

18 November 2022

Project Abodo Shingles
Reference

Daniel Gudsell

Abodo Wood Ltd.

Email: Daniel.Gudsell@abodo.co.nz

Dear Daniel,

Re: Evaluation of Abodo Shingles



1. BACKGROUND

Oculus was asked by Abodo Wood Ltd. to evaluate the building code compliance of shingle roof and cladding system. This letter outlines our general observations, opinions and conclusions which may be useful to designers and council officers in establishing compliance with the New Zealand Building Code.

B1 – Structure

The nail fixing pattern denoted in the Abodo installation manual includes structural battens to create a ventilated cavity. This arrangement is consistent with cladding suitable up to and including Extra High wind zones according to NZS3604. This wind zone pressure equates to 1.82 kPa thus could be suitable for buildings outside the scope of 3604 but lower than this cladding pressure. The fixing pattern is sufficient to achieve all the requirements of this building code clause. In the event of a building beyond the Extra High wind zone, or 1.82 kPa specific engineering may be required for this code clause.

B2 - Durability

A letter describing the results of one of these tests, “SCION Report The Durability of Thermowood Thermally Modified Wood - Results from Durability Tests After Eleven Years, July 2015” was reviewed by Oculus. This letter from Scion (a Crown Research Institute) details an exterior exposure test completed at their Whakarewrewa facility comparing Abodo thermally modified wood against two other timbers (H3.1 treated Radiata Pine, H3.2 Treated RP, and Macrocarpa heartwood).

NZS3602 section 111.2.5 states that both Cypress Heartwood (Macrocarpa is a variety of Cypress) and H3.2 treated Radiata Pine can be used as uncoated or stained timber cladding as part of an acceptable solution, whereas H3.1 treated RP cannot. Extrapolating from this, it would be logical to state that if the timber in question were more durable than the timber types in the acceptable solution, then the timber would perform better than the acceptable solution and therefore be acceptable and fit for purpose. The 4 types of timber (H3.1, H3.2, Macrocarpa and thermowood) were left exposed for approximately 11 years, and the following was observed:

- Thermowood was shown to be more durable than Macrocarpa heartwood. In order of durability: H3.1 was worst, then Macrocarpa, then thermowood, then H3.2 was best.

Since macrocarpa is a species of heart cypress, which is permitted for a no-finish or stained finish within NZS3602 clause 111.2.5, any timbers that are more durable than this would logically also be fit for purpose as a no-finish or stained finish cladding.



- Therefore since Thermowood is more durable than macrocarpa, it can be used as no-finish or stained cladding as well.
- It would appear that the threshold between a timber cladding requiring a paint versus being acceptable with a no-finish or stained finish rests between H3.1 and Cypress.
- Since Thermowood is above that threshold, it can be used without a finish.

Furthermore, Abodo has maintenance and recoating protocols for their claddings, and have done aging testing at their facility to show that even without coatings, their claddings will fade or discolour, but will generally be durable enough to meet the minimum 15 year requirement of B2/AS1.

In addition, preservative treatments can be added to the product to further enhance the durability for some applications if required.

E2 – External Moisture

The shingles form the outside rainshedding surface of the wall system. In the event water were able to bypass the outer surface, it would readily drain down the ventilated cavity to the bottom and back to the outside. The ventilated cavity provides further protection by drying the cladding and wall system, a concept well established as sufficient to meet the requirements of the building code.

This concept incorporates a secondary weather resistive barrier layer inboard of the battens. This layer can be a number of different materials provided they meet the requirements of NZS 2295:2006 namely providing resistance to bulk water transport, but also shrinkage, durability and water permeability requirements. The selection of this layer is beyond the scope of the cladding manufacturer's responsibility as is the performance for the remainder of the wall system in managing moisture both external and internal.

As the shingle system incorporates similar, if not identical details to cedar shingles (a long established well performing cladding), it would follow that in terms of managing water the Abodo system would fair equally or better. In this ventilated cladding arrangement, the exterior cladding details are not required to be weathertight and deviations from manufacturer's details would not adversely affect the performance of the system provided the weathertightness principles of deflection, drain, drying are observed.

Given this robust nature of this assembly, this cladding product will contribute to compliance of the wall systems for buildings of any height, scale or exposure zone and it not limited to the restrictions of E2/AS1 or NZS 3604.

Conclusions

Based on the information reviewed, we believe the Abodo shingle system meets all the relevant building code clauses above. As noted above, in the event a building is beyond specific wind pressures of 1.82 kPa then specific engineering of the fixings may be required however, all other clauses remain relevant for buildings of any type.



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Director