

## **TECHNICAL:**

### **Non deemed-to-satisfy external wall cladding systems**

This Advisory Notice provides advice on the processes required to be undertaken when external wall cladding products and/or cladding systems which are not DtS building solutions, and are proposed to be incorporated into the design of a building. These are hereafter referred to as 'non DtS' cladding systems.

#### **BACKGROUND**

In recent years, residential and commercial buildings in Australia have seen a dramatic increase in the use of innovative, external wall cladding products and/or systems which are not dealt with in the BCA as Deemed-to-Satisfy (DtS) building solutions.

External cladding systems which are currently allowed under a DtS approach include:

- Masonry
- Weatherboards
- Fibre-cement sheets
- Metal sheets
- Plywood sheets

Examples of non DtS cladding systems include but are not limited to the following:

- Autoclaved aerated concrete
- Aluminium composite panels
- Architectural insulated panels
- External insulation & finish (rendered) systems:
  - Expanded polystyrene panels
  - Extruded polystyrene panels
  - Phenolic insulation panels
  - Polyisocyanurate panels

When non DtS cladding systems are included in a design they are required to be presented as an Alternative Solution. The Alternative Solution is to include information/evidence that allows the relevant authority to determine that the material, form of construction and design meets the Performance Requirements of the BCA.

Additionally for Class 2 – 9 buildings, practitioners are also required to reference all relevant provisions of National Construction Code Volume One - BCA, in particular, Performance Requirements relating to fire-resistance and combustibility.

The relevant authority is required to ensure that the Assessment Method outlined in the BCA is followed to comply with the Performance Requirements.

**DISCUSSION**

Non DtS cladding systems are required to follow the Alternative Solution assessment process specified in the BCA. The Alternative Solution should demonstrate that it complies with the Performance Requirements of the BCA, or that the Alternative Solution is equivalent to, or better than the DtS provisions. A combination of both methods may also be used. The relevant authority may seek evidence to support that the use of the material, form of construction and design meets a Performance Requirement or a DtS provision as described in the BCA.

These requirements are set out in the following clauses:

- Volume One, clauses A0.5, A0.8, A0.9 and A0.10
- Volume Two, clauses 1.0.5, 1.0.8, 1.0.9 and 1.0.10

**Duties of applicants/designers**

Architects and building designers should take care when specifying non DtS cladding systems. Where an alternative is specified, the relevant authority processing the application for Building Rules Consent to ensure their application contains sufficient evidence/information to show that the building work is compliant.

To assist the relevant authority in determining whether the non DtS system is an acceptable Alternative Solution, relevant certificates, reports and forms should be submitted at the design stage, including all details of the Alternative Solution concerned.

**The relevant authority**

The relevant authority is required to ensure that the process specified for an Alternative Solution, the Assessment Method and the relevant Performance Requirements of the BCA are followed. Flexibility is provided in these provisions such as Expert Judgement. This allows for the use of a report from an expert who has the qualifications and experience to determine whether a Building Solution complies with the Performance Requirements.

Otherwise, manufacturers of non DtS cladding systems can be allowed to opt to have their products assessed and reported on by a Registered Testing Authority (R.T.A). These reports may be used as evidence to support that the use of a material, form of construction or design meets a Performance Requirement as described in the BCA.

Another option is CodeMark product certification. This scheme gives the relevant authority and building practitioner's confidence of legislative compliance. Certification bodies are accredited through the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) who in turn evaluate and certify building products/systems. A relevant authority is obliged to accept CodeMark certified cladding systems.

However, practitioners should note that CodeMark Certificates applying to a product only (i.e. not a building system), is not in itself evidence of compliance with the Performance Requirements of the BCA. A complying product by itself may not address weather-tightness of the building system. Therefore, care is needed when reviewing the scope of the certificate.

The relevant authority should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable, relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

The relevant authority should be aware of the conditions or limitations of any report presented. All relevant design issues should be considered, including but not limited to; articulation joints, fasteners, flashings, weather-proofing, condensation, fire-resistance levels (FRL), bending and shear strength. Bending, shear and fastening considerations may need to be determined using engineering principles.

It is important to check that appraisals, certificates and technical reports cover all relevant BCA Performance Requirements of the cladding system proposed. They must be current and relevant to the Alternative Solution.

When assessing an application for building rules consent a relevant authority should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The relevant authority should also give due consideration to the conditions or limitation of any material or system provided to them by the applicant.

The relevant authority should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA.

### **Potential consequences of failure of non DtS external wall cladding systems**

External cladding systems must be able to resist actions that they may be reasonably subject to, including but not limited to; live and dead loads, rainwater, wind, earthquake, thermal actions.

In particular, the penetration of water into a building which may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements risking the life safety of building occupants.

Examples include:

- Timber framed balustrades to balconies where inadequate detailing and poor weatherproofing, may lead to undetected decay of the timber structure causing structural failure.
- Hidden fungal growth may affect the health of occupants, causing respiratory and skin problems. The young, old and those with weakened immune systems are most at risk. Dampness may also encourage dust mites.
- When bulk thermal insulation becomes damp, it will reduce its effectiveness. This, in turn, will reduce the energy efficiency of the building concerned.
- Water may accumulate around horizontal members (bottom plates, heads, sills, deck joists, noggings, and parapets) with potential to cause deterioration of the building elements.

Where the possibility exists that moisture will penetrate or collect on the inside face of the external cladding, this moisture must be able to escape the building fabric, either by natural drainage or ventilation of a cavity.

### **Sources of water penetration**

#### Wind Forces

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular maintenance program is required. Non DtS cladding systems should be able to demonstrate adequate weather proofing details.

### Condensation

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame. Warm air inside a building may condense as it cools, causing moisture droplets to form in insulation, on the framework surface, and the internal face of the cladding.

Condensation is possibly more problematic in Climate Zone 6 areas compared to Climate Zones 4 and 5. Proposals for the use of non DtS cladding systems, in these regions should account for the climate. Buildings in cooler climates tend to be closed and sealed over the winter period allowing higher levels of air-borne moisture to be retained in a building. Particular attention should be given to where dew points are likely to occur within these cladding systems. In warmer climates, buildings tend to be aired more often and temperature differences from inside to outside the building will not be as severe, however practitioners should still use caution.

Refer to the ABCB Handbook: Condensation on buildings. Visit [www.abcb.gov.au](http://www.abcb.gov.au)

### Poor design and installation

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world, highlights the need for non DtS cladding systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11.0 billion. Repair costs to some houses have been in the order of \$NZ 300,000.

### **Conclusion**

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems. There is an obligation on the relevant authority to be satisfied that the material, form of construction and design meets the Performance Requirements of the BCA.

Care should be taken that all issues have been addressed, including, where appropriate, further assessment by qualified experts. Any system should be constructed in accordance with the specified details. Mixing and matching of cladding systems will void reliance on available test results and reports.



Government  
of South Australia

## **Further information**

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