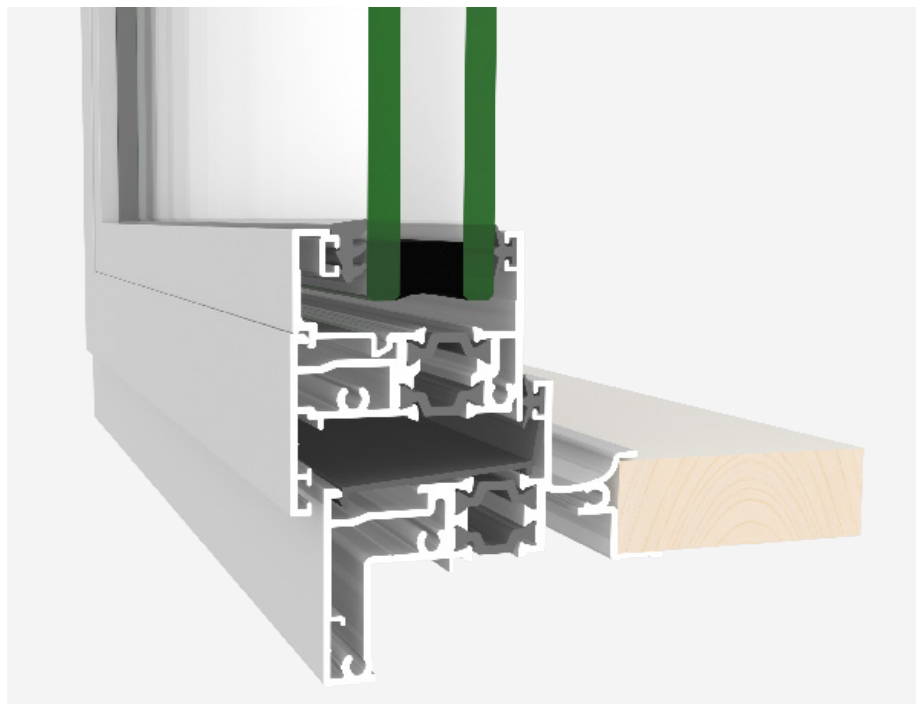




BRANZ Appraised
Appraisal No. 1259 [2024]

APL
ThermalHEART+®
WINDOW AND DOOR
SYSTEMS

Appraisal No. 1259 [2024]
Amended 02 May 2024



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 APL ThermalHEART+® Window and Door Systems are a range of thermally broken aluminium window and door joinery units for use in residential and light commercial buildings. The joinery units are available with fixed glazing and/or opening sashes/doors. The joinery is available in three ranges:
 - Metro Series ThermalHEART®
 - APL Architectural Series ThermalHEART®
 - Residential Series ThermalHEART®
- 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 ThermalHEART+® Window and Door Systems 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 ThermalHEART+® Window and Door Systems, 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 ThermalHEART+® Window and Door Systems meet the requirements arising for loads from self-weight, wind and impact, i.e. B1.3.3 [a], [h] and [j]. See Paragraphs 9.1-9.3.

Clause B2 DURABILITY: Performance B2.3.1 [b] 15 years, B2.3.1 [c] 5 years and B2.3.2. APL ThermalHEART+® Window and Door Systems meet these requirements. See Paragraphs 10.1 and 10.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. APL ThermalHEART+® Window and Door Systems 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 and F2.3.3 [a] and [b]. APL ThermalHEART+® Window and Door Systems meet these requirements. See Paragraph 15.1.

Clause F4 SAFETY FROM FALLING: Performance F4.3.1. APL ThermalHEART+® Window and Door Systems can be used to meet this requirement. See Paragraph 16.1.

Clause G4 VENTILATION: Performance G4.3.1 and G4.3.3. APL ThermalHEART+® Window and Door Systems can be used to meet these requirements. See Paragraph 18.1.

Clause G7 NATURAL LIGHT: Performance G7.3.1 and G7.3.2. APL ThermalHEART+® Window and Door Systems can be used to meet these requirements. See Paragraph 19.1.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 and H1.3.2E. APL ThermalHEART+® Window and Door Systems contribute to meeting these requirements. See Paragraph 20.1.

Technical Specification

- 4.1 APL ThermalHEART+® Window and Door Systems are 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 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. The joinery units can be supplied with H3.1 treated timber reveals attached to the aluminium frames by stapling through the nailing fin. APL Window Solutions can provide a head flashing and clip on end dams to suit a 20 mm cavity.
- 4.3 Each joinery unit bears the brand name, a rating showing the appropriate NZS 4211 Wind Zone, and air infiltration rating.
- 4.4 APL Window Solutions can supply The AGP System® [IGUs] with the joinery units. The IGUs are manufactured by Architectural Glass Products Limited [AGP®]. The IGUs meet the relevant requirements of NZS 4223 Parts 1 to 4 and are marked with AGP® on the spacer bar. If IGUs are supplied by other manufacturers, these must also meet the relevant requirements of these standards, but these IGUs have not been assessed and are outside the scope of this Appraisal.

Accessories

- 4.5 Accessories used with APL ThermalHEART+® Window and Door Systems, which can be supplied by the window fabricator on request are:
- **Joinery sill support bars and fixings** complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.5 b) v).
 - **Head flashings** complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.4.
 - **Sill flashings** [for direct-fixed claddings] complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.5.
- [Note: The building contractor is responsible for the supply of these accessories if they are not supplied by the window fabricator.]*
- 4.6 Fixings used to fit APL ThermalHEART+® Window and Door Systems to the framing which are supplied by the window installer are minimum:
- 65 mm x 8 g stainless steel screws, or,
 - 75 x 3.15 mm hot-dip galvanised nails.

Handling and Storage

- 5.1 Handling and storage of APL ThermalHEART+® Window and Door Systems 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 Window Solutions Specifier Guide, dated 2023/1, Sections 3.1, 5.1, 8.1, 16.1, 17.1 and 18.1.
 - Window & Glass Association New Zealand, Guide to Window Installation as described in E2/AS1 Amendment 10, Version 1.7, 23 November 2022.
- 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 Design of the joinery units is carried out to meet the requirements of NZS 4211, NZS 4223 Part 3 and sill support deflection limits.
- 7.2 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.
- 7.3 It is recommended that APL Window Solutions be consulted for information and recommendations on window size, configuration and glass requirements.
- 7.4 Where APL ThermalHEART+® Window and Door Systems 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 The structural performance of APL ThermalHEART+® Window and Door Systems meet the requirements of NZS 4211.

Wind Zones

- 9.2 APL ThermalHEART+® Window and Door Systems are 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 ULS of 2.5 kPa.

Ease of Operation

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

Durability

Serviceable Life

- 10.1 APL ThermalHEART+® Window and Door Systems and associated gaskets and seals are expected to remain serviceable under New Zealand conditions for at 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 APL ThermalHEART+® Window and Door Systems to continue to meet the NZBC durability performance requirements and to maximise their 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 APL ThermalHEART+® Window and Door Systems, 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 APL 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 APL ThermalHEART+® Window and Door Systems are not suitable for use where fire rated windows, fire doors or smoke control doors are required by the NZBC.

External Moisture

General

- 14.1 APL ThermalHEART+® Window and Door Systems must be installed in accordance with NZBC Acceptable Solution E2/AS1. When installed in accordance with this Appraisal and the Technical Literature, APL ThermalHEART+® Window and Door Systems prevent the penetration of moisture that could cause undue dampness or damage to building elements.
- 14.2 Buildings outside the scope of NZBC Acceptable Solution E2/AS1 must be the subject of specific weathertightness design for the joinery installation details. The designer must develop these joinery installation details to meet their own requirements and the performance requirements of the NZBC. These details have not been assessed and are outside the scope of this Appraisal.
- 14.3 All window and door joinery must be installed using flexible flashing tapes and air seals in accordance with NZBC Acceptable Solution E2/AS1, Paragraphs 9.1.5 and 9.1.6, or when used outside the scope of NZBC Acceptable Solution E2/AS1, specific weathertightness design details must also follow these principles.

Air and Water Leakage

- 14.4 APL ThermalHEART+® Window and Door Systems comply 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 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, APL ThermalHEART+® Window and Door Systems 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 APL 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 APL ThermalHEART+® Window and Door Systems 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 APL ThermalHEART+® Window and Door Systems 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 APL ThermalHEART+® Window and Door Systems, 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 [m²K/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

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 ThermalHEART+® Window and Door Systems 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. Where the installation is exempt from requiring building consent, the installation of APL ThermalHEART+® Window and Door Systems must comply with the NZBC and be completed by builders or installers with experience in window and door installation.

System Installation

- 22.1 WGANZ provides Technical Literature covering installation details for aluminium windows and doors. Information may also be obtained from NZBC Acceptable Solution E2/AS1.
- 22.2 The selected underlay must be installed by the building contractor in accordance with the underlay supplier's instructions. Flexible flashing tape must be fitted to the sill and the head/jamb junction in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.5, prior to installation of APL ThermalHEART+® Window and Door Systems.
- 22.3 The framed opening size must be large enough to give approximately 7.5-10 mm clearance all round between the wall framing and the reveal liner. Installation of joinery may be carried out before or after the fixing of the cladding depending on the type of cladding and sealing or flashing system being used.

- 22.4 Sills must be set true and level and jambs plumb before fixing the joinery permanently in place.
- 22.5 Fixings into the supporting framing must be in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.8 with regard to fixing type and position. Packing must be provided between the joinery reveal and framing or substrate at the point of fixing to set the joinery frame in correct alignment. There must be no vertical or lateral pressures transmitted to the joinery frames from the building structure, cladding or packers. All packers must be in a sound condition suitable for supporting the selected fastener or fixing.
- 22.6 The installation of the joinery and associated flashings must be in accordance with the details provided in NZBC Acceptable Solution E2/AS1 or details of a specific design.
- 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 to NZS 4211 has been completed on each joinery configuration. This testing was comprised of a mixture of units from the three ranges covered by this Appraisal and the APL Metro Series ThermalHEART® with Centrafix™ series [BRANZ Appraisal No. 1188]. An opinion has been given by BRANZ technical experts confirming the applicability of this testing to all joinery units available across the three ranges covered by this Appraisal.
- 23.2 The NZS 4211 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.

Other Investigations

- 24.1 Opinions on durability, strength and stability of the joinery have been given by BRANZ technical experts.
- 24.2 Site inspections were carried out by BRANZ to assess the practicability of installation of APL ThermalHEART+® Window and Door Systems.

Quality

- 25.1 The extrusion and fabrication process for APL ThermalHEART+® Window and Door Systems 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 APL ThermalHEART+® Window and Door Systems 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.
- BRANZ Bulletin Issue 634, Finishing aluminium, February 2019.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4211:2008 Specification for performance of windows.
- NZS 4223 Part 3:2016 Glazing in buildings.
- Window & Glass Association New Zealand, Guide to Window Installation as described in E2/AS1 Amendment 10, Version 1.7, 23 November 2022.
- Window & Glass Association New Zealand, Maintenance, Version 1, undated.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 02 May 2024

This Appraisal has been amended to update the IGU supplier information.



In the opinion of BRANZ, **APL ThermalHEART+® Window and Door Systems** 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



Claire Falck

Chief Executive

Date of Issue:

26 January 2024