



TECHNICAL BULLETIN

Fire Safety Compliance Guide: Wall and Ceiling Linings

FOR WAREHOUSES AND COMMERCIAL OR INDUSTRIAL SHEDS
WHERE THE INSULATION ACTS AS THE WALL OR CEILING LINING



Background and Introduction

Is exposed insulation in warehouses and commercial or industrial sheds considered a wall or ceiling lining?

If so, what fire performance requirements does it need to meet to demonstrate compliance with the *deemed-to-satisfy* provisions of the National Construction Code's (NCC) Building Code of Australia (BCA)?

To help answer these important questions Kingspan Insulation engaged independent chartered professional fire safety engineer, Ignis Solutions, to produce a Fire Safety Evaluation. The report assesses the fire safety Performance Requirements of the NCC BCA Volume One to help clarify the definitions, intent and *deemed-to-satisfy* compliance requirements for exposed insulation in walls and ceilings. It also details the relevant Australian Standards as well as the appropriate test methods that should be applied.



This Technical Bulletin combines guidance from the Ignis Solutions report with some proprietary information from Kingspan Insulation.



Note: This document is a guide only. Fire safety requirements and final designs should always be checked against the NCC for compliance. Kingspan Insulation Pty Ltd accepts no responsibility or liability for parties acting solely on the basis of information presented in this guide.

Fire Performance Requirements for Wall and Ceiling Linings

What is a wall or ceiling lining?

A lining is any material installed in a wall or ceiling that is exposed to the internal compartment of a building.

Is insulation considered a wall or ceiling lining if it's left exposed to the interior?

Yes, it is because it is left exposed. If plasterboard, for example, is used to line the internal side of the wall or ceiling, then the plasterboard would be considered the lining material. However, when no plasterboard is installed, the insulation left exposed will be considered the lining material.

In a fire event, the lining material's resistance to spread of flame and fire development is what will help keep the fire contained within the internal compartment of a building, and allow time to evacuate the area safely.

What are the NCC fire performance requirements for wall and ceiling linings?

The *deemed-to-satisfy* provisions of the NCC require any wall or ceiling lining material to achieve a Group Number of Group 3 or better.

"If a material or an assembly is used as a wall or ceiling lining, where it is exposed to the compartment it must achieve a Group Number..."

Ignis Solutions

NCC reference: BCA Vol. One, Specification C1.10 Clause 4.

What is a Group Number?

A Group Number is a fire hazard property classification which is calculated based on test results. Group Numbers range from Group 1 to Group 4, with a Group 1 classification being the best performance.

How is a Group Number achieved?

A Group Number is achieved in accordance with AS 5637.1, which is referenced in the NCC. Under this standard, a Group Number can be achieved from tests to either AS ISO 9705, AS/NZS 3837 or ISO 5660.1.

NCC reference: BCA Vol. One, Specification C1.10 Clause 4.

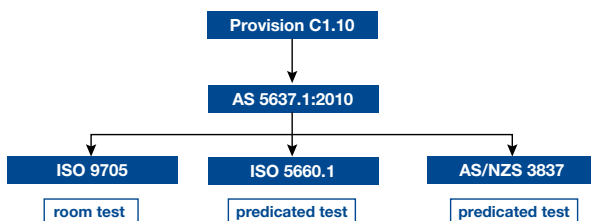


Figure 1 Hierarchy of fire hazard property testing for internal lining compliance.

What are the differences in the test methods?

AS/NZS 3837 and ISO 5660.1 are small scale tests using only a small specimen of material. They are considered predictive tests as the results can be empirically correlated to how the material might behave in a large scale fire, depending on the material.

AS ISO 9705, on the other hand, is a full scale fire test conducted in a fire test room 3.6 m long x 2.4 m wide x 2.4 m high, which is installed with the material. It tests how a material behaves in an actual full scale fire event.

Which test method is the right one?

It depends on the type of material being used.

If a material, product or assembly possesses any of the following characteristics, then AS ISO 9705 must be used:

- a) It has profiled facings not allowed by AS/NZS 3837;
- b) It contains materials that melt or shrink away from a flame;
- c) It has joints or openings; and
- d) It has a reflective surface.

Testing to AS/NZS 3837 or ISO 5660.1 to claim a Group Number is only allowed when the material is:

- a) Painted or unpainted paper-faced gypsum plasterboard;
- b) Solid timber and wood products such as particleboard and plywood; or
- c) Rigid non-thermoplastic foams such as polyurethane (homogenous material without foil facing).

Reference: AS 5637.1, Clause 5.3.2, Clause 5.3.3.

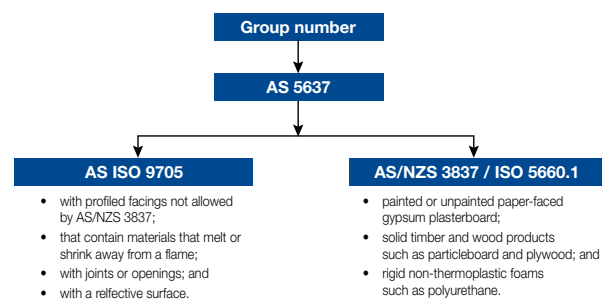


Figure 2 Summary of the test method selection path.

What common insulation products need AS ISO 9705 testing to achieve a Group Number?

Common insulation products that require testing to AS ISO 9705 to achieve a Group Number include:

- Foil-faced glasswool insulation blanket;
- Foil sarking;
- Reflective insulation;
- Expanded or extruded polystyrene;
- Insulated sandwich panels;
- Foil-faced rigid phenolic or PIR boards.

“A pliable membrane used as a building internal lining on a wall or ceiling requires an appropriate Group Number tested to ISO 9705...”

Ignis Solutions

Why is small scale testing to AS/NZS 3837 or ISO 5660.1 **not** acceptable for these products?

Because it has been recognised by regulators that there is very poor correlation between the small scale tests and how these products would perform in a real full scale fire.

For example, the foil facing on composite insulation products can protect the insulation in the early stages of the small scale AS/NZS 3837 test.

In the large scale AS ISO 9705 test, however, due to the involvement of more material and the confines of the test room, there can be much greater heat development which can lead to an earlier flashover than predicted in the small scale AS/NZS 3837 test. Temperatures could get higher than 750°C, at which point even glasswool and materials considered ‘non-combustible’ may burn. Therefore the large scale AS ISO 9705 test gives a far more accurate representation of a material’s fire resistance properties.

So because the performance of these products in the small scale AS/NZS 3837 test is not indicative of the material’s true performance in a real full scale fire, they cannot claim a Group Number based on it. Instead, they must be tested to AS ISO 9705.

Fire Performance Requirements for Wall and Ceiling Linings

What if a supplier of one of these products claims a Group Number based on AS/NZS 3837 or ISO 5660.1 testing?

It would not comply with AS 5637.1 and the *deemed-to-satisfy* provisions of the NCC. To minimise your risks, you should reject it and demand an AS ISO 9705 test report.

NCC reference: BCA Vol. One, Specification C1.10 Clause 4.

What Group Number do I need for warehouses and commercial or industrial sheds?

Group 1, 2 or 3, depending on which part of the building the insulation is installed in and whether or not the area is sprinklered.

Full details of these conditions and minimum Group Number requirements are available from Table 3 of Specification C1.10 of the NCC BCA Volume One.

NCC reference: BCA Vol. One, Specification C1.10, Table 3.

Does Kingspan have a compliant product for these building types?

Yes, *Kingspan AIR-CELL Insuliner™*. This latest innovation from Kingspan achieves a Group 2 classification when tested to AS ISO 9705.

Warehouses and commercial or industrial sheds are steel buildings. Do they need an R0.2 thermal break?

No. Because the vast majority of warehouses and commercial or industrial sheds are not air-conditioned or heated, the NCC does not require a thermal break.

In the rare occasion that this type of building has a heating or cooling system installed, which has an energy input of more than 15 W/m², then a thermal break would be required.

NCC reference: BCA Vol. One, A1.1, J1.3, J1.5.



AIR-CELL Insuliner™

Kingspan AIR-CELL Insuliner™ is an Australian-made reflective insulation designed specifically for warehouses and commercial or industrial sheds where the insulation acts as the wall or ceiling lining. It is manufactured with a patented physically cross-linked, closed-cell insulation core sandwiched by highly reflective foil facings.



According to AS 5637.1, because the product has a reflective surface, it must be tested to AS ISO 9705 for determination of a Group Number.

Kingspan AIR-CELL Insuliner™ achieves Group 2 and is the only reflective insulation product in Australia which achieves a Group Number better than Group 4ⁱ.

It can therefore be used to demonstrate *deemed-to-satisfy* compliance to the NCC fire performance requirementsⁱⁱ in warehouses and commercial or industrial sheds where conventional internal wall or ceiling linings are not applied.



Fire Performance

Characteristic	Standard	Classification
NCC Group Number	AS ISO 9705	Group 2
Flammability Index	AS 1530.2	≤ 5



Figure 3 Physically cross-linked Kingspan AIR-CELL Insuliner™

What does Group 2 mean?

A Group 2 fire performance classification means that the product can be used in most areas of buildings apart from fire-isolated exits and fire control rooms. It also means that a sprinkler system is not required, which can be a significant saving.

Full details of installed locations, conditions and minimum Group Number requirements are available from Table 3 of Specification C1.10 of the NCC BCA Volume One.

"Kingspan AIR-CELL Insuliner™ achieves Group 2 and is the only reflective insulation product in Australia which achieves a Group Number better than Group 4ⁱ."

It can therefore be used to demonstrate *deemed-to-satisfy* compliance to the NCC fire performance requirementsⁱⁱ in warehouses and commercial or industrial sheds where conventional internal wall or ceiling linings are not applied."

ⁱ Correct at time of printing.

ⁱⁱ NCC BCA Vol. One, Specification C1.10.

Contact Details

General Enquiries

Tel: 1300 247 235

Email: info@kingspaninsulation.com.au

Kingspan Insulation Pty. Ltd. reserves the right to amend product specifications without prior notice. The information, technical details and fixing instructions etc. included in this literature are given in good faith and apply to uses described. Recommendations for use should be verified as to the suitability and compliance with actual requirements, specifications and any applicable laws and regulations. For other applications or conditions of use, Kingspan Insulation offers a Technical Advisory Service the advice of which should be sought for uses of Kingspan Insulation products that are not specifically described herein. Please check that your copy of the literature is current by contacting us or visiting www.kingspaninsulation.com.au



Kingspan Insulation Pty Ltd

Tel: 1300 247 235

Email: info@kingspaninsulation.com.au

www.kingspaninsulation.com.au