

# UNI PLUS AND UNI DOUBLE LAYER INSTALLATION (WALL APPLICATION)

## Executive summary

Masons Plastabrick (MPB) are looking to offer a UNI Plus and a UNI double flexible wall wrap system (the system) that will be able to be left exposed for 180 days and the system after this time still continue to satisfy the applicable performance requirements of the NZ building code. This solution will rely on the installation of two layers of UNI<sup>1</sup> in accordance with MPB's installation requirements. The two layer system relies on the exposed UNI wrap acting as a sacrificial layer to the "protected" layer of UNI wrap.

Providing that all MPB installation requirements are followed with repairs to the outer layer performed as necessary, it is my opinion that for a 180-day exposure limit, compliance with B2 (durability) be met. That is, the applicable provisions of the NZ building code will be satisfied after this period of exposure

## Introduction

MPB has asked for my opinion on the code compliance of B2 (durability) for the UNI Plus double layer solution.

This opinion covers:

- Ability for this system to meet the applicable performance requirements of the NZ building code, in particular B2, and
- A risk discussion on any unintended consequences.

For clarity I have considered this system in terms of

- use as described in section 4 of CM70116 Rev1
- applicable provisions of the building code as per section 5 of CM70116 Rev 1
- the conditions and limitations of use as per section 6, CM70116 Rev 1 excluding 2(c).

## Installation of the system

MPB will require that the system is installed in accordance with:

- Masons' UNI and UNI Plus Double Layer 180 day Installation Guide V1.0 May 2022, and
- Masons' UNI and UNI Plus Double Layer 180 day Installation Details V1.0 May 2022

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<sup>1</sup> For this opinion UNI is to be taken as meaning UNI or UNI Plus

## EVALUATION

### Building code compliance after 180 days.

In NZ, the minimum performance characteristics required from flexible building wrap and the extent to which these characteristics may change following exposure to UV is given in NZS 2295:2006 (including Amendment 1) and Table 23, E2/AS1.

NZS 2295 is cited in E2/AS1 and on that basis compliance with these documents must be relied upon by a Building Consent Authority as establishing compliance with the NZ Building Code (s19(b) Building Act 2004).

### NZS 2295:2006 (including Amendment 1)

NZS 2295:2006 defines the requirements necessary to establish compliance with:

- B2 (durability)
- C3 (spread of flame)
- E2 (external moisture)

Section 2 of the standard specifies the following performance characteristics.

Characteristic	Metric
Vapour resistance	≤7 MN s/g ASTM E96 B.
Absorbency	≥100 g/m <sup>2</sup> , tested to AS/NZS 4201: Part 6
Resistance to water penetration	≥20 mm tested to AS/NZS 4201: Part 4
Moisture shrinkage	No requirement
pH extract	≥5.5 and ≤8.0, tested to AS/NZS 1301.421s
Mechanical strength	
Edge tear resistance (TAPPI T 470)	Machine Direction 100 N      Cross Direction 55 N
Tensile strength (ASTM D882)	Machine Direction 2 N      Cross Direction 1 N
Flammability	≤ 5, tested to AS 1530.2
Air resistance	≥ 0.1 MN s/m <sup>3</sup> , tested to ISO 5636-5
Resistance to UV exposure	≥ 85 % of initial mechanical strength, test to ASTM G154 or equivalent outside exposure

With respect to performance characteristics after 180 days, the key metric relates to a reduction in mechanical strength of no more than 15 %.

Table 23, E2/AS1

Compliance with Table 23 establishes compliance with E2 (external moisture) through E2/AS1.

Category	Application	Vapour resistance	Absorbency	Water resistance	pH of extract	Shrinkage	Mechanical
Flex wall underlay (synthetic)	Wall claddings over a cavity(6). Flexible underlays over rigid underlays – refer to Paragraph 9.1.7.2. Direct fixed absorbent wall claddings(4) (e.g., timber, fibre cement, etc).	NZS 2295:2006 section 2 No minimum absorbency requirement					
Air barrier	Where no internal linings.	≤7 MN s/g ASTM E96 B	≥100g/ m <sup>2</sup> NZS 2295	≥20 mm NZS 2295	≥6.0 and ≤9.0	≥0.5% NZS 2295	Edge tear strength NZS 2295. Air resistance BS 6538: Part 3: ≥ 0.1 MN s/m <sup>3</sup>

## Test results

To evaluate the performance of the system after 180 days, MPB engaged Scion to test the system to NZS 2295 including exposure to UV for 2250 hours, which is equivalent to 180 days.

At the conclusion of the test period, the tensile and edge-tear strength of the protected layer was measured. Results were as follows:

Property	% of original value
Tensile strength retention, md	96.8
Tensile strength retention, cd	94.8
Edge-tear strength, md	98.1
Edge-tear strength, cd	95.3

These results establish that:

- the protected layer still meets the requirements of NZS2295 after UV exposure of 180 days, and
- will therefore also continue to meet the other performance requirements of the NZ building code after exposure for 180 days.

## Risk of other unintended consequences

There is a risk that moisture will pass through the first layer and accumulate between the first and second layers.

This risk is not significant.

Flexible building wrap functions as a drainage pathway (in respect of external moisture) and enables water vapour to exit the building envelope. It can also contribute to the air tightness of the building.

The risk is that water could accumulate between the two layers and not be able to drain away or dissipate. However, this seems unlikely as there is nothing that would impeded the ability for the protected layer to act as a drainage path in its own right. The installation methodology ensures that both layers are independent of each other.

Additionally, best practice is that any tears to the outer layer are repaired, and I note that this requirement is included in the installation instructions..

In respect of any water that does penetrate the first layer I note:

- It will not penetrate the second layer.
- Water will dissipate via two mechanisms: the second layer acting as a drainage layer, and the outer layer providing moisture vapour transference to the exterior.

## Conclusion

I have considered the building code compliance of the UNI Plus and UNI Double Layer Flexible Wrap system, when exposed to UV for a period up to 180 days.

The test data confirms that the under layer of wrap is protected from UV damage by the outer layer.

This means that the system will comply with the same applicable provisions of the building code and provide the same functionality as that provided for by CM70116 Rev 1, and be left exposed for 180 days.

I considered the risk of unintended consequences and the only potential issue could be moisture being trapped between the two layers of wrap. However taking into consideration the method of installation and the vapour permeability/water resistance characteristics of the wrap, I concluded that this risk is insignificant.

## References

Bureau Veritas. [06/04/2022]. Product Certificate Masons UNI and UNI Plus Flexible Air Barriers. Cert. No. CM70116 Rev 1. Retrieved from [https://www.building.govt.nz/building-code-compliance/product-assurance-and-multiproof/codemark/product-certificate-register/?keyword=UNI&action\\_doSearch=Search&sort=recent#results](https://www.building.govt.nz/building-code-compliance/product-assurance-and-multiproof/codemark/product-certificate-register/?keyword=UNI&action_doSearch=Search&sort=recent#results). [Accessed 23/05/2022].

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