10.0 Testing, commissioning and customer operating instructions

This section covers what to do once a heat pump system is installed. It includes what to check before it is commissioned, testing the system, briefing the homeowner on the new system and carrying out a quality assurance check once everything is completed.

Once the installation is complete, the system can be commissioned. If instructions are provided by the manufacturer, they must be followed; otherwise, testing and commissioning must comply with the Australia and New Zealand Refrigerant Handling Code of Practice 2007.

10.1 Pre-commissioning checks

Outdoor unit – check:

- ❏ The unit is secure and correctly mounted.
- ❏ There is a clear air movement path.
- ❏ Valve caps have been replaced and securely tightened.
- ❏ Wiring has been signed off.

Indoor unit – check:

- ❏ Unit mounting is level and secure.
- ❏ Remote control base is securely screwed to wall.

Pipework – check:

- ❏ Pipework has been correctly installed and secured.
- ❏ Pipework is correctly insulated.

Indoor unit drainage – check:

- ❏ Pour some water into the indoor unit drainage pan.
- ❏ Ensure that the water flows through the outlet and drainage hose without leaking.

10.2 Electrical checks

Wiring:

- ❏ Carry out tests required under the wiring regulations.
- ❏ Do a polarity test.
- ❏ Electrical code compliance certificate is obtained and a copy handed to the owner.

Labelling:

- ❏ Provide labels on indoor and outdoor units to identify:
  - fuse location
  - phase colour
  - size of protection device.

10.3 Prepare the remote control

- ❏ Remove the battery cover.
- ❏ Insert new batteries.
- ❏ Replace cover.

10.4 Testing the new system

- ❏ Switch the system on.
- ❏ Ensure that no LED lights are on. If LED lights are on or blinking, the installation is faulty. Disconnect the power supply and locate and fix the fault.
- ❏ Check the emergency operation by pressing the emergency operation on/off switch and holding down for 3-5 seconds. This will start a test run (continuous operation for a set period) during which the thermostat does not work.
- ❏ Press the emergency operation on/off switch again to turn off.
- ❏ Test unit in heating and cooling mode as described below.

Indoor unit – check:

- ❏ The fan operates at all speeds.
- ❏ There is no vibration of the unit.
- ❏ Vertical and horizontal air direction controls are operating.
- ❏ Air circulation mode (circulating air without heating/cooling) is operating.
- ❏ The unit operates to the correct heat command – use a thermometer. With an indoor ambient air temperature of 21°C:
  – for heating, an air-off coil temperature of 45-50°C or better should be achieved
  – for cooling, an air-off coil temperature of 8-12°C or better should be achieved.
- ❏ The manual operation is functioning – for situations when the remote cannot be used.
- ❏ The auto start is functioning.
- ❏ An electronic sound can be heard by pressing the on/off button of the remote control.
- ❏ The condensate pump (if installed) works.

Note: Air-off coil (delivery air) temperature is dependent on the ambient internal temperature and the outdoor temperature. A good rule of thumb is to ensure a 10-15°C temperature difference between air-on coil (air coming back to the coil) and air-off coil (delivery air) for the indoor unit for both heating and cooling.

10.5 Instructions to the owner

Checklist of instructions to the owner on the use of the system:

- ❏ Demonstrate how to set the controls/different modes correctly.
- ❏ Demonstrate how to use the remote control.
- ❏ Demonstrate how to remove and clean air filters.
- ❏ Advise:
  – on what to expect on very hot or very cold days
  – that the system will take a few minutes to warm up.
- ❏ Advise of service requirements.
- ❏ Recommend reading the operating instructions manual.
- ❏ Provide a service checklist.
- ❏ Provide the warranty.
- ❏ Provide an electrical code compliance certificate.
- ❏ Provide a record of the system commissioning data.
- ❏ Provide contact names and numbers in case of problems.

Understanding how to use a heat pump efficiently is important information for homeowners. The following information is taken from the EECA ENERGYWISE™ publication *How to choose a heat pump and use it wisely* – it can also be downloaded from **www.energywise.govt.nz**

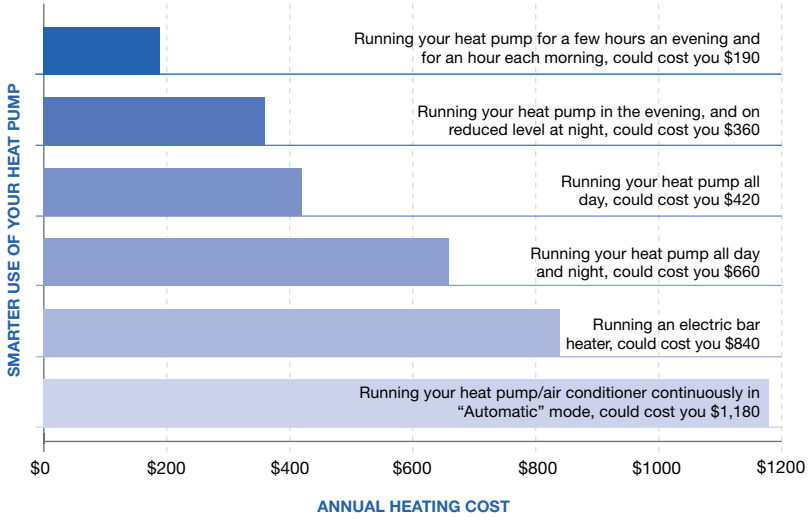
Heat pump running costs

Now you've chosen your heat pump, you'll get maximum energy efficiency gains and savings on your power bill by using it wisely.

If a heat pump/air conditioner is run all day and night, you can expect to double your power bill. But if you use your heat pump for a few hours in the evening, and an hour in the morning, you can expect to save about $500 a year, as opposed to an electric heater.

Figure 10.1 shows how much the cost of running a heat pump can vary depending on how you use it. This chart illustrates the way that you run your heat pump can have a significant impact on overall running costs.

Figure 10.0 Annual heat pump running costs



Note: These figures are for information only. The values used are based on a number of assumptions (such as size of heat pump, ambient room and outside air temperature, levels of home insulation etc). Actual running costs will vary significantly depending on these assumptions as well as each particular product's characteristics and the individual installation.

Some heat pump installers suggest to consumers that they leave the heat pump on 24 hours a day. Heat pumps should only be used in this way if there are people in the house all day (especially if they are elderly, babies or have health problems) and if the householder wants to keep the house warm at night, otherwise they are wasting energy and increasing the potential for your heating bill to go up.

Heat pumps work harder on cold nights

Heat pumps work harder, and therefore use more energy, when the ambient air is colder. If you need to run your heat pump at night (for example for health reasons), turn down the thermostat setting to keep a minimum of background heat. Efficient home insulation will also make a big difference in keeping homes warm at night.

Extra load on energy supply

Dry winter months pose two problems: increased heating demand, and reduced energy resources in the hydro lakes. If all the heat pumps around the country were left running all day and night, this could equate to a demand equal to 5% of the total national production of electricity.

Use the remote

Remote controls come standard with most heat pumps. Users can set the timer so that their heat pump turns on an hour before they get home, and by using a temperature sensor to make it easy to achieve a constant, comfortable temperature.

It is also possible to get a 7-day timer which allows you to programme on/off times for each day of the week for maximum energy efficiency.

Summer cooling

Using a heat pump as an air conditioner in summer instead of opening the windows and doors will increase your power bill. Instead, try creating a cross-draft by leaving windows open on opposite sides of the house. You can also close blinds or curtains to keep the sun out in the heat of the day. If you do use the air conditioner to cool the space, close windows and doors otherwise the heat pump will have to work harder to keep the temperature down and end up costing you more.

Checklist for using a heat pump efficiently

Like any heating option, heat pumps give the best energy savings when they are used wisely.

- Heat the spaces that you are actually using and shut doors and curtains to keep the heat in.
- Don't have the temperature higher than you need it – aim for between 18-22°C while you are using a space, and 16°C overnight if required.
- Learn to use the timer features so your heat pump turns on an hour or so before you get home, instead of leaving it on all day.
- Make sure your house is well insulated, so that you keep the heat you are paying for in your house longer.
- Clean the filter (inside and outside) regularly, as per the manufacturer's instructions.
- Only use your heat pump as an air conditioner if you really need to. Try opening windows and doors on either side of the house to get a through breeze. Close curtains on hot, sunny days to keep your home cool and shady.

10.6 Quality assurance checklist for auditing

Carry out a quality assurance check on completion of installation of a heat pump system.

Outdoor unit

- ❏ Is the outdoor unit secure with no likelihood of falling over?
- ❏ Is there any vibration or noise disturbance to owners and/or adjacent properties?
- ❏ Is the area around the unit clear so there is no likelihood that the air supply routes will become blocked?
- ❏ Has the unit been installed to provide future servicing access?
- ❏ Is all the exterior ducting neat and tidy, with all flashing and waterproofing completed?
- ❏ Have all service covers been replaced?
- ❏ Is the unit clearly labelled?
- ❏ Have the installer's checklists been sighted?

Indoor unit

- ❏ Is the indoor unit secure and does not vibrate?
- ❏ Has the test run been carried out?
- ❏ Is the unit neatly installed with no pipework or ducting visible?
- ❏ Have the installer's checklists been sighted?

Pipework

- ❏ Is the pipework appropriate for the refrigerant used in the system?
- ❏ Has a leak test been carried out?
- ❏ Was the system evacuated?
- ❏ Is the system charged to a level appropriate for the pipe length?
- ❏ Are the stop valves fully open?
- ❏ Have the installer's checklists been sighted?

Drainage

- ❏ Is the drain hose from the indoor unit properly installed?
- ❏ Has the indoor unit drainage been tested by pouring water into the tray?
- ❏ Has the outdoor drainage pipe been directed away appropriately?

Electrical

- ❏ Does the electrical work have an electrical code compliance certificate?
- ❏ Has a copy of the Code of Compliance certificate been given to the owner?
- ❏ Is the unit connected to a separate circuit (if over 5 kW output), hard wired back to the mains distribution board?
- ❏ Is there a circuit breaker in the system and has the circuit been properly labelled on the distribution board?
- ❏ Is the energy rating label on the unit or available for viewing?

Instructions to the owner

- ❏ Has the operation of the system been explained to the owner?
- ❏ Does the owner have the operating manual?
- ❏ Has the owner been advised of maintenance and servicing requirements?
- ❏ Does the indoor unit have the energy rating label applied, or available?
- ❏ Has the owner been given a copy of the warranty?