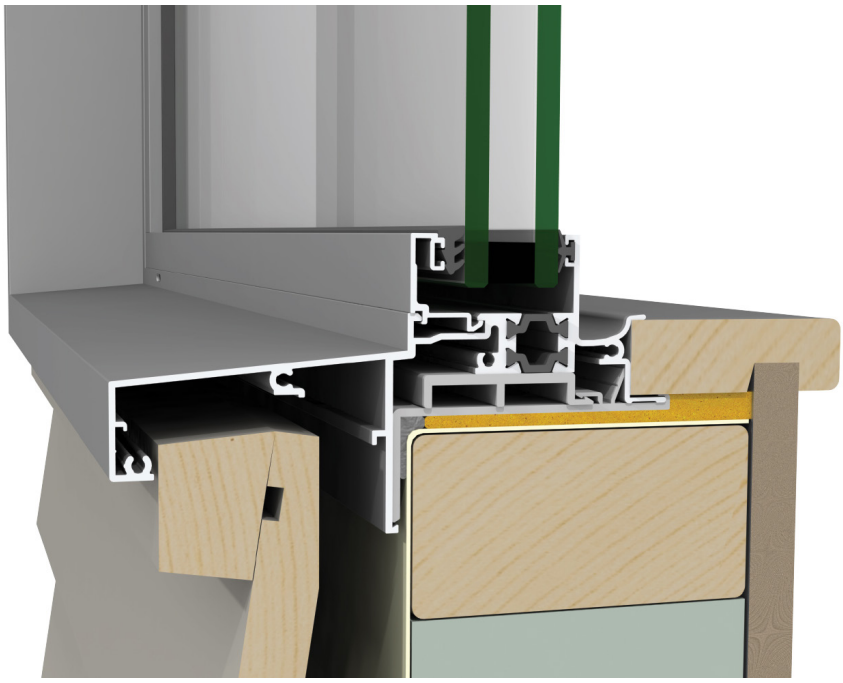
BRANZ Appraised
Appraisal No. 1188 [2023]

APL METRO SERIES CENTRAFIX™ ThermalHEART® WINDOWS AND DOORS



Appraisal No. 1188 (2023)

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 APL Metro Series Centrafix™ ThermalHEART® Windows and Doors are thermally broken aluminium window and door joinery units which include a proprietary recessed installation method. The joinery units are available with fixed glazing or opening sashes.

1.2 The opening sash window styles covered by this Appraisal include:

- Awning and Casement (open out)
- Bi-fold (open out)
- Sliding and Stacking.

1.3 The opening door styles covered are:

- Bi-fold (open out)
- French doors (open out)
- Hinged (open in and open out)
- Sliding and Stacking.

Scope

2.1 APL Metro Series Centrafix™ ThermalHEART® Windows and Doors have been appraised for use as window and door joinery within the following scope:

- designed and manufactured in accordance with NZS 4211 for weathertightness, airtightness and structural design; and,
- in new or existing timber-framed buildings within the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; or,
- in timber-framed buildings within the scope limitations of NZBC Verification Method E2/VM2; and,
- situated in NZS 3604 defined Wind Zones up to, and including, Extra High, or situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa; and,
- with cavity-based cladding systems complying with NZBC Acceptable Solution E2/AS1, or with cladding systems covered by a valid BRANZ Appraisal or BRANZ CodeMark Certificate that specify a drained and vented cavity with a minimum depth of 18 mm and a maximum depth of 45 mm; or,
- with masonry veneer complying with NZBC Acceptable Solution E2/AS1.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, APL Metro Series Centrafix™ ThermalHEART® Windows and Doors, if used, designed, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:**

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. APL Metro Series Centrafix™ ThermalHEART® Windows and Doors meet the requirements arising for loads from self-weight, wind and impact, i.e. B1.3.3 (a), (h) and (j). See Paragraphs 9.1-9.4.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years, B2.3.1 (c) 5 years and B2.3.2. APL Metro Series Centrafix™ ThermalHEART® Windows and Doors meet these requirements. See Paragraphs 10.1 and 10.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. APL Metro Series Centrafix™ ThermalHEART® Windows and Doors meet this requirement for the joinery units and will contribute to the wall cladding system meeting this requirement. See Paragraphs 14.1-14.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1, F2.3.3 (a) and (b). APL Metro Series Centrafix™ ThermalHEART® Windows and Doors meet these requirements. See Paragraph 15.1.

Clause F4 SAFETY FROM FALLING: Performance F4.3.1. APL Metro Series Centrafix™ ThermalHEART® Windows can be used to meet this requirement. See Paragraph 16.1.

Clause G4 VENTILATION: Performance G4.3.1 and G4.3.3. APL Metro Series Centrafix™ ThermalHEART® Windows and Doors can be used to meet these requirements. See Paragraph 18.1.

Clause G7 NATURAL LIGHT: Performance G7.3.1 and G7.3.2. APL Metro Series Centrafix™ ThermalHEART® Windows and Doors can be used to meet these requirements. See Paragraph 19.1.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 and H1.3.2E. APL Metro Series Centrafix™ ThermalHEART® Windows and Doors contribute to meeting these requirements. See Paragraphs 20.1 and 20.2.

Technical Specification

4.1 APL Metro Series Centrafix™ ThermalHEART® Window and Door joinery is fabricated from aluminium extrusions that are thermally broken with a polyamide spacer within the profile sections. The extrusions are polyester powder coated or anodised prior to cutting to length in the joinery fabrication process.

4.2 Centrafix™ ThermalHEART® joinery units have a perimeter fin for face fixing the unit to the outer face of the wall framing. Fixing holes are pre-formed in the fixing fin at 300 mm centres and no more than 150 mm from the corner of the unit. The joinery units incorporate an integral sill support mechanism and sill tray. The sill fin of each unit is supplied with a compressible foam strip.

4.3 Each joinery unit is assembled with aluminium profiles, insulating glass units (IGUs), connectors, window fasteners, seals, sealant and opening hardware to meet the requirements of NZS 4211. Where specified, the joinery units are supplied with H3.1 treated timber reveals attached to the aluminium frames by stapling through the nailing fin. APL Window Solutions provide a head flashing with integral cavity closer and clip on end dams to suit a 20 mm cavity. The joinery unit can also be supplied with a factory fitted soffit trim, a sill extension bar or a sill support bar.

4.4 Each joinery unit bears the brand name, a rating showing the appropriate NZS 4211 Wind Zone, and air infiltration rating.

4.5 IGUs must be selected in accordance with the requirements of NZS 4223 Part 3 and AS/NZS 4666.

4.6 Accessories used with APL Metro Series Centrafix™ ThermalHEART® Windows and Doors which are supplied by the window installer are:

- **Joinery fin fixings** - minimum 32 mm long x 10 g stainless steel wood screws for fixing to timber framing, or minimum 50 mm long x 10 g stainless steel screws fixed into wall plug anchors for fixing to concrete slab edge.
- **Flashing tape** - a BRANZ Appraised flashing tape with a minimum width of 50 mm suitable for bonding to polyester powder coated or anodised aluminium and the selected rigid or flexible wall underlay. Flashing tape is used to seal the head and jamb fins to the wall underlay as detailed within the Technical Literature.
- **Reveal fixings** (where required) - 75 x 3.15 mm jolt head hot-dip galvanised nails or 65 mm x 8 g stainless steel screws.
- **Joinery trim cavity insulation** - a BRANZ Appraised expanding foam.

Handling and Storage

5.1 Handling and storage of APL Metro Series Centrafix™ ThermalHEART® Windows and Doors window and door joinery on-site is the responsibility of the installer. Joinery units must be handled with care to avoid damage, especially scratching, and must be stored under cover on edge, and supported on the sill with protection materials (timber strips, cardboard) to avoid damage and distortion.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- APL Metro Series ThermalHEART® with Centrafix™ SYSTEM GUIDE, dated 01-3-23.

6.2 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

General

7.1 APL Metro Series Centrafix™ ThermalHEART® Windows and Doors incorporate an external fixing flange (fin) that allows the joinery to be installed and sealed to the face of the wall underlay or floor edge. The joinery is designed for use with cavity-based wall cladding systems and features an integrated aluminium facing that extends 58 mm from the wall framing line.

7.2 A weather and airtight barrier around the joinery perimeter is created when the fin and the wall underlay is taped with a suitable flashing tape. The flashing tape must not be exposed to the weather or ultraviolet (UV) light for a period greater than that specified by the flashing tape proprietor before being covered by the cladding system.

7.3 The installation method for Centrafix™ ThermalHEART® joinery is an alternative solution to the installation method contained within NZBC Acceptable Solution E2/AS1. Flexible flashing tapes are not required around the window opening as specified in NZBC Acceptable Solution 9.1.10.2 c).

7.4 Design of the joinery units is carried out to meet the requirements of NZS 4211, NZS 4223 Part 3 and sill support deflection limits.

7.5 Where combinations of fixed lights and opening sashes are required, the height of the window will depend on the maximum allowable mullion height for the wind exposure and the mullion spacing selected. The joinery can be of any width, provided the width of any light is within the maximum allowable transom length and the maximum allowable sash width. In all cases, the glass must meet the structural requirements for the wind exposure selected.

7.6 It is recommended that APL Window Solutions be consulted for information and recommendations on window size, configuration and glass requirements.

7.7 Where a proprietary cladding manufacturer provides window and door joinery installation detailing as part of their system, permission must be obtained from the cladding supplier before Centrafix™ ThermalHEART® joinery installation detailing is substituted.

7.8 Where required, installations of Centrafix™ ThermalHEART® joinery can be complemented by the use of cladding trims (e.g. scribers, facings) to ensure a weathertight joint between the window facing and the cladding. Refer to the Technical Literature for typical details

7.9 Where Centrafix™ ThermalHEART® joinery is used with cladding systems not covered by this Appraisal (refer to Paragraph 2.1), designers must detail the junction between the joinery and the cladding to meet their own requirements and the performance requirements of the NZBC. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Joinery Security

8.1 The design of the joinery units is such that when closed, sashes cannot be readily opened from the outside by, for example, the insertion of a thin blade.

Structure

9.1 Centrafix™ ThermalHEART® joinery units are designed to be supported directly by a sill trimmer, or a timber or concrete floor. As such, there is no requirement for a joinery support bar or any additional means of sill support.

9.2 The structural performance of Centrafix™ ThermalHEART® joinery units meets the requirements of NZS 4211.

Wind Zones

9.3 Centrafix™ ThermalHEART® joinery is suitable for use in NZS 3604 defined Wind Zones up to, and including, Extra High, or situated in specific design wind pressures up to a maximum design differential (ULS) of 2.5 kPa.

Ease of Operation

9.4 The sashes meet the opening force requirements of NZS 4211, Paragraph 7, and can be opened without difficulty.

Durability

Serviceable Life

10.1 Centrafix™ ThermalHEART® joinery and associated gaskets and seals are expected to remain serviceable under New Zealand conditions for as least 15 years. Over time, some loss of gloss and some colour fade may affect the appearance of the surface finish.

10.2 During the life of the joinery, components such as IGUs, fittings and seals may need to be replaced due to environmental exposure and damage.

Maintenance

11.1 Regular maintenance is required for Centrafix™ ThermalHEART® joinery to continue to meet the NZBC durability performance requirements and to maximise its serviceable life. BRANZ Bulletin issue 634 and the Window & Glass Association New Zealand (WGANZ) guidance documentation should be used as a reference for the maintenance of the powder coating and anodised surfaces and the required frequency of washing determined by pollution levels. Joinery installed in polluted areas such as severe industrial, geothermal and marine exposures are recommended to be cleaned every 3 months. Regular cleaning (at least every 6 months) is recommended for unpolluted rural and urban areas.

11.2 Annual inspections must be made to ensure that all aspects of Centrafix™ ThermalHEART® joinery, including visible flashings, seals and cladding junctions remain in a weathertight condition. Any damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately in accordance with the instructions of APL Window Solutions.

11.3 Hardware should be periodically lubricated to minimise wear and to ensure smooth operation, and can be readily replaced by the window manufacturer if necessary.

11.4 Care must be taken to avoid damage or discolouration of the aluminium members when stripping paint from adjacent timber, for example, by means of a blowlamp or paint stripper.

11.5 Concrete, mortars and other alkaline type materials must not come into contact with the aluminium or glass surfaces. If accidental splattering of these materials onto the aluminium or glass does occur, it must be removed immediately by wiping and washing it from the surface with clean water. Paint or other coating material splashes or splatters must also be removed from the surfaces immediately with a clean cloth.

11.6 Re-glazing, if required, must be undertaken by glazing tradespersons.

Means of Escape

12.1 Where Centrafix™ ThermalHEART® doors are used on escape routes, the relevant provisions of NZBC Clause C4 must be met. This may be achieved, for example, by meeting the relevant requirements of NZBC Acceptable Solution C/AS2 Part 3 for access, door fastenings, locking devices, direction of opening, degree and width of opening, hardware and provision of vision panels.

Control of Internal Fire and Smoke Spread

13.1 Centrafix™ ThermalHEART® joinery is not suitable for use where fire rated windows, fire doors or smoke control doors are required by the NZBC.

External Moisture

General

14.1 Centrafix™ ThermalHEART® joinery is an Alternative Solution to the window and door joinery solutions provided in NZBC Acceptable Solution E2/AS1. When installed in accordance with this Appraisal and the Technical Literature, Centrafix™ ThermalHEART® prevents the penetration of moisture that could cause undue dampness or damage to building elements.

14.2 Centrafix™ ThermalHEART® joinery must be installed with flashing tape to the head and jamb fins to seal the unit to the wall underlay. At the sill, the joinery has a compressible foam seal which seals the sill fin to the wall underlay or floor edge. The gap between the reveal and framing is filled with an expanding foam seal to improve the thermal performance. Flashing tapes around the window and door trim opening as detailed in NZBC Acceptable Solution E2/AS1, Paragraphs 9.1.5 b) and 9.1.6 are **not** required.

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 cladding 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.

Air and Water Leakage

14.4 Centrafix™ ThermalHEART® joinery complies with the air and water leakage requirements of NZS 4211, Sections 8 and 9. Air leakage ratings for the joinery achieve the NZS 4211 air conditioning rating. Water leakage ratings allow for their installation in NZS 3604 defined Wind Zones up to, and including, Extra High or situated in specific design wind pressures up to a maximum design differential (ULS) of 2.5 kPa.

Hazardous Building Materials

Human Impact Safety

15.1 Glazing likely to be subject to human impact must comply with NZS 4223 Part 3, as specified in NZBC Acceptable Solution F2/AS1, Section 1.0.

Safety from Falling

16.1 Where specified, Centrafix™ ThermalHEART® joinery can be supplied to comply with NZBC Acceptable Solution F4/AS1, Section 2.0.

Restricting Access to Residential Pools

17.1 Openable windows and doors that provide access to the immediate pool area must be carefully considered in the building design stage by the designer, paying particular attention to any requirements for restrictor stays or self-closing and self-latching door hardware. The design of windows and doors and their hardware specifications in these instances are outside the scope of this Appraisal. NZBC Acceptable Solution F9/AS1 provides guidance for meeting these requirements.

Ventilation

18.1 Centrafix™ ThermalHEART® windows can be used to meet the ventilation performance requirements of the NZBC if the joinery is installed in exterior walls that enclose occupied spaces, in sufficient quantity or size with opening sashes to provide a net openable area of not less than 5% of the room floor area.

Natural Light

19.1 Centrafix™ ThermalHEART® joinery can be used to meet the performance requirements of the NZBC for natural light providing a sufficient number of joinery units are installed with an acceptable glazing transmittance value, and they are located correctly within exterior walls along with an acceptable interior surface reflectance. NZBC Acceptable Solution G7/AS1 provides guidance for meeting the area, glazing transmittance value, location and surface reflective requirements.

Energy Efficiency

20.1 Centrafix™ ThermalHEART® joinery supplied with IGUs will assist the building envelope in meeting the performance requirements of NZBC H1.3.1 and H1.3.2E. Refer to NZBC Acceptable Solutions H1/AS2 and H1/AS2 and Verification Methods H1/VM1 and H1/VM2 for means of demonstrating compliance with the H1 Energy Efficiency performance provisions. For Centrafix™ ThermalHEART® joinery, the construction R-values from NZBC Acceptable H1/AS1 Table E.1.1.1 should be used. The relevant construction R-values are detailed in Table 1.

Table 1: Selected NZBC Acceptable Solution H1/AS1 Table E.1.1.1 Window R-values

IGU Spacer Type	IGU Type	Thermally broken aluminium frame R-value [m^2K/W]
Aluminium	Clear/Clear: Air	0.32
Aluminium	Clear/Low E1: Argon	0.39
Thermally Improved	Clear/Low E2: Argon	0.42
Thermally Improved	Clear/Low E3: Argon	0.46
Thermally Improved	Clear/Low E4: Argon	0.50
Thermally Improved	Clear/Low E4: Krypton	0.54

20.2 The installation method for Centrafix™ ThermalHEART® requires applying expanding foam to all interior trim cavities. In this instance, the expanding foam does not require a backing rod as it contributes to the thermal performance of the installed joinery only and is not required for air sealing.

Installation Information

Installation Skill Level Requirement

21.1 All design and building work must be carried out in accordance with the Technical Literature and this Appraisal by competent and experienced tradespersons conversant with APL Metro Series Centrafix™ ThermalHEART® Windows and Doors installation. Where the work involves Restricted Building Work (RBW) this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License class.

System Installation

22.1 Centrafix™ ThermalHEART® must be installed strictly in accordance with Technical Literature. The following is a summary of key elements of the installation process:

22.2 The timber framing around the window opening must be checked to ensure that the framing is aligned and free from any protrusions. Where the joinery unit extends to the floor, the framing line must finish flush with the floor edge or overhang by up to 5 mm. The framed opening size clearance is not important, however a 5 to 7 mm clearance all-round the joinery reveal is recommended.

22.3 The selected wall underlay must be installed by the building contractor in accordance with the underlay manufacturer's instructions prior to the installation of the joinery.

22.4 Installation of the joinery must be carried out before the installation of the cavity battens and selected cladding. The joinery unit is fitted into the formed opening with the outer fixing fin finished hard against the face of the wall frame over the wall underlay. The sill must be set true and level and jambs plumb before fixing the joinery permanently in place.

22.5 The head, sill and jambs are fixed through the pre-formed holes in the fixing fins to the framing or floor edge at 300 mm centres. After the joinery unit has been fixed in place, the jamb and head fixing fins must be taped to the wall underlay with flashing tape. The tape must be installed with minimum 25 mm covering the fixing fin and the remainder onto the wall underlay. All fixings and unused fixing holes must be covered. *[Note: Where tape installation is not possible, e.g. where the joinery finishes hard under a soffit, a compressible foam tape is used to create an airtight seal.]*

22.6 The cavity battens and wall cladding system are installed around Centrafix™ ThermalHEART® joinery in accordance with the Technical Literature and the cladding system proprietors instructions.

22.7 Appropriately specified windows and doors must be installed where required to comply with the requirements of Safety from Falling, Restricting Access to Residential Pools and Human Impact Safety.

Basis of Appraisal

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

Tests

23.1 Testing has been carried out on APL Metro Series Centrafix™ ThermalHEART® Windows and Doors joinery to NZS 4211. This testing covered positive and negative deflection, operating force (static and moving), air infiltration (negative and positive), water penetration, ultimate strength and torsional strength. Testing was undertaken at the Architectural Profiles Limited test laboratory, which is an IANZ (International Accreditation New Zealand) accredited laboratory. The test reports have been reviewed by BRANZ experts and found to be satisfactory.

23.2 Testing of Centrafix™ ThermalHEART® joinery to the BRANZ ad-hoc method for airtightness of window installation methods was completed at BRANZ. The testing compared the performance of Centrafix™ ThermalHEART® joinery with the known airtightness of the NZBC Acceptable Solution E2/AS1 window installation method.

23.3 BRANZ expert opinion on NZBC E2 code compliance for Centrafix™ ThermalHEART® joinery was based on testing and evaluation of the details within the scope and as stated within this Appraisal. Centrafix™ ThermalHEART® joinery was tested to NZBC Verification Method E2/VM1 to verify the systems performance in NZS 3604 Wind Zones up to, and including, Extra High, or situated in specific design wind pressures up to a maximum design differential (ULS) of 2.5 kPa. The testing assessed the performance of the window head, jamb and sill details with cavity based wall cladding systems. 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 Centrafix™ ThermalHEART® joinery will meet the performance levels of NZBC Acceptable Solution E2/AS1 for window and door joinery installation.

Other Investigations

24.1 Opinions on durability, strength and stability of the joinery have been given by BRANZ experts.

24.2 Site inspections were carried out by BRANZ to assess the practicability of installation of Centrafix™ ThermalHEART® joinery.

Quality

25.1 The extrusion and fabrication process for Centrafix™ ThermalHEART® 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.

25.2 APL Window Solutions or its licensees are responsible for both the design and quality of the fabricated joinery supplied.

25.3 Building designers are responsible for the design of the building and for the incorporation of Centrafix™ ThermalHEART® joinery into their design in accordance with the instructions of APL Window Solutions.

25.4 The quality of installation, handling and storage on-site is the responsibility of the installer, in accordance with the instructions of APL Window Solutions.

25.5 Building owners are responsible for the maintenance of the joinery in accordance with the instructions of APL Window Solutions.

Sources of Information

- AS/NZS 4666:2012 Insulating glass units.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4211:2008 Specification for performance of windows.
- NZS 4223 Part 3:2016 Glazing in buildings.
- Ministry of Business, Innovation and Employment Record of Amendments - Acceptable Solutions, Verification Methods and Handbooks.
- The Building Regulations 1992.

BRANZ

In the opinion of BRANZ, APL Metro Series Centrafix™ ThermalHEART® Windows and Doors are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to Architectural Profiles Limited t/a APL Window Solutions, 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. Architectural Profiles Limited t/a APL Window Solutions:
   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;
   d) 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.
3. 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 Architectural Profiles Limited t/a APL Window Solutions:
4. 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.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to Architectural Profiles Limited t/a APL Window Solutions: or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
06 April 2023