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True Oak® Roof and Wall Claddings

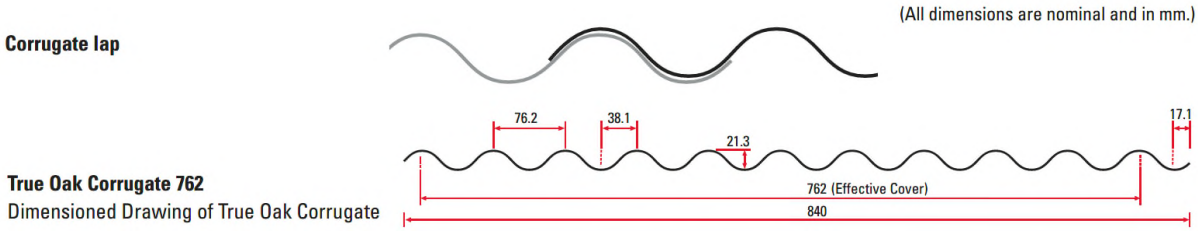
Compliance with the Building Code for E2 External Moisture

Executive Summary

This report presents arguments supporting the use of **True Oak®** profile as roofing and vertically and horizontally fixed wall cladding complying with the requirements of the Building Code regarding E2 External Moisture.

Background

True Oak® is a corrugate profile roofing and cladding.



True Oak Corrugate 762
Dimensioned Drawing of True Oak Corrugate

Acceptable Solution E2/AS1 provides for corrugate profile roofing with a minimum crest height of 16.5 mm.

It also provides for metal cladding of corrugate profile to be used as wall cladding when direct fixed vertically (up to and including Risk Score 20). It also allows horizontal fixing over a drained and ventilated cavity (up to and including Risk Score 20). It does not provide for vertical fixing on cavity. Vertical fixing on cavity is not provided for because solid cavity battens would normally compromise the ventilation and drainage of the cavity. However, using castellated battens (as an alternative solution) overcomes this and is widely accepted. For corrugate profiles, vertical fixing on cavity (should that be considered) is no different than direct fixing, which is permitted up to and including Risk Score 20.

Compliance with the Building code Clause E2 External Moisture for different profiles and use in alternative applications requires analysis of the profile and its use in those applications.

True Oak® profile and E2/AS1

Acceptable Solution E2/AS1 covers a range of profiles:

> **8.4.4 Profiles**
> Profiles covered in this Acceptable Solution are shown in Figure 38, and consist of:
> a) **Corrugated** – curved with a crest height of 16.5 mm minimum,
> b) **Trapezoidal** – symmetrical or asymmetrical with a minimum crest height of 19 mm, and for asymmetrical a flat or lightly profiled pan width of 210 mm maximum between crests, and
> c) **Trough profile** – with vertical ribs at a minimum height of 38 mm, and flat or lightly profiled pans of 210 mm maximum between crests.

E2/AS1 para 8.4.4	**True Oak®**	
minimum crest height of 16.5 mm	21.3 mm	Complies

It also applies to particular grades of material:

> **8.4.3.2 Steel**
> Materials for the manufacture of profiled steel roof cladding shall:
> a) have a BMT of 0.4 mm minimum
> b) be grade G550, or G300 for rolled, crimped, or trough profile roofing
> c) be selected for corrosion protection according to the intended exposure zone as shown in Table 20.

(The same requirements are repeated for profiled steel cladding, in para 9.6.3.2)

E2/AS1 paras 8.4.3.2/9.6.3.2	**True Oak®**	
BMT 0.4 mm minimum	0.40 or 0.55 mm	Complies
Grade G550 or G300	G550	Complies
be selected for corrosion protection according to the intended exposure zone……	Various coating options available.	Complies

The **True Oak®** profile meets the characteristics specified in E2/AS1 in all respects for roofing and when used within the limitations of E2/AS1 it complies with E2 External Moisture.

This report also examines how compliance with performance requirements of clause E2 External Moisture of the Building Code could be argued for **True Oak®** an alternative solution for use as roofing for a minimum roof pitch of 4 degrees, which is outside the limitations of E2/AS1.

The relevant Building Code requirement is cl E2.3.2:

> E2.3.2 Roofs and exterior walls must prevent the penetration of water that could cause undue dampness, damage to building elements, or both.

Analysis

Roofing

For roofing, the acceptable solution E2/AS1 provides for trapezoidal profile roofing limited to those with a minimum crest height of 16.5 mm.

The **True Oak®** profile meets the characteristics specified in E2/AS1 in all respects.

However, E2/AS1 limits corrugate profiles to a minimum roof pitch of 8 degrees.

The capacity of the **True Oak®** corrugate profile has been analysed[1] to establish whether it would comply with the performance requirements of E2 External Moisture when used at a roof pitch of minimum 4 degrees That report stated that "The conclusion that code compliance is met is supported by design calculations and practical demonstration of performance regarding depth of water in the profile valley under high intensity rainfall, absence of capillary action at edge laps, and the effect of wind on the likelihood of water ingress at edge laps. It is also supported by observations from the leadership of the industry's peak bodies – The New Zealand Metal Roofing Manufacturers Association (MRM) and the Roofing Association of New Zealand (RANZ)."

The MRM Code of Practice provides for a minimum roof pitch of 4 degrees where the corrugate crest height is between 21 mm and 35 mm.

Wall Cladding

The **True Oak®** profile meets the characteristics specified in E2/AS1 in all respects for cladding and when used within the limitations of E2/AS1 it complies with E2 External Moisture.

Conclusions

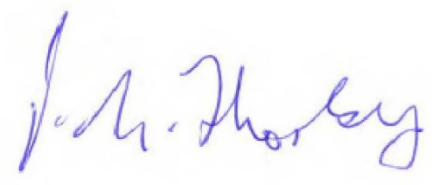
True Oak® roofing meets the requirements in Acceptable Solution E2/AS1 for corrugate profile metal roofing and meets the performance requirements of E2 External Moisture.

True Oak® roofing also meets the performance requirements of E2 External Moisture when used with a minimum roof pitch of 4 degrees.

True Oak® direct fixed vertically as cladding (up to and including Risk Score 20) complies with E2/AS1.

True Oak® fixed horizontally as cladding over a nominal 20 mm drained cavity meets the requirements in Acceptable Solution E2/AS1 for corrugate profile metal roofing and meets the performance requirements of E2 External Moisture.

True Oak® fixed vertically as cladding over a nominal 20 mm drained cavity meets the performance requirements of E2 External Moisture.



P N Thorby

[1] Compliance of True Oak Corrugate Profile with the New Zealand Building Code (External Moisture E2), Tekton Consulting Report T14044, 23 November 2015