



All About Cold-Climate Ductless Heat Pumps

Ductless heat pumps, often called ductless mini-splits, have come a long way in the last decade. While mass-market heat pumps used to struggle at the coldest temperatures, demand for the technology has grown in colder regions of North America and Scandinavia, and the technology has matured to serve these climates.

Today, every major manufacturer (along with some of the smaller ones, too) offers “extended capacity,” or cold-climate ductless heat pumps. In fact, cold-climate ductless systems are able to provide at least 80–85% of their heating “oomph” at temperatures as cold as 5 degrees Fahrenheit, making them the go-to for many HVAC contractors who work in colder areas.

If you live in an area where temperatures frequently dip below freezing and you have electric resistance heat, then a cold-climate ductless heat pump is an ultra-efficient — and comfortable — option worth looking into.

What is considered “cold climate”?

“Cold climate” is a general term used to describe any location that experiences extended periods of below-freezing temperatures. In the Northwest, this generally means east of the Cascade mountains or at elevations above 2,500 feet, but homes west of the Cascades can be considered “cold climate” if historic local weather records show periods near or below 5 degrees Fahrenheit.

What is a cold-climate ductless heat pump?

A cold-climate ductless heat pump is an inverter-driven mini-split or ductless heat pump that is capable of providing comfortable heating for a home when outdoor temperatures are as low as -15 degrees Fahrenheit.



To get technical, a cold-climate ductless heat pump meets these minimum specifications:

1. The compressor must be variable capacity. Unlike single-stage compressors, which can only run at full power, variable capacity compressors offer:
 - Longer run times, which improve:
 - Air distribution.
 - Temperature and humidity control.
 - Air quality.
 - Quieter operation.
 - Greater efficiency.
2. Indoor and outdoor units must be part of an AHRI match system. AHRI is the Air-Conditioning, Heating and Refrigeration Institute, which matches indoor and outdoor units to verify that they will work together as a system to achieve the energy efficiency and longevity you expect.
3. A Heating Seasonal Performance Factor (HSPF) greater than or equal to 10.0. HSPF is an HVAC industry measurement of air source heat pump efficiency. The higher the HSPF rating, the more efficient the unit — a rating of 8.0 is considered minimum efficiency for most utility rebates.
4. Maintains 80% of its rated capacity at 5 degrees Fahrenheit without the aid of electric resistance backup heating.
5. The Coefficient of Performance (COP) at 5 degrees Fahrenheit is greater than 1.75 at maximum capacity. COP is a performance rating of how effective a heat pump is at transferring heat versus the electricity it consumes. Most efficient heat pumps have a COP of 2 or greater in a typical temperature range — this portion of the specification proves that the system will continue to deliver the heat needed at low temperatures, without integrated back up electric resistance heat.
6. Must have a drain pan heater (or equivalent) controlled by the DHP to run only as part of the defrost cycle.



When should a cold-climate ductless heat pump be used?

Cold-climate ductless heat pumps can be used for primary heating, or to displace (supersede) a home's existing electric resistance heating system, like baseboards or wall heaters in the main body of the house. Less expensive noncold-climate ductless heat pumps won't work as well when temperatures dip below freezing, which can significantly impact energy efficiency.

How big should my system be?

It's important to understand how much heating and cooling is needed in a home in order to appropriately size the system. Proper sizing will keep the initial purchase price low, maximize system performance and allow for greater efficiency. Your installer should make sure your cold-climate ductless system has both capacity to sufficiently heat a home during peak winter months, as well as the ability to maintain temperatures in the home under mild weather conditions without sacrificing performance. Before upgrading your home's HVAC system, it is best to insulate the home and reduce air leaks — consider starting with a weatherization professional who can assess your home for potential upgrades.

What is the best cold-climate ductless heat pump to install?

Once you've considered the appropriateness of a cold-climate ductless heat pump, it's time to select a model. Start by reviewing this [database of qualified products](#) from major brands that meet general cold-climate standards, which is maintained by the Northeast Energy Efficiency Partnership (NEEP).

What kind of maintenance is needed?

All mini-splits need regular maintenance. Follow these simple guidelines to maintain performance and extend the life of the system:

- Clean your air filters every two months and replace them per the recommendations in your owner's manual. Keep the outdoor unit clear of debris that may affect airflow or clog drainage under the unit.
- Inspect the outdoor unit seasonally to ensure the outdoor coil is clean, there are no breaks in pipe coverings or insulation and there are no oil stains around the refrigerant line-set connections.
- Schedule annual inspection and maintenance visit from your installer to inspect and clear condensate lines, check for refrigerant leaks, clean compressor coils, and ensure your system is operating efficiently.

How do I operate a cold-climate ductless heat pump to maximize efficiency?

How you operate your ductless system can have a big impact on its efficiency and performance. Along with the tips listed below, be sure to read the owner's manual and ask the installer questions about usage.

- Keep snow and debris away from the outdoor unit.
- Use the "heat" or "cool" setting rather than the "auto" setting — using the "auto" setting can greatly increase energy use and cause the DHP to interact poorly with other heating systems.
- Only turn off the system when neither heating nor cooling is needed.
- Use the "automatic" fan speed setting — this allows the fan to operate as quietly as possible.
- At nighttime, avoid setting the temperature back more than 4 degrees Fahrenheit from the daytime temperature setting — ductless heat pumps provide best efficiency and comfort with a steady temperature setpoint and small night setback.
- When using backup heat via electric resistance or electric forced-air furnace, be sure to set the backup heating thermostat to 3–4 degrees lower than the DHP thermostat — this will ensure the DHP provides the majority of heating, and the backup is only used when necessary.

Learn more in our Ductless Heat Pump Guide for Homeowners.

Are any rebates available?

Many utilities throughout the Pacific Northwest offer rebates on the purchase of a ductless heat pump — some up to \$1,500 for qualified customers. To see if you're eligible for rebates, visit the [Utility Search](#) page and enter your ZIP Code to find your local electric utility.

Even if you live in an area where temperatures frequently dip below freezing, a ductless system can work for you — as long as it's properly sized and maintained. To learn more and find a ductless heat pump installer near you, visit [ComfortReadyHome.com/contractor-search](#).



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