



BRANZ Appraised
Appraisal No.375 [2007]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 375 (2007)**

This Appraisal replaces Appraisal No.
375 (2005) issued 26 April 2005.

**DVS® HOME
VENTILATION
SYSTEMS**

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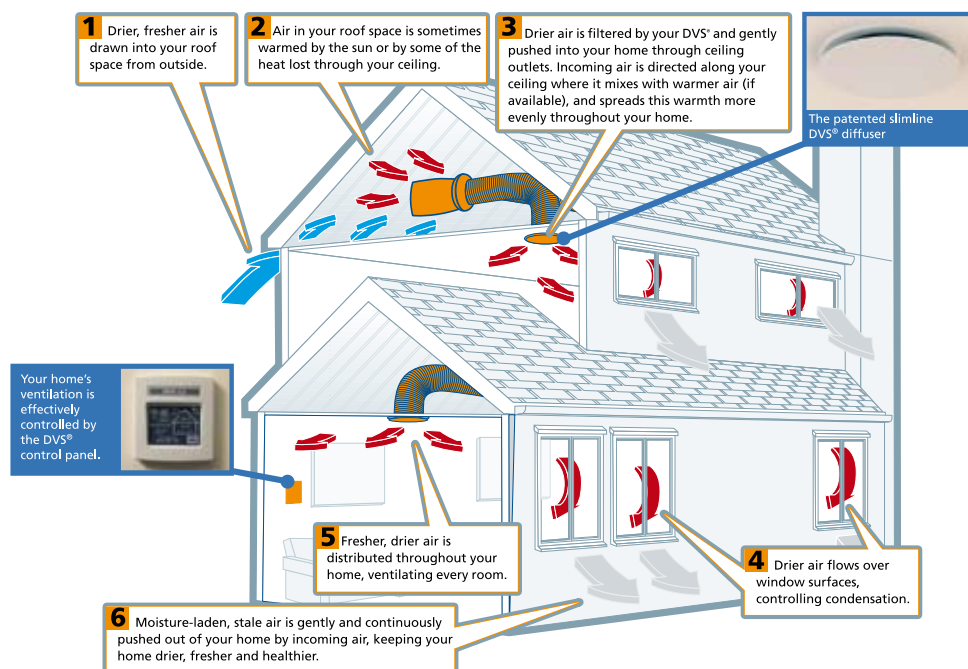
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Product

1.1 The DVS® brand is a range of roof-space mounted, ducted, ventilation systems for houses.



Scope

2.1 The product is a mechanical positive air-handling and ventilation system predominantly for detached housing where buildings show signs of condensation and air quality problems. It is for use in buildings that have no specific building code (NZBC) requirements for heating and mechanical ventilation.

Building Regulations

New Zealand Building Code (NZBC)

3.1 The product is for use as a mechanical positive air-handling and ventilation system where no specific building code requirements apply for mechanical ventilation. It can also provide heating where no specific building code requirements apply for heating. NZBC requirements that do apply to ventilation and heating in specific areas are:

- Clause E3 Internal Moisture
- Clause G4 Ventilation
- Clause G5 Internal Environment.

Technical Specification

4.1 The main components of the DVS® are: fan units (in-line centrifugal type), flexible ducting, filter sock, patented multi-directional ceiling diffusers and controllers. System components and accessories supplied and installed by In-Home Ventilation Ltd, their dealers or agents are as follows:

4.2 The DVS® is available in the following four models: All models incorporate an in-line energy efficient roof space mounted ducted fan unit and all user controls are of extra-low voltage 24 volt DC supply .

- The DVS® 7E is a manually controlled system using key - on/off and manual speed control.

- The DVS® 6E is a manually controlled system using key - on/off and manual speed control and thermostat located in the roof space mounted fan unit which will shut the fan down when the roof space air temperature rises above a pre-set level.
- The DVS® 5E is climate controlled with summer and winter settings. In winter mode, the DVS® 5E automatically speeds up to circulate available warm air from the roof space into the home when the roof space temperature rises above a pre set temperature. In summer mode, the system will automatically turn off when the roof space rises above the pre-set temperature..
- DVS® G3® is an intelligent microprocessor controlled home ventilation system. The G3® automatically monitors and controls the incoming air. As temperatures in the roof space and home change, the G3® adjusts the airflow into the home to suit, based on seasonal conditions and consumer settings. The intelligent software of the G3® system allows a customisable ventilation system and will automatically recognise additional components, such as the Air-Warmer or Automatic Summer Vent. This model features an LCD / microprocessor touch screen system with bus based control (communication) protocols.

4.3 Options available for the DVS® are as follows:

- Air Warmer - designed to pre-warm cooler air from the roof space during winter months before it enters the home.
- Auto Summer Vent - DVS® Automatic Summer Vent delivers a supply of fresh, filtered air, drawn from outside the roof space, when programmed to do so. The Automatic Summer Vent is only available for a G3® system, which regulates the incoming air depending on the temperature of the outside air and the roof space air, and according to the comfort settings on the G3® control panel.

4.4 The supply fan has a filter sock attached to the intake side of the unit, and may incorporate an additional intake duct direct to the outside air via the soffit or a roof vent.

4.5 All models may have extra ceiling diffusers, depending on the house size and room layout.

Handling and Storage

5.1 All components must be kept dry at all times and must be protected from damage or crushing. They should be kept in their original packaging until ready for installation. Care must be taken when handling ceiling diffusers to avoid marking or scratching the exposed surfaces.

Technical Literature

6.1 No Technical Literature for design or inspection purposes is referenced by this Appraisal.

Design Information

General

7.1 The main function of the DVS® system is to take air from a roof space through a filter and into the house living space. This introduction of fresh warm air and air movement then assists in expelling moist, stale and smelly air. Electronic controls avoid introducing unsuitable amounts of cold air from the roof. Options are house ventilating with outside air and also passing air through a heating unit before circulating to the house area.

The extent to which the added ventilation assists with the moisture control will depend on the building and its occupants,

but it should assist in the majority of houses. Factors having a bearing on its effectiveness are; the amount of natural infiltration, ventilation provided by opening windows, standards of heating, and the rate at which moisture is released within the building.

7.2 The DVS® is designed to make use of the drier air present in roof spaces by introducing it into the house at ceiling level. This not only has the benefit of providing drier (and some times warmer) air to the house, at the same time it also re-distributes existing warmer air normally trapped at ceiling level. The system also positively pressurises the building, which has the effect of forcing moisture out through gaps around opening windows and the like.

7.3 There are four different models in the DVS® range, and systems can be tailored around those models specific to the particular site under consideration. After site inspection and consultation, a particular model and system is specifically recommended by the trained DVS® consultant. The exact system recommended will depend on the house location, size, shape, room layout, construction (windows, roof cladding, wall cladding, roof cavity, insulation), occupancy loading, existing heating, and any other relevant factors.

7.4 All systems incorporate a filter that will remove man-made mineral fibres and fungi which are considered to be the particulates of most concern likely to originate in the roof spaces. The filter will require maintenance and replacement as set out in the owner operating guide.

7.5 Existing range hoods, or other mechanical ventilators which vent to the roof space will need to be ducted through the roof to the outside if they are to be retained, to avoid the recirculation of contaminants and moisture to the living areas.

7.6 Most houses will already comply with the NZBC for indoor moisture control, but probably rely on windows being left open. The advantages of the DVS® are improvements to ventilation and moisture control capabilities that go beyond minimum levels established by the NZBC, and also the security provided by the system compared to open windows.

7.7 The DVS® is a mechanical system, and could in principle be used to provide ventilation in accordance with the NZBC to certain internal spaces. If used to comply with the mechanical ventilation provisions, then it will be necessary for compliance to be demonstrated for the particular application (See also Paragraph 14.1). The design of the system in these cases must source suitable air from outside of the building. Compliance for the provisions is outside of the scope of this Appraisal.

Ventilation Rates

8.1 The DVS® is specifically tailored to suit a particular site (its number of air changes per hour is calibrated), and may be installed as an automatic (6E, 5E or G3®) or manual (7E) system.

8.2 The DVS® is designed to deliver various air changes per hour, depending on the particular system installed. The ventilation rates, and hence the number of air changes is determined during the set-up phase of the system and will vary for each particular site. Final set-up must be determined by the owner and set by In-Home Ventilation Ltd in accordance with In-Home Ventilation Ltd's Technical Literature by monitoring the functioning of the system over a period of time and its ability to control moisture to required acceptable levels. Once established, the most effective ventilations rates can be controlled by the owner.

8.3 The ventilation delivered by the DVS® will be supplemented by infiltration, depending on the airtightness of the building and its exposure to wind. Overall, the system will contribute positively to moisture control in dwellings tending to be short of ventilation.

Roof Space Air Quality

9.1 Roof spaces with dampness problems, such as from leaking roofs, lid-less water tanks, moisture being vented into the roof space, and moisture rising from the ground through building cavities require special attention. Roof spaces with an unacceptable level of air contaminants present from off gassing building materials such as LOSP treated timber or lining products that contain formaldehyde must be considered when installing DVS®.

Either the problems must be eliminated, or a specially designed DVS® is installed to source air directly from outside the roof space. In most cases this can easily be achieved.

Durability

10.1 The DVS® will be durable for at least 10 years providing normal maintenance is carried out as described below.

Service Life

10.2 Like all electrical or mechanical equipment, the fan units, and system controllers can be expected to require maintenance or replacement at some time during their life. The ducting and ceiling diffusers are not expected to require any maintenance during the life of the system and should perform satisfactorily for at least the life of the other componentry. Filter socks will require annual replacement.

Maintenance

11.1 Access to the roof space must be maintained at all times during the life of the DVS® in order to maintain access to the fan, filter and other componentry. This can be provided by the normal ceiling access installed in most houses.

11.2 Electrical components may be maintained or replaced at the discretion of the owner, and decisions are usually based on economic considerations.

11.3 Filter socks must be replaced annually, as set out in the owner operating guide, to ensure the ongoing healthy performance of the system. When replacing the filter sock, the fan impeller and inside the casing must be wiped out with a cloth to remove any dust. The ceiling diffuser and surrounding ceiling area can also be wiped with a cloth to remove dust, or if the ceiling is textured a clean brush can be used.

11.4 Ducting must be checked for any tears or delamination and must be repaired with aluminium foil tape where necessary.

11.5 In-Home Ventilation Ltd or their dealers or agents can provide the annual maintenance service upon request.

Outbreak of Fire

12.1 The DVS® must be separated from chimneys and flues passing through the roof space, in accordance with the requirements of NZBC Acceptable Solution C/AS1, Part 9 for the protection of combustible materials.

Internal Moisture

13.1 When the DVS® is used in accordance with this Appraisal, the indoor moisture control capability of houses will be improved.

13.2 However, indoor moisture control is reliant upon a number of conditions existing, and as well as installing the DVS®, this can be best achieved by attending to the following matters:

- Minimising indoor moisture sources.
- Providing adequate general levels of ventilation and special ventilation in high moisture release areas (e.g. range hoods and bathroom ventilation).

- Providing adequate heating (solar and purchased).
- Insulating external walls, ceilings and floors to discourage condensation and mould growth.

13.3 Newer houses tend to be more airtight than older houses, and where windows are kept closed air infiltration will not often provide sufficient ventilation to cope with moisture. In these situations the DVS® provides supplementary ventilation to control moisture. Older houses (pre 1960's) are often sufficiently 'leaky' for natural air infiltration to meet most ventilation needs, so the contribution to moisture control of the DVS® will be less predictable in these situations.

Ventilation

14.1 DVS® as a standard configured system is not intended for use in complying with the mechanical ventilation provisions in NZBC Acceptable Solution G4/AS1, Paragraph 1.3.

14.2 The use of DVS® to comply with the mechanical ventilation provisions in NZBC Acceptable Solution G4/AS1, Paragraph 1.3, is subject to specific design and is outside of the scope of this Appraisal.

Electrical Safety

15.1 Installation of the electrical wiring for the system must be in accordance with New Zealand Electrical Code of Practice NZECP 51, to meet the requirements of the Electricity Regulations and NZBC Clause G9.3.1 (a).

15.2 Electrical safety of the DVS® fan units complies with AS/NZS 60335.2.80.

Installation Information

Installation Skill Level Requirement

16.1 The DVS® must be installed by In-Home Ventilation Ltd, their dealers or agents.

System Installation

17.1 Installation must be in accordance with In-Home Ventilation Ltd's Technical Literature and this Appraisal.

17.2 The main points of installation are summarised as follows:

- Positions of ceiling outlet(s) and fan controllers are established.
- An inspection of the roof cavity is carried out to check for obstructions which may affect the position of some of the components. A check is also made for signs of dampness, such as from extract fans into the roof space, leaks, and water tanks.
- The fan unit is installed.
- The ceiling diffuser holes are cut and the diffuser(s) installed.
- The ducting is cut to the correct length and run from the diffuser(s) to the fan.
- All wiring installation is completed (by a registered electrician), controllers set, filter attached to the fan inlet, and the system is tested.

Health and Safety

18.1 Safe use and handling procedures for the DVS® are provided in the owner operating guide.

Basis of Appraisal

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

Tests

- 19.1 Air flow tests on installed systems were carried out by In-Home Ventilation Ltd. The testing procedure and results were reviewed by BRANZ and found to be satisfactory.
- 19.2 Testing of the electrical components for electrical safety was carried out by Spectrum Laboratories in accordance with AS/NZS 60335.2.80 and AS/NZS 3102, and found to be satisfactory.

Other Investigations

- 20.1 Site inspections were carried out by BRANZ to assess methods used for the installation of the DVS® and to examine completed installations for operation.
- 20.2 An opinion on the use of the DVS® to control moisture and provide ventilation has been given by BRANZ experts.
- 20.3 The manufacturer's Technical Literature that supports the installation details and owner operating guides has been examined by BRANZ and found to be satisfactory.

Quality

- 21.1 Details of the quality and composition of the materials and components used within the system were obtained by BRANZ and found to be satisfactory.
- 21.2 The quality of installation on site is the responsibility of In-Home Ventilation Ltd in accordance with the instructions of In-Home Ventilation Ltd.
- 22.2 Building owners are responsible for the maintenance of DVS® Home Ventilation systems in accordance with the instructions of In-Home Ventilation Ltd.

Sources of Information

- AS/NZS 3100: 2002 Approval and test specification - General requirements for electrical equipment.
- AS/NZS 3102: 2002 (including amendment 1) Approval and test specification for electric duct heaters.
- AS/NZS 60335.2.80: 2004 Household and similar electrical appliances - Safety - Particular requirements for fans.
- NZCEP 51: 2004 New Zealand electrical code of practice for homeowner/occupier's electrical wiring work in domestic installations, Ministry of Economic Development, 2004.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, Third Edition May 2007.
- NZS 4303: 1990 Ventilation for acceptable indoor air quality.
- The Building Regulations 1992, up to, and including June 2007 Amendment.
- The Electricity Regulations 2002.



BRANZ

In the opinion of BRANZ, DVS® Home Ventilation 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 In-Home Ventilation Ltd, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

- This Appraisal:
 - relates only to the product as described herein;
 - must be read, considered and used in full together with the technical literature;
 - does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - is copyright of BRANZ.
- In-Home Ventilation Ltd:**
 - continues to have the product reviewed by BRANZ;
 - shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - abides by the BRANZ Appraisals Services Terms and Conditions.
- 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.
- BRANZ makes no representation or warranty as to:
 - the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - any guarantee or warranty offered by In-Home Ventilation Ltd.
- 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.
- BRANZ provides no certification, guarantee, indemnity or warranty, to In-Home Ventilation Ltd or any third party.

For BRANZ

C Preston
Chief Executive

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