

CONSULTING PTY LTD

Appraisal Report for  
**Building Product Accreditation**

For the

**NuCLAD**

polystyrene exterior insulation and finishing system

(an external wall cladding system for Class 1a & 10 buildings)

Report prepared by

SKIP Consulting Pty Ltd

For

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\* For and on behalf of SKIP Consulting Pty Ltd.

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# 1 Introduction and scope of the appraisal

## 1.1 The client

SKIP Consulting Pty Ltd has been appointed by the Nutex Corporation Pty Ltd (Nutex), the developers of the external wall cladding system known as the NuCLAD polystyrene exterior insulation and finishing system (the NuCLAD Cladding System).

## 1.2 The scope of this submission

This submission is an application to the Building Regulations Advisory Committee (the 'BRAC') in accordance with Part 14 of the Building Regulations 2006 (the 'regulations') for accreditation of a building system.

As there are no relevant deemed-to-satisfy provisions in the Building Code of Australia (BCA) for the weatherproofing requirements for this system it is able to be assessed and appraised against the relevant performance requirements of the BCA and, if considered by the BRAC as suitable, issued with a certificate of accreditation by the BRAC.

The purpose of the accreditation certificate is to provide certainty for the system manufacturer and consumer. This is provided by Section 15(2) of the Building Act (the 'Act') which states;

**Section 15(2)**

*The relevant building surveyor must not refuse to approve building work on the ground that any building product, construction method, design, component or system connected with the building work is unsatisfactory if the product, method, design, component or system is accredited by the Building Regulations Advisory Committee or a prescribed person or body and it complies with that accreditation.*

## 1.3 Description of the building system

The *NuCLAD Cladding System* includes building panels made of Grade M expanded polystyrene. The standard panel size is either 2500mm x 1200mm, or 5000 mm x 1200 mm, in nominal standard thicknesses of 75mm and 100mm.

## 1.4 BCA Performance Requirements applicable to Accreditation

The relevant BCA Performance Requirements applicable to accreditation, for which there are no DtS Provisions for this system, are; P2.1 & P2.2.2. A detailed description of all BCA Performance Requirements and the method of compliance is included in Table 2.1 of this report.

## 1.5 Limits of the assessment and appraisal of the building system

This submission assesses and appraises the building system against the relevant Performance Requirement of the BCA. It does not include inspection of manufacturing processes, quality assurance programs or schemes, or specific site installations methods or techniques.

This appraisal report does not warrant that the system is suitable for any specific purpose, installation or location. In appraising the system the reports, tests and other details provided by the developer, Nutex, have been relied upon in good faith, without further consideration.

## 2 Compliance with the BCA Performance requirements

The following table indicates each BCA Volume 2 performance requirement and the method of compliance for the NuCLAD Cladding System.

**Table No. 2.1**

Relevant BCA Volume 2 Part or Performance Requirement	Summary of requirement and test method or compliance standard
<b>BCA VOLUME 2, SECTION 2 PERFORMANCE PROVISIONS</b>	
<b>PART 2.1 Structure</b>	
Performance Requirement <b>P2.1</b> Structural stability and resistance to actions	<p>No specific Deemed-to-Satisfy Provisions (called Acceptable Construction Practice or Manuals in the BCA Volume 2).</p> <p>The 75 mm thick <i>NuCLAD Cladding System</i> has been tested to <i>AS/1562.1:1992: Installation of sheet roof and wall cladding</i> and <i>AS/NZS 4284:2008: Testing of building facades</i> (Report No. 30B-10-0528-TRP-593729-1, dated 25<sup>th</sup> March 2011 and Report No. 30B-12-0015-TRP-264454-2, dated 24<sup>th</sup> April 2012 by Vipac Engineers and Scientists Ltd).</p> <p>Based on the above test results the <i>NuCLAD Cladding System</i> is suitable for use in non-cyclonic wind region N2 (or lesser) as follows;</p> <ul style="list-style-type: none"> <li>○ Maximum 450 mm stud spacing,</li> <li>○ Not less than 20 mm fastener offset from the sheet edge,</li> <li>○ Maximum 370 mm centres fastener to fastener on structure,</li> <li>○ Not less than 8 fixings per m<sup>2</sup>, and</li> <li>○ Building height to eaves of &lt; 6.0m or ridge of &lt;8.5 m.</li> </ul> <p>Note: For fixing of windows in external walls, these must satisfy BCA Volume 2 DtS provision 3.6.0 &amp; <i>AS 2047—1999; Windows in buildings— Selection and installation</i>.</p>
<b>PART 2.2 Damp And Weatherproofing</b>	
Performance Requirement <b>P2.2.1</b> Surface water	Ground surface water issues not applicable to external wall cladding.
Performance Requirement <b>P2.2.2</b> Weatherproofing	<p>The 75 mm thick <i>NuCLAD Cladding System</i> has been tested to <i>AS/1562.1:1992: Installation of sheet roof and wall cladding</i> and <i>AS/NZS 4284:2008: Testing of building facades</i> (Report No. 30B-10-0528-TRP-593729-1, dated 25<sup>th</sup> March 2011 and Report No. 30B-12-0015-TRP-264454-2, dated 24<sup>th</sup> April 2012 by Vipac Engineers and Scientists Ltd).</p> <p>Eaves and soffit linings must satisfy BCA Volume 2 DtS provision 3.5.3.5.</p> <p>Flashings to wall openings must satisfy BCA Volume 2 DtS provision 3.5.3.6</p> <p>Windows must satisfy BCA Volume 2 DtS provision 3.6.0 &amp; <i>AS 2047—1999; Windows in buildings— Selection and installation</i>.</p>

Relevant BCA Volume 2 Part or Performance Requirement	Summary of requirement and test method or compliance standard
Performance Requirement <b>P2.2.3</b> Dampness	The sub-floor space between a suspended floor of a building and the ground must satisfy BCA Volume 2 DtS provision 3.4.1.2. The system must be located clear of adjoining ground levels as shown in NuCLAD polystyrene exterior insulation and finishing system installation manual (Version No. 2, dated 6 <sup>th</sup> August 2012, 32 pages).
Performance Requirement <b>P2.2.4</b> , Drainage from swimming pools	Drainage from swimming pools not applicable to external wall cladding.
<b>PART 2.3 Fire Safety</b>	
Performance Requirement <b>P2.3.1</b> Protection from the spread of fire	The <i>NuCLAD Cladding System</i> is combustible as defined in the BCA and AS1530.1 and must be located >900 mm from boundaries, as described in the BCA Part 3.7.1.
Performance Requirement <b>P2.3.2</b> Fire detection and early warning	Fire safety issues not applicable to external wall cladding.
Performance Requirement <b>P2.3.3</b> Heating appliances	Fire safety issues not applicable to external wall cladding.
Performance Requirement <b>P2.3.4</b> Bushfire areas	Satisfies the BCA Deemed-to-Satisfy Provisions only for external walls on sites up to BAL-19 and > 400 mm above ground level, as described in AS3959-2009 (combustible external walls).
Performance Requirement <b>P2.3.5</b> Alpine areas	Fire safety issues not applicable to external wall cladding.
<b>PART 2.4 Health And Amenity</b>	
Performance Requirement <b>P2.4.1</b> Wet areas	Internal wet area issues not applicable to external wall cladding.
Performance Requirement <b>P2.4.2</b> Room heights	Internal room height issues not applicable to external wall cladding.
Performance Requirement <b>P2.4.3</b> Facilities	Internal facilities issues not applicable to external wall cladding.
Performance Requirement <b>P2.4.4</b> Light	Internal light issues not applicable to external wall cladding.
Performance Requirement <b>P2.4.5</b> Ventilation	Internal ventilation issues not applicable to external wall cladding.
Performance Requirement <b>P2.4.6</b> Sound insulation	Internal sound insulation issues not applicable to external wall cladding.
<b>PART 2.5 Safe Movement And Access</b>	
Performance Requirement <b>P2.5.1</b> Stairways and ramps	Internal stairway issues not applicable to external wall cladding.
Performance Requirement <b>P2.5.2</b> Barriers	Internal barrier issues not applicable to external wall cladding.

Relevant BCA Volume 2 Part or Performance Requirement	Summary of requirement and test method or compliance standard
Performance Requirement <b>P2.5.3</b> Swimming pool access	Swimming pool access issues not applicable to external wall cladding.
Performance Requirement <b>P2.5.4</b> Swimming pool water recirculation systems	Internal sound insulation issues not applicable to external wall cladding.
<b>PART 2.6 Energy Efficiency</b>	
Performance Requirement <b>P2.6.1</b> Building	<p>The <i>NuCLAD Cladding System</i> energy efficiency properties are based on resistance values calculated in accordance with methods stipulated within BCA Volume One Clause J1.2. These results are; 75 mm panels R1.8, 100 mm panels R2.4 (m<sup>2</sup>.K/W).</p> <p>This material property is not subject to accreditation as <i>AS/NZS 4859.1:2002; Materials for the thermal insulation of buildings, Part 1: General criteria and technical provisions</i> applies and is adopted in the BCA as a DtS Provision.</p>
Performance Requirement <b>P2.6.2</b> Services	Internal sound insulation issues not applicable to external wall cladding.

### **3 Design & construction and other details**

#### **3.1 Design & construction details**

Design and construction details are included in the NuCLAD polystyrene exterior insulation and finishing system installation manual (Version No. 2, dated 6<sup>th</sup> August 2012, 32 pages).

#### **3.2 Other details**

It is noted the 100 mm panel was not tested, but that test results for the 75 mm panel are likely to be able to be applied to the thicker panel, which will be a less severe case for structural strength and weatherproofing. This has been confirmed by VIPAC in their letter of 9 August 2012, file no. 30B-11-0473-TNT-259337-0.

## 4 Results of the appraisal

Based on the documents contained within this report it is considered that the *NuCLAD Cladding System* satisfies performance requirements P2.1 & P2.2.2 of the BCA, to the extent that those Clauses refer to the structural stability of a cladding system with regard to resistance to wind action and rainwater action, and weatherproofing of the product.

The *NuCLAD Cladding System* and therefore a suitable material and fit for the purpose for which it is intended (an external wall cladding system) in accordance with BCA Volume 2, Clause 1.2.1.

### 4.1 Conditions of this appraisal

The *NuCLAD Cladding System* must be used in accordance with the following conditions and limitations;

- 4.1.1. The system must be installed in accordance with the NuCLAD polystyrene exterior insulation and finishing system installation manual (Version No. 2, dated 6<sup>th</sup> August 2012, 32 pages), including only for use in non-cyclonic wind region N2 (or lesser) as follows;
  - a. A maximum 450 mm stud spacing,
  - b. not less than 20 mm fastener offset from the sheet edge,
  - c. a maximum 370 mm centres fastener to fastener on structure,
  - d. not less than 8 fixings per m<sup>2</sup>, and
  - e. a building height to eaves of < 6.0 m or to ridge of <8.5 m.
- 4.1.2. The *NuCLAD Cladding System* is combustible as defined in the BCA and AS1530.1 and must be located more than 900 mm from allotment boundaries, as described in the BCA Part 3.7.1.
- 4.1.3. The system must only be used with the Watergate breathable sarking behind the panels and this sarking must be used and installed in accordance with the Building Research Association of New Zealand (BRANZ) Appraisal Report No.729-2011.
- 4.1.4. The system flashing tape must be used and installed in accordance with the Building Research Association of New Zealand (BRANZ) Appraisal Report No.614-2008.
- 4.1.5. The system has been appraised only for BCA Class 1 and Class 10 buildings.
- 4.1.6. The sub-floor space between a suspended floor of a building and the ground must satisfy BCA Volume 2 DtS provision 3.4.1.2.
- 4.1.7. The system is only to be installed on timber or steel framework and the supporting frame structure must be constructed of timber or steel in accordance with the relevant structural provisions of the Building Code of Australia (BCA) described in Clause 3.4.3.0 and 3.4.2.0 and the relevant Australian Standards, including AS 1684.2-2010 or AS 1684.4-2010 and AS/NZ 4600-2005 (*Cold formed steel structures*) or NASH — *Residential and low-rise steel framing — Part 1 Design criteria*; and (in the case of a steel frame) the frame material has a yield stress of not less than 250 MPa, as applicable.
- 4.1.8. Eaves and soffit linings must satisfy BCA Volume 2 DtS provision 3.5.3.5.
- 4.1.9. Flashings to wall openings must satisfy BCA Volume 2 DtS provision 3.5.3.6.
- 4.1.10. Windows must satisfy BCA Volume 2 DtS provision 3.6.0 & AS 2047—1999; *Windows in buildings— Selection and installation*.



- 4.1.11. Whilst the *NuCLAD Cladding System* is allowable by the BCA DtS bushfire provisions for external walls on sites up to BAL-19 as described in *AS3959-2009* (combustible external walls >400mm above ground) it should not be used on buildings on sites subject to bushfire attack, or in a Bushfire or Wildfire Management Overlay or sites in a bushfire prone area without the specific consideration and approval of a registered fire safety engineer.
- 4.1.12. All fastenings must be protected against corrosion as set out in Part 4 and Appendix C of *AS4773.1-2010 Masonry in small buildings Part 1: Design* and particularly;
- a. for areas less than 1 km from breaking surf; or less than 100 m from salt water not subject to breaking surf; or within industrial areas (severe environments); R4 durability classification connectors and accessories shall be used (typically corrosion grade 316 or 316L stainless steel or engineered polymer),
  - b. for areas 1 km or more but less than 10 km from breaking surf or 100 m or more but less than 1 km from salt water not subject to breaking surf (marine environments), R3 durability classification connectors and accessories shall be used (typically connectors and accessories galvanised after manufacture — 470g/m<sup>2</sup> on each side or galvanised fasteners — 470g/m<sup>2</sup> coating mass)
- 4.1.13. All fixtures and features attached to the wall must be secured into the wall framing and be designed in accordance with engineering principles.
- 4.1.14. Horizontal and vertical construction joints must be designed by a registered building practitioner in the category of engineer, class of structural engineer, but not more than 6.0 m vertically apart and at each floor level.

## **Appendix A: Qualifications and experience of the author**

## Statement of Qualifications and Experience



# Stephen Kip

**Director, SKIP Consulting Pty Ltd**

<b>Academic and Trade qualifications</b>	<ul style="list-style-type: none"><li>▪ Master of Engineering (Victoria University, 1996)</li><li>▪ Graduate Diploma of Building Fire Safety &amp; Risk Engineering (Victoria University, 1993)</li><li>▪ Graduate Diploma of Engineering in Building Project Management (Footscray Institute of Technology, 1989)</li><li>▪ Bachelor of Building (Deakin University, 1991)</li><li>▪ Certificate of Technology, Building Surveying (Footscray TAFE, 1986)</li><li>▪ Certificate of Proficiency (Carpentry), Industrial Training Commission (Vic), 1981</li></ul>
<b>Professional qualifications and memberships</b>	<ul style="list-style-type: none"><li>▪ Victorian registered building practitioner, class of Fire Safety Engineer</li><li>▪ Victorian registered building practitioner, category of Building Inspector</li><li>▪ Victorian registered building practitioner, category of Building Surveyor</li><li>▪ Victorian registered building practitioner (currently voluntarily suspended), category of builder, class of Domestic Builder (unlimited)</li><li>▪ Fellow of the Institution of Engineers (Australia)</li><li>▪ Immediate Past President of the Society of Fire Safety of Engineers Australia</li><li>▪ Honorary Fellow of the academic staff of the University of Melbourne, Faculty of Architecture, Building and Planning</li><li>▪ Current Member of the Victorian Building Appeals Board</li></ul>
<b>Principal experience</b>	<ul style="list-style-type: none"><li>▪ April 2007 - present, Director SKIP Consulting Pty Ltd (Fire Safety Engineering &amp; Building Regulatory Consultancy)</li><li>▪ Dec 2002 - March 2007, Senior Fire Safety Engineer, Warrington Fire Research (Aust) Pty Ltd</li><li>▪ Nov 2000 - Nov 2002, Senior Fire Safety Engineer, Building Research Association of New Zealand (BRANZ)</li><li>▪ Jan 1999 - Oct 2000, Deputy to the Building Commissioner, Building Control Commission, Victoria</li><li>▪ Dec '95 - Jan 1999, Principal Research &amp; Development Officer, Building Control Commission, Victoria</li><li>▪ April 1988 - Nov 1995, Building Surveyor, Gardner Group P/L (Building Surveyors)</li><li>▪ Jan 1988 - April 1990, Principal of building company, KB Constructions</li><li>▪ Nov 1984 - Dec 1987, Building Surveyor, City of Geelong</li></ul>
<b>Other related experience</b>	<ul style="list-style-type: none"><li>▪ 1987 to present, part time lecturing positions in building and fire safety engineering related subjects at several universities including; the University of Melbourne, Victoria University, Deakin University and RMIT University.</li></ul>

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