

# HEAT PUMPS & NOISE

## A NEIGHBOURLY INSTALLATION GUIDE

What you need to know in order to have a smooth, nuisance-free heat pump installation



This guide provides simple advice for both installers and residents looking to purchase a heat pump, air conditioning unit, or other exterior mechanical system.

It will help you to:

- determine an optimum outdoor location
- select a quiet heat pump system
- properly maintain your heat pump
- control and prevent noise travel

### CITY OF VANCOUVER NOISE BYLAW

The City of Vancouver Noise Control [By-Law #6555](#) has been protecting residents from excessive noise since its inception in 1989. This bylaw has residential noise limits depending on the time of day.

#### WHAT ARE THE LIMITS IN THE RESIDENTIAL NEIGHBOURHOODS?



### HOW TO SELECT A HEAT PUMP

#### 1. SELECT A QUIET UNIT

Most manufacturers will specify a 'sound power rating,' a lab-tested decibel dB(A) measurement of the sound generated by a heat pump at full capacity. Most quality models are around 60 dB(A) while newer 'ultra-quiet' models are achieving lower ratings.

These mechanical ratings are different than the Noise Bylaw which specifies a 'sound pressure rating' measured with a noise meter at the property line.

That's why properly locating the unit is critical to achieving a no-complaint system.

#### WHAT HEAT PUMPS ARE THE QUIETEST?

Look for models that have the lowest decibel rating, as well as the following features:

- Variable speed fans and compressors
- Soft start and stop functions
- Nighttime/low sound modes
- Insulated compressors

## 2. SELECT PROPERLY SIZED EQUIPMENT

The contractor should select the appropriately sized system based on the space that is to be heated/cooled. An oversized unit may 'short cycle' i.e. turn on and off more than necessary. This can result in excess noise and can reduce the life of the system.

Consider other energy efficient improvements with your heat pump installation. A less leaky house with more insulation requires less energy to heat and cool, and could help further reduce the size of the unit needed.

## LOCATING THE HEAT PUMP

Most noise complaints are a result of locating the outdoor unit facing, or too close to neighbouring windows, bedrooms or living areas. Consider the following unit placement to reduce noise travel:

### 1. Locate as far away from the property line as possible.

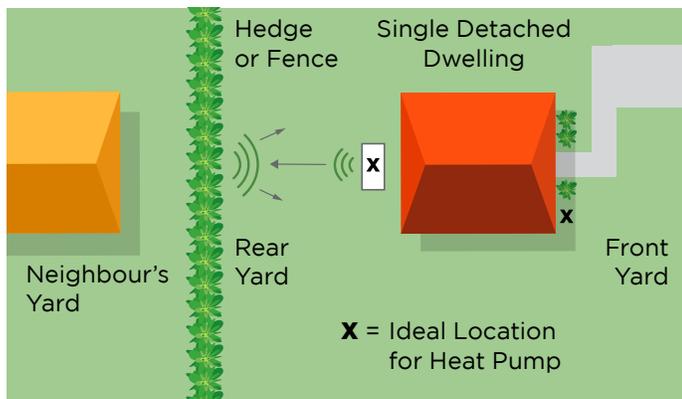
Avoid the side yard in favour of the front or rear yard.

### 2. Keep out of high travel and weather-exposed locations.

For example: the unit should not be under a roof drip line; condensation outlets should not drain on pathways and the unit should not interfere with parking or walkway access.

### 3. If you can see it, you can usually hear it.

Use existing barriers like fences, landscaping, or decks to break uninterrupted noise transmission to neighbours and to your own home. Keep the unit away from any neighbouring windows or openings (especially ground- and upper-floor bedrooms!).



Keep behind any existing barriers. Fences, hedges, and garden sheds can help block a neighbour's line of sight to your heat pump. You may need to install a barrier if your unit can only be installed in a sensitive location.

### 4. Mount the unit on the ground.

Install the unit on a solid base such as a concrete pad or block, with rubber pads or dampeners to further minimize vibration. Wall-mounted units are generally higher which could allow for easier unimpeded noise travel.

### 5. Ensure sufficient air flow clearance.

While locating the unit underneath a deck, patio, or in a dedicated outdoor mechanical space can be a good option, heat pumps require access to clear outdoor air flow to maintain high efficiencies. Follow the manufacturer's instructions for best practices.

### 6. Consider acoustic barriers if a noise issue persists.

Heat pumps generate both high and low frequency noise.

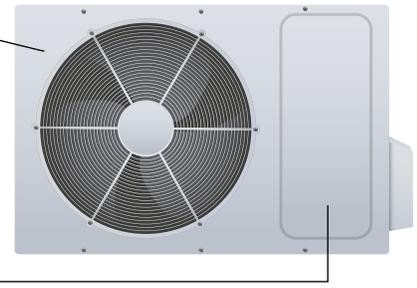
## WHERE DOES HEAT PUMP NOISE COME FROM?

### CONDENSER FAN

- High frequency "whirring"
- Directional noise (horizontal or vertical depending on your unit).

### COMPRESSOR

- Low frequency "drone"



High frequency sounds are readily reduced by structures, but lower frequencies may penetrate structures unless they are reduced at the source. Acoustic barriers or acoustic treatment may be necessary to further reduce noise issues.

## OTHER CONSIDERATIONS



Locate your unit outside the drip-line of your roof



Be careful of hard surfaces that may reflect sound towards your neighbour



Have your heat pump installed by a certified technician



Clean or change your air filter regularly



Keep coils clear of dirt and debris

## MAINTAINING YOUR HEAT PUMP

Heat pumps use fans and motors to move and transfer heat efficiently. The noise produced by these devices can increase over time without periodic maintenance to replace worn parts such as bearings, or tighten loose screws that can cause rattling. Ask your contractor to provide you with an appropriate maintenance schedule.

## SELECTING A CONTRACTOR

Seek a reputable heat pump contractor that will obtain the proper permits and install the equipment safely and correctly. Be sure to discuss the above proper heat pump selection criteria with them, and ensure the details are in writing before signing a contract.

By considering these recommendations, a new heat pump owner can experience many years of comfort *and* good neighbourly relations.

## FOR MORE INFORMATION

If you have questions, please contact staff at 3-1-1 or visit [vancouver.ca/heat-pumps](http://vancouver.ca/heat-pumps)