

(a) a *critical radiant flux* not less than that listed in Table S7C3; and

(b) in a building not protected by a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17, a maximum *smoke development rate* of 750 percent-minutes; and

(c) a *group number* complying with S7C6(b), for any portion of the floor covering that is continued more than 150 mm up a wall.

Table S7C3: Critical radiant flux (CHF in kW/m²) of floor linings and floor coverings

Class of building	Building not fitted with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17	Building fitted with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification 17	Fire-isolated *exits* and fire control rooms
Class 2, 3, 5, 6, 7, 8 or 9b, excluding Class 3 accommodation for the aged and Class 9b as specified below	2.2 kW/m²	1.2 kW/m²	2.2 kW/m²
Class 3 accommodation for the aged	4.5 kW/m²	2.2 kW/m²	4.5 kW/m²
Class 9a *patient care areas*	4.5 kW/m²	2.2 kW/m²	4.5 kW/m²
Class 9a areas other than *patient care areas*	2.2 kW/m²	1.2 kW/m²	4.5 kW/m²
Class 9b auditorium or audience seating area used mainly for indoor swimming or ice skating	1.2 kW/m²	1.2 kW/m²	2.2 kW/m²
Class 9b auditorium or audience seating area used mainly for other sports or multi-purpose functions	2.2 kW/m²	1.2 kW/m²	2.2 kW/m²
Class 9c *resident use area*	N/A	2.2 kW/m²	4.5 kW/m²
Class 9c areas other than *resident use areas*	N/A	1.2 kW/m²	4.5 kW/m²

As detailed above, the Bjelin range is deemed to have a critical radiant flux of 7.6 kW/m² and a smoke development rate of 40.31 % × min. As such, the Bjelin hardened timber flooring, on the underlay systems described in this assessment, is deemed suitable for use within all applications stated within Table S7C3 of the NCC 2022 as the critical radiant flus is not less than 4.5 kW/m². Additionally, the systems are suitable for non-sprinklered applications as the smoke development rate does not exceed 750 % × min.

4 Conclusion

Based on testing of variations of the Bjelin hardened timber flooring to AS ISO 9239.1-2003, it is deemed that the Bjelin flooring range achieves a critical radiant flux of 7.8 kW/m^2 and a smoke development rate of 40.31 % × min. The Bjelin S, Bjelin M, Bjelin L, Bjelin XL, and Bjelin XXL, adhered directly to the substrate with MAPEI ULTRABOND ECO S955 1K, or adhered to Acoustamat underlay with MAPEI ULTRABOND ECO S955 1K adhered to the substrate, or floating on Belgotex Aqua Elite underlay, are suitable for use in all non-sprinklered Class 2-9 applications outlined within Table S7C3 with respect to their fire hazard properties.

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