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Slimline® Wall Cladding

Compliance with the Building Code for E2 External Moisture

Executive Summary

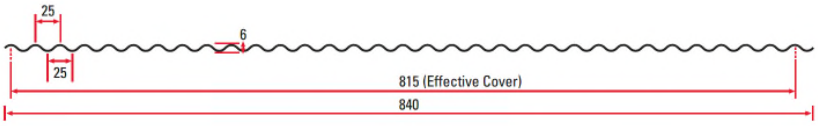
This report presents arguments supporting the use of **Slimline®** profile as vertically and horizontally fixed wall cladding complying with the requirements of the Building Code regarding E2 External Moisture.

Background

Slimline® is a corrugated profile wall cladding.

(All dimensions are nominal and in mm.)

Slimline lap



Slimline - Mini Corrugate
Dimensioned Drawing of Slimline

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

It also provides for corrugated profile to be used as wall cladding when direct fixed vertically or when fixed horizontally over a drained and ventilated cavity (up to and including Risk Score 20). Vertical fixing on cavity is not explicitly addressed, but the notes to E2/AS1 Table 3 comment that direct fixed vertical corrugated steel is included as cavity construction, ie 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.

SlimlineSlimline® profile and Acceptable SolutionE2/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	Slimline®	
minimum crest height of 16.5 mm	6 mm	Does not meet minimum height

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 E2/AS1 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	**Slimline®**	
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 **Slimline®** profile does not meet the minimum profile depth specified in E2/AS1 for roofing and wall cladding.

This report examines how compliance with performance requirements of clause E2 External Moisture of the Building Code could be argued for **Slimline®** as an alternative solution for use as wall cladding.

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

Wall Cladding

Acceptable Solution E2/AS1 provides for metal cladding of corrugated profile in the following situations:

	Direct Fixed	On cavity
Horizonal fixing	No	Yes (Risk score 0-20)
Vertical fixing	Yes	Yes

The Acceptable Solution provides for minimum profile depth of 16.5 mm. **Slimline®** has a 6 mm profile depth, and this analysis considers the effect of this on meeting the performance requirements of E2, by comparison with the characteristics of the profile that is specified in E2/AS1.

This analysis looks at the building physics of corrugated profile as a wall cladding, and compares **Slimline®** with the characteristics of standard corrugated.

It considers

- comparative likelihood of ingress of external moisture
- mechanisms for drainage and ventilation
- the characteristics of underlay between the profile and timber framing

Ingress of moisture behind the cladding:

Penetration can be considered under three scenarios:

Penetrations – such as windows etc. Flashing details etc are no more complex for **Slimline®** than they are for standard corrugated, or other wall claddings provided in E2/AS1.

Profile sidelaps – this can be discounted as the channels do not run with any significant depth of water (unlike, potentially, a roofing application). Whilst the profile is obviously not as deep as that of a standard corrugate profile, the **Slimline®** edge lap - of which there is one at approximately 800 mm spacing – does sit proud of the wall whereas for example vertical board and batten the Acceptable Solution E2 the lap is flat on the board, and is at approximately 150 mm spacings. In both situations a capillary break is provided. As for standard corrugated profile, the capillary break incorporated in the side lap provides a drainage path down the lap joint for moisture before it can track to the reverse side of the profile. The probability of water ingress through the edge lap of **Slimline®** installed vertically is no higher than for vertical board and batten, which is provided for in Acceptable Solution E2/AS1 where the Risk Score is up to and including 12.

Fixings – wall claddings are typically fixed through the pan of the profile. The fixings specified for **Slimline®** are TEKs with neos which incorporate a seal between the head of the fixing and the face of the prolife, to prevent moisture tracking through the fixing penetration.

There is no reason to believe **Slimline®** is any more likely to allow the ingress of external moisture than vertical board and batten, which is allowed as an acceptable solution.

Mechanisms for drainage and ventilation

Ventilation and drainage generally are provided by the cavities formed by the **Slimline®** profile. The cross-sectional area of each void formed by the profile against underlay or RAB is approximately 75 mm2, without any flat bearing of the profile against the fixing. This can be compared with say vertical board and batten where the void formed by the spacing of the boards would be typically 160 mm2, spaced typically 180 mm apart. Looking at this per meter width of wall, the void area for **Slimline®** is 3000 mm2, compared with 890 mm2 for board and batten. So **Slimline®** provides drainage and ventilation at least equivalent to vertical board and batten.

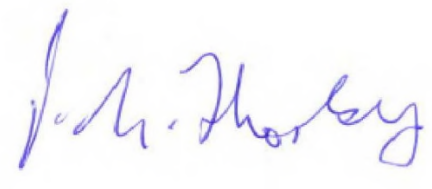
Characteristics of the Cladding/Fixing interface

When a profile is fixed on a cavity there is no direct contact between the profile and the building underlay or RAB. There is direct contact between the underlay and the fixing framing, in a way that is the same regardless of the type of cladding.

Conclusions

Slimline® fixed horizontally as cladding over a nominal 20 mm drained cavity meets the performance requirements of E2 External Moisture (up to and including Risk Score 20).

Slimline® fixed vertically as cladding over a nominal 20 mm drained cavity meets the performance requirements of E2 External Moisture (up to and including Risk Score 20).



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