BRANZ Appraised

Appraisal No. 970 (2023)

VELUX SUN TUNNELS

Appraisal No. 970 (2023)

This Appraisal replaces BRANZ Appraisal No. 970 (2017)

BRANZ Appraisals

Technical Assessments of products for building and construction.

Velux New Zealand Ltd
62b Princes Street
Onehunga
Auckland
Tel: 0800 650 445
Web: www.velux.co.nz

BRANZ
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz

Product

1.1 Velux Sun Tunnels are for use on roofs of buildings to provide natural light into interior spaces within buildings. Velux offer four models of Sun Tunnels: TWF which features flexible internal ducting, TWR, TLR and TCR which use rigid ducting. All models are suitable for roof pitches between 15° and 60°, however the TCR model can be used at pitches between 0° and 60°. Some models can also be used to provide ventilation.

Scope

2.1 Velux Sun Tunnels (TWF, TWR and TLR) have been appraised for use on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regard to building height and maximum floor plan area; and,
- with roof structures designed and constructed to meet the requirements of the NZBC; and,
- with pitched roof cladding types and profiles specified in NZBC Acceptable Solution E2/AS1; and,
- with a roof pitch between 15° and 60°; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 Velux Low-Pitch Sun Tunnels (TCR) have been appraised for use on buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regard to building height and maximum floor plan area; and,
- with roof structures designed and constructed to meet the requirements of the NZBC; and,
- for use on flat or nominally flat roofs making use of membrane roof systems; and,
- with a roof pitch between 0° and 60°; and,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Velux Sun Tunnels, if designed, used, 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 B1.3.3. Velux Sun Tunnels meet the requirements for loads arising from snow, wind and impact [i.e. B1.3.3 (g), (h) and (j)]. See Paragraphs 8.1–8.3.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years. Velux Sun Tunnels meet this requirement. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Velux Sun Tunnels meet these requirements. See Paragraph 12.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1 and F2.3.3 (a). Velux Sun Tunnels meet these requirements.

Clause G7 NATURAL LIGHT: Performance G7.3.1 and G7.3.2. Velux Sun Tunnels contribute to meeting these requirements. See Paragraph 15.1.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1 and H1.3.2E. Velux Sun Tunnels contribute to meeting these requirements. See Paragraph 16.1.

Technical Specification

4.1 Velux Sun Tunnels are complete roof to ceiling skylight systems.

4.2 Velux Sun Tunnels incorporate a square external roof window. The TWF and TWR models have integral flashings which are suitable for profiled metal and tiles roofing. The TLR model has integral flashings which are suitable for use with slate and shingle roofing. Velux Sun Tunnels comprise a ceiling mounted, frosted acrylic double diffuser with a white ceiling trim ring. The roof window is connected to the ceiling diffuser with either a flexible (TWF) or a rigid (TWR and TLR) highly reflective, aluminium light transmission tunnel. The rigid 'light tunnel' is made up of one straight and two adjustable angle sections which are suitable for most direct 'line of sight' installations. A rigid extension kit ZTR 0K14 is available to extend the rigid 'light tunnel' up to a maximum length of 6 m.

4.3 The Velux TCR Sun Tunnel incorporates a light-capture dome above roof level attached to a highly reflective aluminium light transmission tunnel providing light to the interior via a diffuser unit mounted on the ceiling below. The rigid aluminium 'light-tunnel' is made up of straight and adjustable-angle tunnel sections to allow passage of light through the roof-space.

4.4 The minimum ceiling to roof distance is 400 mm for the TWF models and 900 mm for the TWR, TLR and TCR models.

4.5 The Velux Sun Tunnel models covered by this Appraisal are:

- TWF 0K14: 350 mm diameter tube.
- TWR 0K10: 250 mm diameter tube.
- TWR 0K14: 350 mm diameter tube.
- TLR 0K14: 350 mm diameter tube.
- TCR 014: 350 mm diameter tube.

4.6 Velux Sun Tunnels TWF, TWR and TLR all use a single pane of 4 mm toughened glass to the exterior, which has a coating that is designed to reduce the buildup of dirt and to ease cleaning. Velux Sun Tunnel TCR features an acrylic dome to the exterior.

4.7 Flashings and roof detailing for the Velux Low-Pitch Sun Tunnels (TCR) must be specifically designed and are outside the scope of this Appraisal, and will need to be considered by the designer at the time of preparing design documentation.

Handling and Storage

5.1 Handling and storage of all components of Velux Sun Tunnels is under the control of the Velux Sun Tunnel installer. Components must be kept dry and under cover at all times. Care must be taken to avoid surface damage to the window components and flashings during the installation process.

Technical Literature

6.1 This Appraisal must be read in conjunction with:

- Technical Manual - Velux Skylights and Roof Windows - New Zealand - Product: Sun Tunnels - April 2020.

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 Velux Sun Tunnels are for use on roofs of buildings to provide natural light into interior spaces within buildings. Velux offer four models of Sun Tunnels. The TWF model features flexible internal ducting and the TWR, TLR and TCR models use rigid ducting. All models are suitable for roof pitches between 15° and 60°, however the TCR model can be used at pitches between 0° and 60°.

7.2 Velux Sun Tunnels are suitable for most existing timber-framed roofs. For such installations, it is important that the roof structure is checked by a suitably qualified person for structural adequacy and suitability of the existing roof cladding.

7.3 When installed on new roofs, whenever possible the installation should be carried out concurrently with the roof cladding installation.

Structure

Wind

8.1 Velux Sun Tunnels are suitable for use in NZS 3604 Wind Zones up to, and including, Extra High.

Snow

8.2 Velux Sun Tunnels are suitable for use in areas where buildings are designed for a 1 kPa snow loading.

Point Loads

8.3 Velux Sun Tunnels have not been tested for point loads from AS/NZS 1170 because the size of the sun tunnels would not require a point load to be applied.

Durability

Serviceable life

9.1 Velux Sun Tunnels are expected to have a serviceable life of at least 15 years, provided they are maintained in accordance with this Appraisal and the Technical Literature.

9.2 On exposure to the weather, the coil coated aluminium may gradually lose the original surface finish. A faster reduction in both surface finish and overall serviceable life can be anticipated in severe industrial, geothermal and marine exposures.

Maintenance

10.1 The exterior glazing surfaces of Velux Sun Tunnels can only be cleaned from the exterior of the building.

10.2 The glazing and external surfaces of Velux Sun Tunnels can be cleaned using a mild, non-abrasive glass cleaner along with a soft brush or other non-abrasive applicator to maintain the surface appearance. Solvent-based cleaners must be avoided when cleaning the acrylic dome on the TCR model as they may damage the surface.

10.3 Keep all leaves clear from around sun tunnels. Make sure all exposed fasteners are secure. Inspect the unit and flashing for excessive wear or scratches. Scratches on the unit may be fixed with touch up paint available through Velux New Zealand Ltd. Damaged units or flashings should be repaired or replaced as soon as they are detected

10.4 The interior diffuser pane of the Velux Sun Tunnels can be cleaned from the inside. Before cleaning, the diffuser can be removed according to the installation instructions. Solvent-based cleaners must be avoided when cleaning the plastic interior components as they may damage the surface.

Prevention of Fire Occurring

11.1 Separation or protection must be provided to Velux Sun Tunnels from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Verification Method C/VM1 and NZBC Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

12.1 Velux Sun Tunnels, when installed in accordance with this Appraisal and the Technical Literature, will prevent the penetration of moisture that could cause undue dampness or damage to building elements.

Internal Moisture

13.1 Experience has shown that in normal domestic or similar applications, ceiling mounted double-glazed acrylic diffusers do not pose a significant risk of condensation when correctly installed.

Ventilation

14.1 Velux Sun Tunnel models TWR OK14 and TWF OK14 can be fitted with the Velux ZTV ventilation adaptor which is available from Velux New Zealand Ltd. It allows the connection of any in-line mechanical ventilation device so extract ventilation can be provided without the need for additional roof penetrations. The Velux Sun Tunnel, when fitted with the ventilation adaptor, will contribute to the compliance of a building with NZBC Clause G4. Consideration must be given to the 'mechanical ventilation' required for a particular space by the designer. NZBC Acceptable Solution G4/AS1 provides guidance on required ventilation.

Natural Light

15.1 Velux Sun Tunnels all contain transparent apertures that will contribute to the compliance of a building with NZBC Clause G7. Consideration of the amount of illuminance provided by the sun tunnel for a particular space will depend on a wide range of factors unique to each installation e.g. room size, position, sun orientation, angle, etc. The use of Velux Sun Tunnels to supplement natural light from other sources is an Alternative Solution to NZBC Clause G7.

Energy Efficiency

Velux Schedule Method

16.1 The Velux Schedule Method may be used as an alternative solution to the Schedule Method contained in the NZBC Acceptable Solution H1/AS1 for housing, and other buildings up to 300 m^2 in floor area. The Velux Schedule Method requires that:

- the sum of the vertical glazing area and the Velux product area (Velux skylights, roof windows and sun tunnels) is 30% or less of the total wall area; and
- the combined glazing area on the east, south, and west facing walls is 30% or less of the combined total area of these walls; and
- the Velux product area is no more than 1.5 m^2 or 1.5% of the total roof area (whichever is greater); and
- the opaque door area is no more than 6 m^2 or 6% of the total wall area (whichever is greater); and
- the roof, wall, floor, window and door glazing R-values are in accordance with section 2.1.2 of NZBC Acceptable Solution H1/AS1.

Calculation and Modelling Methods

16.2 Alternatively, designers can use the calculation methods contained in NZBC Acceptable Solutions H1/AS1 or H1/AS2, or the modelling methods contained in NZBC Verification Methods H1/VM1 or H1/VM2. Contact Velux New Zealand Ltd for the relevant product R-values.

Installation Information

Installation Skill Level Requirement

17.1 The installation of Velux Sun Tunnels must be completed by installers trained by Velux New Zealand Ltd, or by competent, experienced tradespersons with an understanding of roof window installation and weathertightness details.

System Installation

18.1 Installation must be completed in accordance with instructions given in the Velux Sun Tunnels installation instructions and this Appraisal.

Health and Safety

19.1 There are no particular health and safety issues relating to the installation or use of Velux Sun Tunnels. Installers must however observe safe working practices for working on roofs and at heights.

Basis of Appraisal

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

Tests

20.1 Velux Sun Tunnels have been subjected to dynamic weather resistance testing by a National Association of Testing Authorities (NATA) registered laboratory in Australia.

Other Investigations

21.1 Velux Sun Tunnels have been assessed for resistance to impact loads, snow loads and resistance to wind pressures (non-cyclonic regions). These assessments have been reviewed by BRANZ and were found to be satisfactory.

21.2 An assessment was made of the durability of Velux Sun Tunnels by BRANZ.

21.3 The Velux Schedule Method has been reviewed by BRANZ experts.

21.4 Site inspections have been carried out by BRANZ to assess fitness for purpose and the practicability of installation, and to assess in service performance.

21.5 Weathertightness detailing of the Velux Sun Tunnels has been assessed by BRANZ and found to be satisfactory. Instructions for installation of units and associated flashing components for different roof types have also been reviewed and found to be satisfactory.

21.6 The Technical Literature for Velux Sun Tunnels has been examined by BRANZ and found to be satisfactory.

Quality

22.1 The manufacture of Velux Sun Tunnels 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. BRANZ has taken note of Uniform Evaluation Service (UES) Evaluation Report Number 199 which covers quality aspects associated with Velux Sun Tunnel TCR model. BRANZ has also taken note of ETA Denmark European Technical Assessment ETA-13/0764 of 14/10/2015 which covers Velux Sun Tunnel models TWF, TWR, TLR and Velux Flashings.

22.2 The quality of materials, components and accessories supplied to the market is the responsibility of Velux New Zealand Ltd.

22.3 Quality of installation on-site of Velux Sun Tunnel components and accessories is the responsibility of the installer.

22.4 Designers are responsible for building design, and specification of natural lighting and ventilation systems.

22.5 Building owners are responsible for any required maintenance of Velux Sun Tunnels, in accordance with the advice of Velux New Zealand Ltd.

Sources of Information

- AS 4285:1995 Skylights.
- AS/NZS 1170.0:2002 Structural design actions - Permanent, imposed and other actions.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4223.4:2016 Code of practice for glazing in buildings - Dead, wind and snow loading.
- 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, Velux Sun Tunnels 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 Velux New Zealand 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. Velux New Zealand 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 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 Velux New Zealand 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 Velux New Zealand Ltd or any third party.

For BRANZ

Claire Falck
Chief Executive

Date of Issue:
21 August 2023