



BRANZ Appraised

Appraisal No. 982 [2017]

HRV VENTILATION SYSTEM

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BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

1.1 The HRV Ventilation System is a roof-space mounted, ducted, ventilation system for houses.

Scope

2.1 The HRV Ventilation System is a mechanical positive air-handling and ventilation system predominantly for existing 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 some heating where no specific building code requirements apply for heating.
- 3.2 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 HRV Home Ventilation System are the Next Generation ventilation unit (in-line centrifugal type fan in a housing also containing an air filter element), flexible ducting, ceiling and wall diffusers and the HRV touchscreen keypad.
- 4.2 System components and accessories supplied and installed by HRV, their dealers or agents are as follows:
- **The HRV Ventilation System** incorporates an in-line energy efficient roof space mounted ducted fan unit and all user controls are powered by a low voltage DC power supply.
 - **The HRV touchscreen keypad** is an intelligent microprocessor controller for the HRV Ventilation System which automatically controls the incoming air. As temperatures in the roof space and home change, the HRV Ventilation System adjusts the airflow into the home to suit, based on seasonal conditions and consumer settings. The intelligent software of the HRV touchscreen keypad allows a customisable ventilation system and will automatically recognise additional optional components.

4.3 Options available for the HRV are as follows:

- **Summer Kit** - The HRV Summer Kit delivers a supply of fresh, filtered air, drawn from outside the roof space. When programmed to do so the system 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 control panel.
- The HRV Ventilation System 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 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 HRV Ventilation System is to take air from a roof space through a filter and into the house living spaces. 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. The extent to which the ventilation added by the HRV Ventilation System assists with 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 air infiltration, ventilation provided by opening windows, standards of heating, and the rate at which moisture is released within the building.
- 7.2 The HRV Ventilation System 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 sometimes 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 The HRV Ventilation System can be tailored specifically to suit a particular site under consideration. After site inspection and consultation, a system layout is recommended by the trained HRV consultant. The exact system design 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 HRV Ventilation System 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 HRV Ventilation System 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 with the ventilation provisions of the NZBC is outside of the scope of this Appraisal.

Ventilation Rates

- 8.1 The HRV Ventilation System is specifically tailored to suit a particular building.
- 8.2 The HRV Ventilation System is designed to deliver variable air changes per hour, depending on the design and layout of 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 building. Final set-up must be determined by the owner and set by HRV in accordance with HRV's installation manual 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 ventilation rates can be controlled by the owner.
- 8.3 The ventilation delivered by the HRV Ventilation System will be supplemented by air 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 an HRV Ventilation System. Either the problems must be eliminated, or a specially designed HRV Ventilation System is installed to source air directly from outside the roof space. In most cases this can easily be achieved.

Durability

Serviceable Life

- 10.1 The HRV Ventilation System is anticipated to have a serviceable life of at least 10 years providing normal maintenance is carried out as described below. 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.

Maintenance

- 11.1 Access to the roof space must be maintained at all times during the life of the HRV Ventilation System 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 The filter will require maintenance and replacement as set out in the owner operating guide to ensure the ongoing healthy performance of the system. 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 HRV or their dealers or agents can provide the two-yearly maintenance service upon request.

Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to the HRV Ventilation System from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for the separation and protection of combustible materials from heat sources.



Internal Moisture

- 13.1 When the HRV Ventilation System 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 HRV ventilation system, 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 HRV ventilation system 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 HRV Ventilation System will be less predictable in these situations.

Ventilation

- 14.1 A standard configured HRV Ventilation System is not intended for use in complying with the mechanical ventilation provisions in NZBC Acceptable Solution G4/AS1, Paragraph 1.5.
- 14.2 The use of a HRV Ventilation System to comply with the mechanical ventilation provisions in NZBC Acceptable Solution G4/AS1, Paragraph 1.5, 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 [Safety] Regulations and NZBC Clause G9.3.1 [a].
- 15.2 Electrical safety of the HRV fan units complies with AS/NZS 60335.2.80: 2004.

Installation Information

Installation Skill Level Requirement

- 16.1 The HRV Ventilation System must be installed by HRV, their dealers or agents.

System Installation

- 17.1 Installation must be in accordance with HRV's installation manual 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 and the system is tested.

Health and Safety

- 18.1 Safe use and handling procedures for the HRV Ventilation System are provided in the owner operating guide.

Basis of Appraisal

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

Tests

- 19.1 Testing of electrical components for electrical safety was carried out by accredited testing bodies in accordance with AS/NZS 60335.1 and AS/NZS 60335.2.80 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 HRV Ventilation System and to examine completed installations for operation.
- 20.2 An opinion on the use of the HRV Ventilation System to control moisture and provide ventilation has been given by BRANZ experts.
- 20.3 The manufacturer's installation manual 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 HRV in accordance with the instructions of HRV.
- 21.3 Building owners are responsible for the maintenance of HRV Ventilation Systems in accordance with the instructions of HRV.

Sources of Information

- AS/NZS 3100: 2017 Approval and test specification - General requirements for electrical equipment.
- AS/NZS 60335.2.80: 2004 Household and similar electrical appliances - Safety - Particular requirements for fans.
- Electricity [Safety] Regulations 2010.
- NZECP 51: 2004 New Zealand Electrical Code of Practice For Homeowner/Occupier's Electrical Wiring Work In Domestic Installations, Ministry of Economic Development, 2004.
- NZS 4303: 1990 Ventilation for acceptable indoor air quality.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



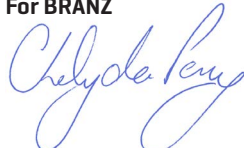
In the opinion of BRANZ, the **HRV Ventilation System** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Cristal Air International T/A HRV**, 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. **Cristal Air International T/A HRV**:
 - 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 **Cristal Air International T/A HRV**.
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 **Cristal Air International T/A HRV** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

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18 September 2017