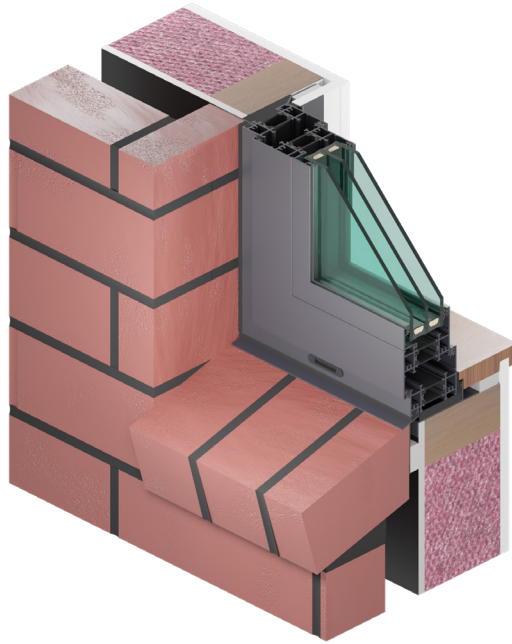




**BRANZ Appraised**  
Appraisal No. 1260 [2024]

## FMIBI 3 SIDED RECESSED JOINERY THERMAL INSTALLATION METHOD



**Appraisal No. 1260 [2024]**

### BRANZ Appraisals

Technical Assessments of  
products for building and  
construction.



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## Product

- 1.1 The FMIBI 3 Sided Recessed Joinery Thermal Installation Method is a proprietary recessed installation method for the FMIBI Thermal Linear 45 (TL45) range of thermally broken aluminium window and door joinery units. TL45 joinery units are available with fixed glazing or opening sashes.
- 1.2 The opening sash window styles covered by this Appraisal are:
  - Awning and Casement (open out)
- 1.3 The opening door styles covered are:
  - Sliding
  - Stacking.

## Scope

- 2.1 The FMIBI 3 Sided Recessed Joinery Thermal Installation Method has been appraised for use with TL45 window and door joinery within the following scope:
  - in new or existing timber-framed buildings within the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; or,
  - 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, FMIBI 3 Sided Recessed Joinery Thermal Installation Method, 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. FMIBI 3 Sided Recessed Joinery Thermal Installation Method meets 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. FMIBI 3 Sided Recessed Joinery Thermal Installation Method meets these requirements. See Paragraphs 10.1 and 10.2.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. FMIBI 3 Sided Recessed Joinery Thermal Installation Method meets 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]. FMIBI 3 Sided Recessed Joinery Thermal Installation Method meets these requirements. See Paragraph 15.1.

**Clause F4 SAFETY FROM FALLING:** Performance F4.3.1. FMIBI 3 Sided Recessed Joinery Thermal Installation Method can be used to meet this requirement. See Paragraph 16.1.

**Clause G4 VENTILATION:** Performance G4.3.1 and G4.3.3. FMIBI 3 Sided Recessed Joinery Thermal Installation Method can be used to meet these requirements. See Paragraph 18.1.

**Clause G7 NATURAL LIGHT:** Performance G7.3.1 and G7.3.2. FMIBI 3 Sided Recessed Joinery Thermal Installation Method can be used to meet these requirements. See Paragraph 19.1.

**Clause H1 ENERGY EFFICIENCY:** Performance H1.3.1 and H1.3.2E. FMIBI 3 Sided Recessed Joinery Thermal Installation Method contributes to meeting these requirements. See Paragraphs 20.1 and 20.2.

## Technical Specification

4.1 TL45 window and doors are fabricated from aluminium extrusions that are thermally broken with a polyamide spacer within the profile sections. The extrusions are polyester powder coated prior to cutting to length in the joinery fabrication process. Each TL45 joinery unit is assembled with aluminium profiles, insulating glass units (IGUs), connectors, fixing lugs, window fasteners, seals, sealant, opening hardware and timber reveals to meet the requirements of NZS 4211. The units bears the brand name, a rating showing the appropriate NZS 4211 Wind Zone and air infiltration rating.

4.2 FMI Building Innovation Ltd can supply IGUs with the joinery units. The IGUs meet the requirements of NZS 4223 Parts 1 to 4 and are marked with FMI on the spacer bar. If IGUs are supplied by other manufacturers with FMI Building Innovation Ltd joinery units, 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.

4.3 FMI Building Innovation Ltd also provide the following components:

- **Head flashing** - an aluminium profile with integral cavity closer and clip on end dams to suit a 20 mm cavity.
- **Jamb flashing** - an aluminium profile.
- **Sill flashing** - aluminium profile with end caps.
- **Sill tray** - an aluminium profile with integral thermal break.
- **Support blocks** - black rigid support blocks 9 mm thick x 25 mm wide.
- **Foam blocks** - Closed cell one-sided foam, 50 mm x 50 mm x 20 mm.

- 4.4 Accessories used with FMIBI 3 Sided Recessed Joinery Thermal Installation Method which are supplied by the window installer are:
- **Lug fixings** - minimum 45 mm long x 8 g stainless steel wood screws for fixing to timber framing, and 45 mm x 8 g stainless steel screws fixed into a nylon plug for fixing to concrete slabs.
  - **Sill tray fixings** - 60 x 3.15 mm galvanised flat head clouts or 45 mm long x 8 g stainless steel countersink wood screws and 45 mm x 8 g stainless steel screws fixed into a nylon plug for fixing to concrete slabs.
  - **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.
  - **Spacers** - 10 mm thick plastic spacers.
  - **Sealant** - a BRANZ Appraised exterior grade sealant.
  - **Joinery trim cavity insulation** - a BRANZ Appraised expanding foam.

## Handling and Storage

- 5.1 Handling and storage of FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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:
- FMI 3 Sided Recessed Joinery Thermal Installation Method TL45/55 Suite, Edition 2, dated 04/06/2024.
- 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method consists of a sill tray flashing, the joinery unit, and head and jamb flashings. Fixing of the joinery unit is by way of fixing lugs.
- 7.2 The installation method for FMIBI 3 Sided Recessed Joinery Thermal Installation Method is an alternative solution to the installation method contained within NZBC Acceptable Solution E2/AS1. Flexible flashing tapes are still required around the window opening as specified in NZBC Acceptable Solution 9.1.10.2 c).
- 7.3 Design of the joinery units is carried out to meet the requirements of NZS 4211, NZS 4223 Part 3 and sill support deflection limits.
- 7.4 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.
- 7.5 It is recommended that FMI Building Innovation Ltd be consulted for information and recommendations on window size, configuration and glass requirements.
- 7.6 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method installation detailing is substituted.
- 7.7 Where required, installations of FMIBI 3 Sided Recessed Joinery Thermal Installation Method can be complemented by the use of cladding trims [e.g. scribes, facings] to ensure a weathertight joint between the window facing and the cladding. Refer to the Technical Literature for typical details.



- 7.8 Where FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method units meets the requirements of NZS 4211.

### Wind Zones

- 9.3 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method, 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 FMI Building Innovation Ltd.
- 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 blow lamp 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method is 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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, FMIBI 3 Sided Recessed Joinery Thermal Installation Method prevents the penetration of moisture that could cause undue dampness or damage to building elements.
- 14.2 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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.
- 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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, FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method, 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 <sup>2</sup> K/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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method requires applying expanding foam to all interior trim cavities. In this instance, the expanding foam does not require a backing rod.

## 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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. Particular attention must be paid to the sill trimmer which must be level, straight and not twisted. The framed opening size must be large enough to give approximately 10 mm clearance all round between the wall framing and the joinery.
- 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. 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method.
- 22.4 Installation of the joinery unit and flashings must be carried out before the installation of the cavity cladding. The sill tray flashing is fitted prior to the joinery unit. The joinery unit is then fixed to the inside face of the framing by screw fixing through the fixing lugs. Once the joinery unit is installed, the head flashing and then the jamb flashings are fitted.
- 22.5 The cavity battens and wall cladding system is installed around the FMIBI 3 Sided Recessed Joinery Thermal Installation Method in accordance with the Technical Literature and the cladding system proprietors instructions.
- 22.6 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMI Building Innovation Ltd 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.

### Other Investigations

- 24.1 Opinions on the durability and weathertightness of the joinery and the installation method have been given by BRANZ experts.
- 24.2 Site inspections were carried out by BRANZ to assess the practicability of installation of FMIBI 3 Sided Recessed Joinery Thermal Installation Method.

### Quality

- 25.1 The extrusion and fabrication process for FMIBI 3 Sided Recessed Joinery Thermal Installation Method 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 FMI Building Innovation Ltd 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 FMIBI 3 Sided Recessed Joinery Thermal Installation Method into their design in accordance with the instructions of FMI Building Innovation Ltd.
- 25.4 The quality of installation, handling and storage on-site is the responsibility of the installer, in accordance with the instructions of FMI Building Innovation Ltd.



25.5 Building owners are responsible for the maintenance of the joinery in accordance with the instructions of FMI Building Innovation Ltd.

### Sources of Information

- AS/NZS 4666:2012 Insulating glass units.
- BRANZ Bulletin 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, Maintenance, Version 1, undated.
- Ministry of Business, Innovation and Employment Record of Amendments - Acceptable Solutions, Verification Methods and Handbooks.
- The Building Regulations 1992.





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02 July 2024

FMIBI 3 SIDED RECESSED  
JOINERY THERMAL  
INSTALLATION METHOD



In the opinion of BRANZ, **FMIBI 3 Sided Recessed Joinery Thermal Installation Method** is 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 **FMI Building Innovation Ltd**, 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. **FMI Building Innovation Ltd:**
  - 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 quality of work;
  - 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 **FMI Building Innovation Ltd:**
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 **FMI Building Innovation Ltd:** or any third party.

For BRANZ

**Claire Falck**  
Chief Executive  
Date of Issue:  
02 July 2024