



BRANZ Appraised

Appraisal No.665 [2009]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 665 (2009)**

SOLATUBE DAYLIGHT SYSTEMS AND ROOF PENETRATIONS

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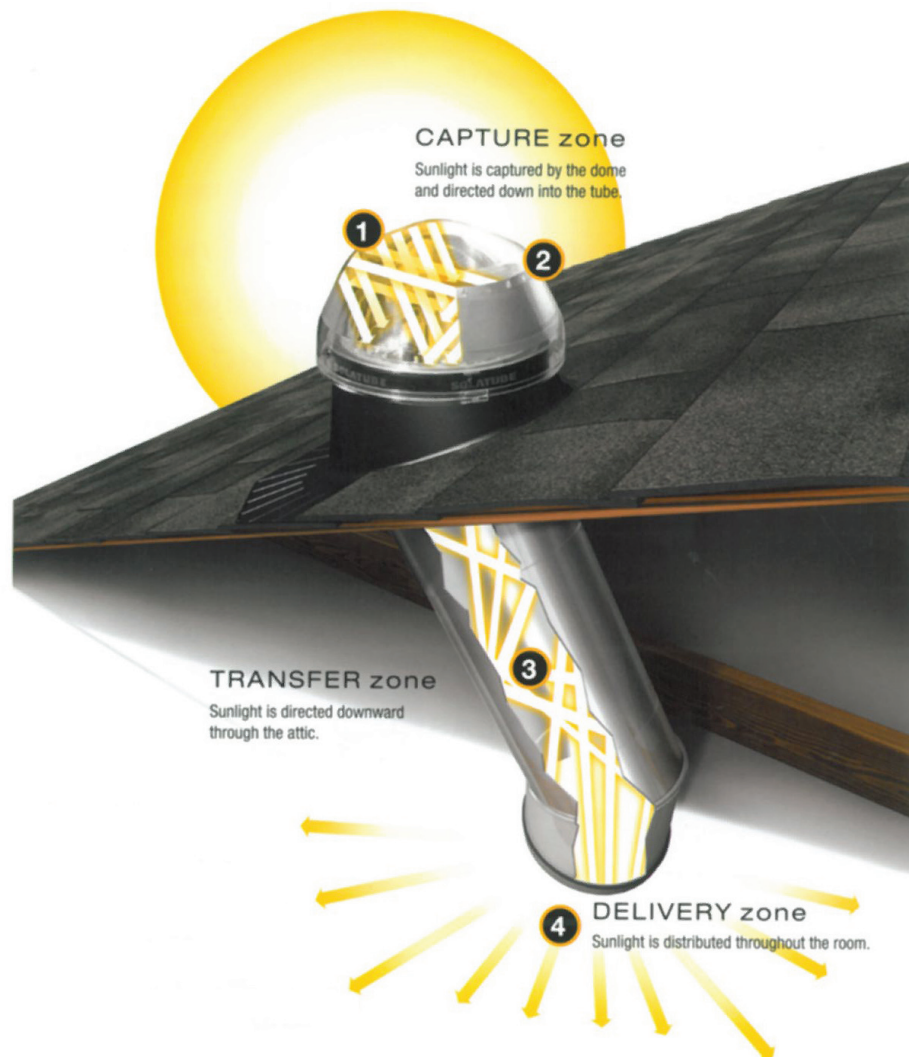


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Product

1.1 Solatube Daylight Systems and Roof Penetrations are for use on domestic and commercial buildings providing a roof penetration system allowing natural light or ventilation to the interior. The system is supplied as a kit providing a tubular roof to ceiling light channel or ventilation duct and a roof flashing system matching the roof type.



Scope

2.1 Solatube Daylight Systems and Roof Penetrations have been appraised as a skylight and roof penetration system on domestic and commercial buildings within the following scope:

- the scope limitations of NZBC Acceptable solution E2/AS1, Paragraph 1.1 with respect to building height and maximum floor plan areas; and,
- with building structures designed and constructed to meet the requirements of the NZBC; and,
- situated in NZS 3604 Building Wind Zones, up to and including 'Very High'; and,
- with roof cladding types and profiles specified in E2/AS1; and,
- for use on flat or nominally flat roofs making use of membrane roof systems.

2.2 Installation of Solatube Daylight Systems and Roof Penetrations must only be carried out by installers registered by Homotech Ltd.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Solatube Daylight Systems and Roof Penetrations, 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 B2 DURABILITY: Performance B2.3.1 (b), 15 years. Solatube Daylight Systems and Roof Penetrations meet this requirement. See Paragraph 8.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.1 and E2.3.2. Solatube Daylight Systems and Roof Penetrations meet these requirements. See Paragraph 11.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Solatube Daylight Systems and Roof Penetrations meet this requirement and will not present a health hazard to people.

Clause G4 VENTILATION: Performance G4.3.3(a), G4.3.3(b), and G4.3.3(c). Solatube Daylight Systems and Roof Penetrations when installed as a ventilation duct will contribute to meeting these requirements. See Paragraph 13.1.

Clause G7 NATURAL LIGHT: Performance G7.3.1 and G7.3.2. Solatube Daylight Systems and Roof Penetrations will contribute to meeting these requirements. See Paragraph 15.1.

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1.(a). Solatube Daylight Systems and Roof Penetrations will contribute to meeting this requirement. See Paragraph 16.1.

3.2 Solatube Daylight Systems and Roof Penetrations have been appraised as an **Alternative Solution** in terms of New Zealand Building Code compliance.

Technical Specification

4.1 Solatube Daylight Systems and Roof Penetrations are a complete roof to ceiling skylight system. The system incorporates a light-capture dome above roof level attached to a highly reflective aluminium light transmission tube providing light to the interior via a diffuser unit mounted in the ceiling below. The rigid aluminium 'light-tube' is made up of straight and adjustable-angle tube sections to allow passage through the roof-space. The systems are supplied as a kit complete with the required flashing components to allow for penetration through various roof cladding types.

4.2 The system is available in a range of diameter options – 250mm, 350mm and 400mm. A 350mm tube can also be compatible with a 400mm diameter flashing, by making use of a reducer made from the same material as the flashing, and can be supplied as a component of the installation kit to create a match between a tube penetration size and flashing size.

4.3 Components and accessories supplied by Hometech Ltd include:

- Capture Dome – manufactured from impact modified acrylic, mounted above the roof level. This dome incorporates light capture and tracking technology designed to optimise the level of captured light.
- Transfer Zone - tubes formed from rolled aluminium sheet with a very high-polish finish, and a proprietary multi-layer polymer coating on the inside of the tube to optimise light-volume transmitted through the tube from the Capture Dome. Tubes are formed either as straight sections, or sections with adjustable incorporated angles allowing for different roof pitches or angled travel through the roof space to avoid obstacles.

- Light Diffuser – these are fitted to the end of the transfer tubing where it exits the roof-space through the ceiling. They are flush-mounted and optically designed to disperse light to as much of the interior space as possible. The polycarbonate diffusers are double-glazed to reduce heat loss into the tubing and roof-space above.
- Flashing elements – the system includes a series of pre-manufactured proprietary flashing elements to accommodate both the alternative sizes of the Solatube Daylight Systems, and the different types of roof claddings. Flashing elements are manufactured in black injection moulded Polypropylene, or gel-coated reinforced polyester depending on the roof type. Also supplied as parts of the installation kit are foam sealing tape and appropriate galvanised Class 4 roof fixing screws.

4.4 The Solatube Daylight System can be adapted and installed as a ventilation system. A powered fan can be installed in the roof vent unit that replaces the light capture dome. Vents are also tubular and interchangeable with domes and use the same flashing component sizes. Ducting for ventilation can be completed with flexible ventilation tube. This allows air extraction via a ventilation grill or ceiling-light to a water-tight roof-vent.

4.5 Solatube Daylight Systems and Roof Penetrations are delivered to site as a complete kit containing all of the components required to complete a particular installation type, including relevant installation instructions.

Handling and Storage

5.1 Handling and storage of all components of Solatube Daylight Systems and Roof Penetrations, is under the control of Hometech Ltd, and its registered installers. Components must be kept dry and under cover at all times. Care must be taken to avoid surface damage to Solatube components and flashings during the installation process.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Solatube Daylight Systems and Roof Penetrations. 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 Solatube Daylight Systems and Roof Penetrations are a means of transferring natural daylight to the interior of both new and existing buildings, and the components are supplied and installed with an effective weather-proof means of flashing around the tubular penetrations. The flashings are manufactured in a variety of formats and shapes to accommodate the variety of profiles and materials used in both commercial and domestic roofing. The range of flashings is also designed to accommodate a range of penetration sizes. The tubular penetration and flashing system through the roof may also be adapted for use as a ventilation system making use of a fan mounted within the vent.

7.2 When installed into a new roof, if possible the installation should be completed at the same time as the roof is being fitted. This makes installation easier and quicker to complete.

7.3 When installed as a mechanical ventilation system incorporating a fan within the tubing, installation must satisfy the mechanical ventilation requirements of G4/AS1 Paragraph 1.5.1c. The fan, its control, and the electrical installation requirements are outside the scope of this Appraisal.

Impact Resistance

7.4 Solatube Daylight Systems and Roof Penetrations light capture domes have been tested to AS 4285 and have demonstrated adequate resistance to concentrated loads. Examination for impact damage on the domes of older installations in both Australia and New Zealand proved satisfactory. The likelihood of any impact damage to internal light diffusers mounted in ceilings, when installed in commercial situations, should be considered at the design stage.

Durability

Serviceable Life

8.1 Solatube Daylight Systems and Roof Penetrations installations will remain effective with a serviceable life in excess of 15 years, provided they are installed following the instructions of Hometech Ltd and this Appraisal.

Maintenance

9.1 Solatube Daylight Systems and Roof penetrations do not require any maintenance, however the light capture domes should be kept clean for optimum effectiveness and should be periodically inspected as part of normal roof cladding inspection.

Outbreak of Fire

10.1 Solatube Daylight Systems and Roof Penetrations must be separated from chimneys and flues in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

External Moisture

11.1 The Solatube Daylight Systems and Roof Penetrations 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.

11.2 Installation and weathertightness details must accurately follow the installation instructions provided by Hometech Ltd for each flashing detail type.

Internal Moisture

12.1 Adequate thermal resistance is provided by the Solatube Daylight Systems and Roof Penetrations interior diffuser to resist condensation forming in areas where moisture may be generated.

Ventilation

13.1 When a Solatube Daylight System and Roof Penetration is installed and used as a ventilation duct, incorporating a fan, the ventilation system must satisfy the mechanical ventilation requirements of NZBC Acceptable Solution G4/AS1.

Electricity

14.1 When the Solatube system is installed for the purposes of ventilation, and a fan is installed as a component of the system, the electrical installation must comply with requirements of NZBC Acceptable Solution G9/AS1 and installation of the electrical wiring must be in accordance with AS/NZS 3000.

Natural Light

15.1 The Solatube Daylight Systems and Roof Penetrations can assist in meeting the NZBC requirements for provision of sufficient natural light to building interiors.

Energy Efficiency

16.1 The polycarbonate light diffusion units mounted on the ceiling inside the building are constructed as double glazed units giving an R value of 0.41 m²K/W, thus satisfying the higher skylight R value requirement of 0.34 m²K/W.

Installation Information

Installation Skill Level Requirements

17.1 Installation of Solatube Daylight Systems and Roof Penetrations and associated components supplied by Hometech Ltd must be installed by installers registered with Hometech Ltd.

System Installation

18.1 Installation of Solatube Daylight Systems and Roof Penetrations must be completed in accordance with the instructions of Hometech Ltd.

18.2 Particular attention must be paid to the sizing and creation of apertures in the roofing material and associated placing and installation of the flashing elements supplied as part of the kit.

18.3 Care must be taken during transportation and installation to avoid damage to the Solatube elements and associated flashing components.

Health and Safety

19.1 There are no special Health and Safety issues relating to the installation or the use of Solatube Daylight Systems and Roof Penetrations. Installers must however observe safe working practices for working on roofs.

Basis of Appraisal

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

Investigations

20.1 BRANZ has assessed Solatube Daylight Systems and Roof Penetrations for function, fitness for purpose and resistance to impact, based on in-service performance.

20.2 An assessment was made of the durability of the components of Solatube Daylight Systems and Roof Penetrations by BRANZ technical experts.

20.3 The double glazed light diffusion units have been assessed for thermal resistance by BRANZ experts and were found to be satisfactory.

20.4 Site visits have been carried out by BRANZ staff to assess fitness for purpose and the practicability of installation, and to assess in-service performance.

20.5 Weathertightness installation detailing of the Solatube Daylight Systems and Roof penetrations has been assessed by BRANZ and found to be satisfactory. Instructions for the installation of units and associated flashing components for different roof types have also been reviewed and found to be satisfactory.

20.6 The Technical Literature for Solatube Daylight Systems and Roof Penetrations has been examined by BRANZ and found to be satisfactory.

20.7 Solatube Daylight Systems and Roof Penetrations Capture Domes have been tested in Australia to AS 4285 for resistance to concentrated loads, resistance to wind pressures (non cyclonic regions), and water-tightness. The results of these tests were examined by BRANZ and found to be satisfactory.

Quality

21.1 Components of the Solatube Daylight Systems and Roof Penetrations have been examined by BRANZ and details of the quality and composition of the materials used were obtained and found to be satisfactory.

21.2 The manufacturing quality system of Solatube Inc. has been assessed by BRANZ and found to be satisfactory.

21.3 The quality management system of the manufacturer of the Polypropylene flashing units has been assessed and registered as meeting the requirements of ISO 9001:2000 by Bureau Veritas.

21.4 The quality of materials, components and accessories supplied to the market is the responsibility of Hometech Ltd.

21.5 Quality of installation on site of components and accessories is the responsibility of installers registered with Hometech Ltd.

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

21.7 Building owners are responsible for any required maintenance of Solatube Daylight Systems and Roof Penetrations in accordance with the instructions of Hometech Ltd.

Sources of Information

- AS 4285: 1995 Skylights.
- AS/NZS 3000: 2000 Wiring rules.
- NZS 3604: 1999 Timber framed buildings.
- Compliance document for NZBC External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005.
- New Zealand Building Code Handbook, Department of Building and Housing, Third Edition, May 2007.
- The Building Regulations 1992, up to, and including, August 2008 amendment.



BRANZ

In the opinion of BRANZ, Solatube Daylight Systems and Roof Penetrations 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 Hometech 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. **Hometech 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.
3. 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.
4. 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 Hometech Ltd.
5. 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.
6. BRANZ provides no certification, guarantee, indemnity or warranty, to Hometech Ltd or any third party.

For BRANZ

P Burghout
Chief Executive

Date of issue: 14 October 2009