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WHEN TO USE CAVITY WALL CONSTRUCTION?

Cavity Wall construction forms an integral part of an improved weathertight solution for building envelopes and was recently introduced as a concept to the Building Code of Australia published as part of the National Construction Code Series 2015, Volume 2 (NCC 2015, Building Code of Australia – Volume Two). Cavity wall construction originated as part of a weathertight solution developed in Canada, and later adopted in New Zealand, commonly known as the 4D's of weathertightness; Deflection, Drainage, Drying and Decay/Durability where the cavity provides drainage and drying.

RISK MATRIX

Whilst the NCC 2015, Building Code of Australia - Volume Two does not explicitly dictate when cavity wall construction should be used, its Risk Matrix does share similarities with the Risk Matrix from the New Zealand Building Code (NZBC) Clause E2/AS1 - External Moisture. Table 1 is an extract of Table V2.2.1a – *Risk Factors and Scores* and illustrates the Risk factor and subsequent score to be used to determine the suitability of direct fix or cavity wall construction.

TABLE 1: Risk factors and scores (Extracted from NCC 2015, Building Code of Australia – Volume Two - Table V2.2.1a)

Risk factor	Category	Risk severity	Score
Wind Region	Region A (AS/NZS 1170.2)	Low to Medium	0
	Region B (AS/NZS 1170.2)		
	Region C (AS/NZS 1170.2)	High	1
	Region D (AS/NZS 1170.2)	Very High	2
Number of storeys	One Storey	Low	0
	Two storeys in part	Medium	1
	Two storeys	High	2
	More than two storeys	Very High	4
Roof/wall junctions	Roof-to-wall junctions fully protected	Low	0
	Roof-to-wall junctions partially exposed	Medium	1
	Roof-to-wall junctions fully exposed	High	3
	Roof elements finishing within the boundaries formed by the external walls	Very High	5
Eaves Width	Greater than 600 mm for a single storey	Low	0
	451-600 for single storey; or Greater than 600 mm for two storey	Medium	1
	101-450 mm for single storey; or 451-600 mm for two storey; or less than 600 mm for above two storey	High	2
	0-100 mm for single storey; or 0-450 mm for two storey; or less than 600 mm for above two storey	Very High	5

Envelope complexity	Simple shape with single cladding type	Low	0
	Complex shape with no more than two cladding types	Medium	1
	Complex shape with more than two cladding types	High	3
	As for high risk but with fully exposed roof-to-wall junctions	Very High	6
Decks, porches and balconies	None; or Timber slat deck or porch at ground level	Low	0
	Fully covered in plan view by roof; or Timber slat deck attached at first or second floor level	Medium	2
	Balcony exposed in plan view at first floor level; or Balcony cantilevered at first floor level	High	4
	Balcony exposed in plan view at second floor level or above; or Balcony cantilevered at second floor level or above	Very High	6

Notes:

1. Eaves width is measured horizontally from the external face of any wall cladding to the outer edge of any overhang, including fascia and external gutters
2. Barriers to prevent falling and parapets are considered as 0 mm eaves

SUITABLE WALL CLADDING OPTIONS

Guidance on the suitability of particular cladding systems are not provided via The NCC 2015, Building Code of Australia – Volume Two, however compliance documents for the NZBC Clause E2 External Moisture, Acceptable Solution AS1 (NZBC E2/AS1) do provide direction regarding the suitability of wall claddings used in direct fix or cavity wall construction.

The use of cavity wall construction or direct fix claddings is driven by risk, firstly whether the structure is exposed to conditions that may be conducive to moisture ingress, and secondly by mitigating factors such as the existence of a secondary line of defence through a drained and bottom vented cavity in the case of cavity wall construction.

Following guidance from NZBC E2/AS1, CHH Woodproducts recommends the use of cavity wall construction over a nominal 20 mm drained and bottom vented cavity for fixing Shadowclad on structures exhibiting a risk score less than 20 (Cavity wall construction, risk score < 20). CHH Woodproducts only recommends Shadowclad be direct fixed when a risk score of less than 6 is achieved (Direct fix cladding risk score, < 6).

Further, CHH Woodproducts recommends the use of a rigid air barrier where wind speeds exceed N3 or C1 as defined in accordance with AS 4055, Wind Loads for housing. For Risk Scores above 20, specific architectural engineering design is required for weathertightness.

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CONCLUSION

Decisions around the use of direct fix or cavity wall construction for claddings, like Shadowclad, is paramount in the ongoing weathertightness of a building solution. The NCC 2015, Building Code of Australia – Volume Two has introduced the concept of cavity wall construction in the May 2015 edition through Risk Scores factors and scores, however it stops short of providing guidance on when to use, or not to use, direct fix or cavity wall construction.

CHH Woodproducts recommends applying the rules from the NZBC relating to the use of cavity wall construction. The following rules are proposed for application of direct fix or cavity wall construction relating to the Risk Score from Table 1:

- Where Risk Score < 6 Shadowclad may be applied as a direct fix cladding, although cavity wall construction provides the most suitable solution for weathertightness
- For Risk Scores 7-20 Shadowclad shall be installed on cavity wall construction
- For Risk Scores >20 Specific Engineering Design is required