



BRANZ Appraised

Appraisal No.557 [2007]

BRANZ Appraisals

**Technical Assessments of products
for building and construction**

**BRANZ
APPRAISAL
No. 557 (2007)**

**NU-WALL
ALUMINIUM
DIRECT FIXED
CLADDING SYSTEM**

**Aluminium Product Brands NZ
Limited**

15 Gabador Place
Mt Wellington
Auckland

Tel: 09 915 3600

Fax: 09 573 5643

Web: www.aluminium.co.nz



BRANZ

BRANZ Limited
Private Bag 50 908
Porirua City
New Zealand
Tel: +64 4 237 1170
Fax: +64 4 237 1171
www.branz.co.nz

BRANZ Pty Ltd
P O Box 830
Brookvale
NSW 2100
Australia
Tel: +61 2 9938 6011
Fax: +61 2 9938 6911
www.branz.com.au



Product

1.1 The Nu-Wall Aluminium Direct Fixed Cladding System is a direct fixed, interlocking powder coated aluminium weatherboard system. It is designed to be used as an external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

1.2 The system includes horizontally fixed Nu-Wall weatherboards (Classique, Shiplap, Ripple 150, Ripple 190, Aero 70, Aero 115, Aero 190, Louvre 60, Louvre 120, Ullos, Mono 190 and AliClad) installed over an absorbent wall wrap, internal and external corner mouldings, starter strip, board jointers, board locators, soffit caps, joinery flashings and accessories.



Scope

2.1 The Nu-Wall Aluminium Direct Fixed Cladding System has been appraised as an external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- constructed with timber framing complying with the NZBC; and,
- with a risk score of 0-12, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Building Wind Zones up to, and including 'Very High'.

2.1 The Nu-Wall Aluminium Direct Fixed Cladding System has also been appraised as an external wall cladding for steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- constructed with steel framing complying with the NZBC; and,
- with a risk score of 0-12, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- situated in NZS 3604 Building Wind Zones up to, and including 'Very High'.

2.3 The Nu-Wall Aluminium Direct Fixed Cladding System must only be installed horizontally on vertical, flat surfaces. The tops of parapets and balustrades must have a minimum 5° slope and be waterproofed with metal cap flashings in accordance with the Technical Literature.

2.4 The Nu-Wall Aluminium Direct Fixed Cladding System is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. (*The Appraisal of the Nu-Wall Aluminium Direct Fixed Cladding System relies on the joinery meeting the requirements of NZS 4211 for the relevant Building Wind Zone.*)

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the Nu-Wall Aluminium Direct Fixed Cladding System if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. The Nu-Wall Aluminium Direct Fixed Cladding System meets the requirements for loads arising from self-weight, wind and impact [i.e. B1.3.3 (a), (h) and (j)]. See Paragraphs 9.1 - 9.3.

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years. The Nu-Wall Aluminium Direct Fixed Cladding System meets this requirement. See Paragraphs 10.1 and 10.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Nu-Wall Aluminium Direct Fixed Cladding System meets this requirement. See Paragraphs 14.1 - 14.3.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Nu-Wall Aluminium Direct Fixed Cladding System meets this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 System components and accessories for the Nu-Wall Aluminium Direct Fixed Cladding System, which are supplied by Design Aluminium Limited, are:

Nu-Wall Weatherboards

- Nu-Wall weatherboards are produced in a variety of profiles (Classique (136 mm cover), Shiplap (150 mm cover), Ripple 150 (150 mm cover), Ripple 190 (190 mm cover), Aero 70 (140 mm cover), Aero 115 (115 mm cover), Aero 190 (190 mm cover), Louvre 60 (120 mm cover), Louvre 120 (120 mm cover), Ullos (162 mm cover), Mono 190 (190 mm cover) and AliClad (150 mm cover)) and are powder coated or anodised on the exposed surfaces. When installed, the cladding is effectively 14.5 mm thick. Nu-Wall weatherboards are supplied in 5.0 m lengths as standard, but can be supplied up to 9.0 m long.
- Nu-Wall weatherboards are manufactured from 6063 T5 or 6060 T5 aluminium alloy. The boards and accessories are extruded, cut to length then either powder coated or anodised.

Accessories

- Starter strip - an extruded aluminium profile used to locate and secure the bottom of the first course of weatherboards. The starter strip is available in 5 m lengths.
- Base channel - An extruded aluminium profile used to locate and secure the bottom of the first course of weatherboards where the weatherboard has been longitudinally ripped. The base channel is supplied in 5 m lengths.
- Vented base channel - an extruded aluminium profile used to locate and secure the bottom of notched weatherboards above window and door joinery penetrations. The vented base channel is powder coated or anodised and is available in 5 m lengths.
- External and internal corner moulding - an extruded aluminium 90° two-piece internal corner mould and 90° two-piece external corner mould. The mouldings are powder coated or anodised and are available in 5 m lengths.

- Board jointer - An extruded aluminium two piece vertical jointer for jointing lengths of Nu-Wall weatherboards. The jointer is powder coated or anodised and is supplied in 5 m lengths.
- Universal fixing bracket - an extruded aluminium locator used to secure individual weatherboards. The board locators are 45 mm long and are predrilled for fixing.
- J-Mould - an extruded aluminium profile, powder coated or anodised and available in 5 m lengths.
- Nu-Wall sill flashing - an extruded aluminium flashing to provide drainage for the sill area and conceal the ends of the weatherboards at the sill of window and door trim openings. The sill flashing is powder coated or anodised and is available in 5 m lengths.
- Nu-Wall jamb flashing - an extruded aluminium two piece flashing to conceal the ends of the weatherboards at the jambs and sill of window and door trim openings. The jamb flashing is powder coated or anodised and is available in 6 m lengths.
- Nu-Wall weatherboard fixings (timber frame) - 32 mm long, 8-gauge, Grade 304 stainless steel wood screws.
- Nu-Wall weatherboard, cavity batten and thermal break fixings (steel frame) - self drilling 6-gauge Grade 304 stainless steel screws. The screw length must allow a minimum 10 mm penetration through the steel frame.
- Foam seals and tape - Closed-cell polyethylene foam seals and PVC tape cut to suit the weatherboard profile. The seals are used with internal and external corner mouldings and jamb flashings to create a weather resistant seal. The tape is used to provide a seal between the window joinery and the cladding at the jamb.
- Plastic soaker - extruded polythene 110 mm wide with 2 mm upstands on each edge.

4.2 Accessories used with the Nu-Wall Aluminium Direct Fixed Cladding System, which are supplied by the building contractor, are:

- Building wrap - kraft-based building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall wraps behind direct fixed, non-absorbent, metal-based claddings.
- Flexible sill and jamb flashing tape - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- Thermal break (steel frame) - expanded polystyrene (EPS) in accordance with the requirements of NZBC Acceptable Solution E3/AS1, Paragraph 1.1.4(d).
- Parapet flashings - folded from aluminium.
- Window and door joinery head flashing - extruded or folded from aluminium to suit the window or door joinery opening.
- Window and door trim cavity air seal - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal for use around window, door and other wall penetrations.
- Flexible sealant - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.

Handling and Storage

5.1 Handling and storage of all materials supplied by Design Aluminium Limited or the building contractor, whether on site or off site, is under the control of the building contractor. Nu-Wall weatherboards must be stacked flat, off the ground and supported on a level platform. They must be kept dry either

by storing under cover or providing waterproof covers to the stack. Care must be taken to avoid damage to powder coated surfaces. Weatherboards must always be carried on edge.

5.2 Other accessories must be stored so they are kept clean, dry and undamaged. All accessories must be used within the maximum storage period recommended by the manufacturer.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Nu-Wall Aluminium Direct Fixed Cladding System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

Design Information

Framing

Timber Treatment

7.1 Timber wall framing behind the Nu-Wall Aluminium Direct Fixed Cladding System must be treated as required by NZS 3602.

Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and NZS 4203 (AS/NZS 1170). Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases studs must be at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 800 mm centres.

7.3 Timber wall framing must have a maximum moisture content of 24% at the time of the cladding application.

7.4 Additional framing will be required at soffits, internal and external corners, Direct Fixed joints and window and door openings for the support and fixing of Nu-Wall weatherboards.

Steel Framing

7.5 Steel framing must be to a specific design meeting the requirements of the NZBC.

7.6 The minimum framing specification is 'C' section studs and nogs of overall section size of 75 mm web and 32 mm flange. Steel thickness must be minimum 0.55 mm.

7.7 In all cases, studs must be at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 800 mm centres.

General

8.1 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level paved surfaces, such as footpaths, must be kept clear of the bottom edge of the cladding system by a minimum of 100 mm, and unpaved surfaces by 175 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Table 18.

8.2 At deck or low pitch roof/wall junctions, the bottom edge of the Nu-Wall weatherboards must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.6.

8.3 All buildings must have barriers to airflow in the form of interior linings with all joints stopped, or alternatively, unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. Where rigid sheathings are used, the fixing length must be increased by a minimum of the thickness of the sheathing.

8.4 Where the Nu-Wall Aluminium Direct Fixed Cladding System abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. Details not included with the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Structure

9.1 The mass of the Nu-Wall Aluminium Direct Fixed Cladding System when installed on the wall is approximately 5 kg/m². The Nu-Wall Aluminium Direct Fixed Cladding System is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

9.2 The Nu-Wall Aluminium Direct Fixed Cladding System has good resistance to hard and soft body impacts likely to be encountered in normal residential use, although some chipping of the finish could occur. The likelihood of impact damage to the system when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers should be considered for vulnerable areas.

Wind Zones

9.3 The Nu-Wall Aluminium Direct Fixed Cladding System is suitable for use in all Building Wind Zones of NZS 3604, up to, and including 'Very High'.

Durability

Serviceable Life

10.1 The Nu-Wall Aluminium Direct Fixed Cladding System is expected to have a serviceable life of at least 25 years provided the system is maintained in accordance with this Appraisal.

10.2 On exposure to the environment, the powder coating will gradually lose gloss and coloured coatings will slowly fade. A faster reduction in appearance and a reduction in serviceable life can be anticipated in severe industrial, geothermal, and marine exposures.

Maintenance

11.1 Regular maintenance is essential for Nu-Wall Aluminium Direct Fixed Cladding System installations to continue to meet the NZBC durability performance provision and to maximise their serviceable life.

11.2 Annual inspections must be made to ensure that all aspects of the cladding system, including flashings and any sealed joints remain in a weathertight condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant and the like must be repaired in accordance with the sealant manufacturer's instructions. Regular cleaning (at least every 6 months) of the powder coating with water and a mild detergent is required to remove grime, dirt and organic growth, to maximise the life and appearance of the cladding. Repainting of the powder coating may be considered necessary at some stage during the life of the cladding in order to restore the appearance of the cladding. Repainting must be carried out in accordance with the paint manufacturer's instructions for the treatment of aged powder coated aluminium.

11.3 Minimum ground clearances as set out in this Appraisal must be maintained at all times during the life of the cladding. *(Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of the Nu-Wall Aluminium Direct Fixed Cladding System.)*

Control of External Fire Spread

12.1 The Nu-Wall Aluminium Direct Fixed Cladding System is suitable for use as an external wall cladding on all buildings in accordance with NZBC Acceptable Solution C/AS1 Part 7, Paragraph 7.11.2(a).

Outbreak of Fire

13.1 Nu-Wall weatherboard is considered a non-combustible material and need not be separated from flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from chimneys and flues in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

External Moisture

14.1 The Nu-Wall Aluminium Direct Fixed Cladding System, when installed in accordance with this Appraisal and the Technical Literature prevents the penetration of moisture that could cause undue dampness or damage to building elements.

14.2 The Nu-Wall Aluminium Direct Fixed Cladding System allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet compliance with NZBC Clause E2.3.6.

14.3 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.

Internal Moisture

Water Vapour

15.1 The Nu-Wall Aluminium Direct Fixed Cladding System is not a barrier to the passage of water vapour, and when installed in accordance with this Appraisal and the Technical Literature will not create or increase the risk of moisture damage resulting from condensation. Refer to Paragraph 15.2 for specific requirements for steel framed buildings.

15.2 Where the Nu-Wall Aluminium Direct Fixed Cladding System is installed over a steel frame, **an expanded polystyrene thermal break must be installed over each steel member behind the building wrap** to provide a thermal break in accordance with the requirements of NZBC Acceptable Solution E3/AS1, Paragraph 1.1.4 (d). The Nu-Wall Aluminium Direct Fixed Cladding System is then installed over the top of the thermal break in accordance with the Technical Literature and this Appraisal.

Installation Information

Installation Skill Level Requirements

16.1 Installation of Nu-Wall weatherboards and accessories supplied by Design Aluminium Limited and the building contractor must be completed in accordance with instructions given within the Nu-Wall Aluminium Direct Fixed Cladding System Technical Literature and this Appraisal by tradespersons with an understanding of Nu-Wall aluminium weatherboard installation.

System Installation

Building Wrap and Flexible Sill and Jamb Tape Installation

17.1 The selected building wrap and flexible sill and jamb tape system must be installed by the building contractor in accordance with the wrap and tape manufacturer's instructions prior to the installation of the rest of the Nu-Wall Aluminium Direct Fixed Cladding System. Building wrap must be installed horizontally and be continuous around corners. The wrap must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Particular attention must be paid to the installation of the building wrap and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

Nu-Wall Aluminium Weatherboard Installation

17.2 Nu-Wall weatherboards may be cut on site by power saw fitted with an aluminium cutting blade. Holes and cut-outs may be formed by drilling a number of holes around the perimeter of the opening required, or by using a holesaw suitable for cutting aluminium.

17.3 Nu-Wall weatherboards must be installed starting at the bottom of the wall. The first course of weatherboards must overhang the bottom plate by a minimum of 50 mm. If there is more than one starting level, work from the lowest point up to the next level and try to ensure a joint in the boards coincide with the higher starting level.

17.4 Fix the base section of the corner mouldings in place. The corner mouldings must be continuous in length from the underside of the first weatherboard course to the soffit or top of the wall.

17.5 When the wall being clad is longer than the length of the weatherboard, the base section of the board jointer must be fixed in place over a double stud. The jointer must be fixed plumb and must be continuous from the underside of the first weatherboard course to the soffit or top of the wall.

17.6 The starter strip must be fixed to the wall framing behind the first course of weatherboards. The starter strip must be fixed level and a gap must be maintained between each end of the starter strip and the corner moulds or board jointer.

17.7 Nu-Wall weatherboards are cut to length allowing a 1 mm gap per metre of board for expansion. The first course of weatherboards must be locked into the starter strip and must then be secured at the top of the board with universal fixing brackets fixed to the studs at maximum 600 mm centres. Ensure that the fixing bracket engages correctly with the fixing fin of the board and that the board is held firmly with no downward pressure on it. This should eliminate distortion or cupping of the weatherboard.

17.8 Subsequent courses of weatherboards must be locked into the channel of the board below, and must be secured at the top of the board with universal fixing brackets fixed to the studs at maximum 600 mm centres.

17.9 Board fixing into timber framing is carried out using 32 mm long, 8-gauge stainless steel screws. Fixing into steel framing is carried out with self-drilling 6-gauge stainless steel screws.

17.10 Window and door joinery flashings must be installed in accordance with the Technical Literature.

Aluminium Joinery Installation

17.11 Aluminium joinery and associated head flashings must be installed by the building contractor in accordance with the Technical Literature. A 7.5 - 10 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place.

Finishing

17.12 The Nu-Wall Aluminium Direct Fixed Cladding System is pre-finished and does not require painting at the completion of installation. Touch up of scratches and the like must be completed in accordance with the instructions of Design Aluminium Limited.

Health and Safety

18.1 Hearing and eye protection must be worn while cutting Nu-Wall weatherboards and accessories.

Quality

21.1 The manufacture of Nu-Wall weatherboards and aluminium accessories has been examined by BRANZ, and details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.

21.2 The quality of materials, components and accessories supplied by Design Aluminium Limited is the responsibility of Aluminium Product Brands NZ Limited.

21.3 Quality of installation on site of components and accessories supplied by Design Aluminium Limited and the building contractor is the responsibility of the installer.

21.4 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, building wraps, flashing tapes, airseals, joinery head flashings and inter-storey flashings in accordance with the instructions of Aluminium Product Brands NZ Limited.

21.5 Sub-trades are responsible for installation of penetrations, flashings etc that are relevant to their trade in accordance with the Nu-Wall Aluminium Direct Fixed Cladding System Technical Literature.

21.6 Building owners are responsible for the maintenance of the Nu-Wall Aluminium Direct Fixed Cladding System in accordance with the instructions of Aluminium Product Brands NZ Limited.

Sources of Information

- AS/NZS 1170: 2002 Structural design actions - General principles.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 1999 Timber framed buildings.
- NZS 4203: 1992 General structural design and design loadings for buildings.
- NZS 4211: 1985 Specification for performance of windows.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005.
- New Zealand Building Code Handbook, Department of Building and Housing, Third Edition May 2007.
- The Building Regulations 1992 up to, and including, July 2007 amendment.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

19.1 The following testing on the Nu-Wall Aluminium Direct Fixed Cladding System has been completed by BRANZ:

- BRANZ expert opinion on NZBC E2 code compliance for the Nu-Wall Aluminium Direct Fixed Cladding System was based on evaluation of all details within the scope and as stated within this Appraisal. The Nu-Wall Aluminium Cladding Cavity System was tested to E2/VM1 and the results of this testing have been used as the basis for the weathertightness assessment of the Nu-Wall Aluminium Direct Fixed Cladding System. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meter box head, jamb and sill details, vertical board joints, internal and external corners and parapet cap. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of Acceptable Solution E2/AS1 for direct fixed profiled metal claddings.
- Wind face load and fastener pull through testing. BRANZ determined design wind suction pressures, and by comparing these pressures with NZS 4203 (AS/NZS 1170) pressure coefficients, the fixing requirements were determined for timber and steel framed walls.

Other Investigations

20.1 Structural and durability opinions have been provided by BRANZ technical experts.

20.2 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

20.3 The Technical Literature for the Nu-Wall Aluminium Direct Fixed Cladding System has been examined by BRANZ and found to be satisfactory.



BRANZ

In the opinion of BRANZ, **Nu-Wall Aluminium Direct Fixed Cladding System** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Aluminium Products Brands NZ Limited**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the technical literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Aluminium Products Brands NZ Limited**:
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions.
3. Warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
4. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Aluminium Products Brands NZ Limited**.
5. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
6. BRANZ provides no certification, guarantee, indemnity or warranty, to **Aluminium Products Brands NZ Limited** or any third party.

For BRANZ

C Preston
Chief Executive

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