



BRANZ Appraised
Appraisal No. 1018 [2018]

REHAU UPVC WINDOWS AND DOORS

Appraisal No. 1018 [2018]

Amended 14 July 2021



BRANZ Appraisals

Technical Assessments of
products for building and
construction.



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Product

- 1.1 REHAU uPVC Windows and Doors are a range of window and door joinery units for use in residential and light commercial buildings fitted with insulating glazing units [IGUs]. The joinery units are available with fixed glazing or opening sashes. The opening sash window styles include Awning, Tilt-and-turn, and Sliding. Door styles include Tilt-and-turn and sliding doors.
- 1.2 The REHAU uPVC Window and Door suites covered by the Appraisal are referred to as REHAU Euro-Design Slide S920 and REHAU Prestige-Design S921.
- 1.3 The windows and doors are fabricated in New Zealand by local REHAU Window and Door agents, from uPVC profiles manufactured by REHAU AG & Co. See page 8 for details of local REHAU Window and Door agents.

Scope

- 2.1 REHAU uPVC 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,
 - as an alternative to the aluminium windows and doors specified in NZBC Acceptable Solution E2/AS1 Paragraph 9.1.10; and,
 - in buildings within the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, and,
 - with cladding systems complying with NZBC Acceptable Solution E2/AS1, and,
 - situated in NZS 3604 defined Wind Zones up to, and including, Medium for sliding doors and up to, and including, Extra High for all other window and door types.
- 2.2 REHAU uPVC Windows and Doors have also been appraised for compliance with NZS 4211 where they are specified for use outside the scope of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.1 [as the product is uPVC, not aluminium] and/or the building is outside the scope limitations of NZBC Acceptable Solution E2/AS1 Paragraph 1.1 but is within the wind exposure limitations of NZS 4211. The building weathertightness design and installation of the window and door joinery in these situations is subject to specific design and is outside the scope of this Appraisal.
- 2.3 REHAU uPVC Windows and Doors in sizes above those tested have also been appraised for compliance with NZS 4211 where the proprietary REHAU window system engineering design system, or a design engineer, is able to verify that the strength and deflection requirements are within the limitations of the applicable wind zone.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, REHAU uPVC 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. REHAU uPVC 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 to 9.3.

Clause B2 DURABILITY: Performance B2.3.1(b) 15 years for the windows and doors and B2.3.1(c) 5 years for the hardware. REHAU uPVC Windows and Doors meet these requirements. See Paragraphs 10.1 to 10.5.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. REHAU uPVC Windows and Doors meet this requirement for the joinery unit and contribute to the wall cladding system meeting this requirement. See Paragraphs 14.1 to 14.4.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.2 and F2.3.3(a). REHAU uPVC Windows and Doors meet these requirements. See Paragraph 15.1.

Clause F4 SAFETY FROM FALLING: Performance F4.3.1. REHAU uPVC Windows and Doors can be used to meet this requirement. See Paragraph 16.1.

Clause G4 VENTILATION: Performance G4.3.1 and G4.3.3. REHAU uPVC 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. REHAU uPVC 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. REHAU uPVC Windows and Doors contribute to meeting these requirements. See Paragraph 20.1.

Technical Specification

- 4.1 REHAU uPVC Windows and Doors are fabricated in a variety of extruded uPVC profiles. The uPVC is of a tropical formulation for use in countries with high ultraviolet (UV) exposure levels such as New Zealand. All profiles incorporate internal steel core profiles for additional rigidity. The finished profiles are of various cross-sectional designs, both in sizing and format to allow for differing strength and sash types.
- 4.2 REHAU uPVC is offered in an Oyster White and a standard white colour. REHAU also offer alternative colour options which are achieved by application of a coloured PVDF acrylic foil. The foil is laminated onto the surface of the profiles when it is extruded. Colour stability testing has been assessed by BRANZ for the following colours: Ceylon, Golden Oak and Light Grey. Other colours are available, but these have not been assessed and are outside the scope of this Appraisal.
- 4.3 Seals and gaskets used in the REHAU uPVC Window and Doors are co-extruded EPDM.
- 4.4 Each joinery unit is assembled from uPVC profiles selected according to the window or door sizing. Window and door accessories include fasteners, safety stays, friction stays, and door hardware.
- 4.5 Each joinery unit bears the brand name, a rating showing the appropriate NZS 4211/NZS 3604 wind zone, and an indication of air leakage level.



- 4.6 H3.1 treated timber reveals are affixed to the frames during fabrication. There are two methods for fixing reveals to the frame supported by this Appraisal – screw fixing the reveal directly to the outer perimeter edge of the frame, or fixing by way of proprietary zinc coated fixing brackets which interlock with the joinery frame profile and are screwed to the reveal. Fixing brackets are spaced at approximately 300 mm centres around the perimeter of the frame and the reveal is sealed to the frame with a compatible sealant. This fixing method positions the reveal to be flush with the perimeter edge of the frame which allows for increased cover of the external weathering flange over surrounding claddings. Both reveal designs are detailed in the Technical Literature for REHAU uPVC Windows and Doors.
- 4.7 Glazing must be selected in accordance with the requirements of NZS 4223 Part 3 and AS/NZS 4666.

Accessories

- 4.8 Accessories used with REHAU uPVC Windows and Doors which are supplied by the window fabricator 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.
- 4.9 Fixings used to fix REHAU uPVC Windows and Doors 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 REHAU uPVC Windows and Doors joinery on-site is the responsibility of the window 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 (e.g. timber blocking) to avoid damage and distortion.
- 5.2 Bituminous products must be kept off the surface of uPVC to avoid staining. Solvent based products must not be allowed to come into contact with the surface of the uPVC.

Technical Literature

- 6.1 Refer to the Appraisals listings on the BRANZ website for details of the current Technical Literature for REHAU uPVC Windows and Doors. 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

General

- 7.1 Design of the REHAU uPVC joinery units is carried out to meet the requirements of NZS 4211 and NZS 4223 Part 3 by local REHAU Window and Door agents.
- 7.2 It is recommended that a REHAU agent is consulted for information and recommendations on window size, configuration and glass requirements.
- 7.3 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 installed must meet the structural requirements for the wind exposure selected.

- 7.4 Where REHAU uPVC Windows and Doors are used with proprietary cladding systems not covered by NZBC Acceptable Solution E2/AS1, designers must detail the junction between REHAU uPVC Windows and Doors 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 REHAU uPVC Windows and Doors meets the requirements of NZS 4211.

Wind Zones

- 9.2 The joinery is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High, with the exception of sliding doors which are suitable for use in all Wind Zones of NZS 3604 up to, and including, Medium.

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 REHAU white uPVC joinery profiles and associated EPDM gaskets and seals are expected to remain serviceable under New Zealand conditions of use for a period of at least 15 years, if installed and maintained in accordance within the specifications of REHAU (NZ) Limited. Over time, some loss of gloss, and some colour fade may affect the surface appearance of the uPVC profile.
- 10.2 Coloured PVDF acrylic foils laminated onto the uPVC profiles can also be expected to remain serviceable for at least 15 years. Over time, some loss of gloss and some colour fade may affect the surface appearance of the foil.
- 10.3 During the life of the joinery, components such as hardware fittings and seals may need to be replaced due to environmental exposure and damage.
- 10.4 Glazing installed in REHAU uPVC Windows and Doors is subject to the performance requirements of NZS 4223. Double glazing must in addition meet the requirements of AS/NZS 4666. Glazing installed to the above requirements is expected to have a serviceable life of at least 15 years.
- 10.5 H3.1 timber reveals meet the 15 year durability performance requirements of NZS 3602.

Maintenance

- 11.1 REHAU uPVC Windows and Doors must be regularly cleaned [at least annually] using warm water containing a mild household detergent to remove any grime, dirt and organic growth that may have accumulated and to maximise the life and appearance of the joinery. If proprietary cleaners are used on the glass, care must be taken to ensure that deposits do not discolour or damage the uPVC surface or window seals. Organic solvents, particularly acetone and toluene-based solvents, and similar products must not be used for cleaning as they could damage the surface of the uPVC profiles. REHAU (NZ) Limited should be consulted first to ascertain suitability before any solvent based product is used for cleaning.
- 11.2 Hardware should be periodically lubricated to minimise wear and to ensure smooth operation. Hardware can be readily replaced by REHAU agents if necessary.
- 11.3 Drainage channels should be cleaned periodically and kept clear of any blockages.
- 11.4 Care must be taken to avoid damage or discolouration of the uPVC profiles when stripping paint from adjacent timber, for example, by means of a blowtorch or paint stripper.



- 11.5 uPVC should not need painting at any time. Should painting be contemplated for any reason, only a specialised paint system may be used. The advice of REHAU [NZ] Limited must be sought before any painting is undertaken.
- 11.6 Re-glazing, if required, must be undertaken by a glazier following a REHAU agent's installation instructions.

Means of Escape

- 12.1 Where REHAU uPVC 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 Solutions C/AS1 or 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 REHAU uPVC Windows and Doors are not suitable for use as fire rated windows or where fire doors or smoke control doors are required by the NZBC.
- 13.2 Risk Group SH buildings have no surface finish requirements [Group Number]. Window components and individual doorsets in other Risk Groups are also exempt from the surface finish requirements. Refer to NZBC Acceptable Solution C/AS2 Paragraph 4.17.6 d) and 4.17.6 g).

External Moisture

General

- 14.1 REHAU Windows and Doors, when installed in accordance with the Technical Literature and installation detailing, perform similarly to and are an Alternative Solution to the windows and doors specified in NZBC Acceptable Solution E2/AS1. REHAU uPVC Windows and Doors, when correctly installed, 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 REHAU uPVC Windows and Doors comply with the air and water leakage requirements of NZS 4211, Sections 8 and 9. Air leakage rates for the joinery can reach 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, with the exception of sliding doors which are suitable for use in all Wind Zones of NZS 3604 up to, and including, Medium.

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, Paragraph 1.0.

Safety from Falling

- 16.1 Opening windows must comply with the requirements of NZBC Acceptable Solution F4/AS1, Paragraph 2.0. In cases where the fitting of a window opening restrictor is an appropriate solution, these can be fitted on request by local REHAU Window and Door agents during manufacture, or universal restrictor stays can be retrofitted to the interior surfaces of the joinery units by others.



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 REHAU uPVC Windows and Doors contain openable sashes which will contribute to the compliance of building with NZBC Clause G4. Consideration must be given to the 'net openable area' required for a particular space by the designer. NZBC Acceptable Solution G4/AS1 provides guidance on required ventilation.

Natural Light

- 19.1 REHAU uPVC Windows and Doors can be used to meet the performance requirements of the NZBC for natural light. NZBC Acceptable Solution G7/AS1 provides guidance for meeting these requirements.

Energy Efficiency

- 20.1 REHAU uPVC Windows and Doors are supplied with insulated glazing units (IGUs) and will assist in meeting the performance requirements of NZBC H1.3.1 and H1.3.2E.

Installation Information

Installation Skill Level Requirements

- 21.1 Installation of REHAU uPVC Windows and Doors must be carried out by, or under the supervision of, a Licensed Building Practitioner with the relevant licence class in accordance with this Appraisal and the Technical Literature.

Joinery Installation

- 22.1 REHAU (NZ) Limited provides Technical Literature covering installation details for REHAU uPVC 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 REHAU uPVC Windows and Doors.
- 22.3 The framed opening size must be large enough to give approximately 5–7.5 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 shall 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 has been carried out on the joinery by an IANZ accredited laboratory and meets the requirements of NZS 4211. This testing covered positive and negative deflection, operating force [static and moving], air infiltration [positive and negative], water penetration, ultimate strength, and torsional strength. Test reports were reviewed by BRANZ experts and found to be satisfactory, subject to certain size and wind zone limitations for some listed window and door types. [See Paragraphs 7.2 and 9.2.]
- 23.2 Opinions on the durability of the joinery components and a weathertightness opinion have been given by BRANZ experts.

Quality

- 24.1 The manufacture of REHAU uPVC profiles has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. REHAU AG & Co are also certified to ISO 9001 by TUV Rheinland.
- 24.2 The fabrication of REHAU uPVC Windows and Doors by REHAU Window and Door agents have been examined by BRANZ including methods adopted for quality control.
- 24.3 REHAU [NZ] Limited is responsible for the quality of the supplied uPVC profiles. REHAU Window and Door agents are responsible for both the design and quality of the fabricated joinery supplied.
- 24.4 Building designers are responsible for the design of the building, and for the incorporation of the joinery into their design in accordance with this Appraisal.
- 24.5 Installers and glaziers are responsible for the quality of installation in accordance with the installation instructions REHAU Window and Door agents.
- 24.6 Building owners are responsible for the maintenance of the joinery in accordance with this Appraisal.

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 4218:2009 Thermal insulation – Housing and small buildings.
- NZS 4223.3:2016 Glazing in Buildings – Part 3: Human impact safety requirements.
- Ministry of Business, Innovation and Employment Record of amendments – Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 22 August 2018.

This Appraisal has been amended to update the fixing details for the timber reveals.

Amendment No. 2, dated 14 July 2021.

This Appraisal has been amended to reflect building code updates relating to fire.



REHAU Agents in New Zealand:

Kiwi Windows Limited

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Fairview Systems Limited

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Mt Wellington
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Advanced uPVC Windows & Doors

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Bulls.



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REHAU UPVC WINDOWS AND
DOORS



In the opinion of BRANZ, **REHAU uPVC 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 **REHAU [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. **REHAU [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;
 - 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 **REHAU [NZ] Limited**.
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 **REHAU [NZ] Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

11 July 2018