

DUCTLESS HEAT PUMPS FOR COLD CLIMATES

Do you know some ductless heat pumps are designed to operate in cold climates? When properly applied and installed, research has shown these ductless heat pumps work well for heating homes and for saving energy. Due to the more demanding conditions in which they operate, installation mistakes, shortcuts and oversights can dramatically impact how well these machines perform. This document builds on the Best Practices for Installing Ductless Heating and Cooling Systems to include practices essential to successful installation and performance of these ductless heat pumps in cold climates.

WHAT IS A COLD CLIMATE?

- Areas where winter nighttime temperatures commonly drop below 20°F, and where historical data shows winter temperatures regularly fall to 5°F or lower, are considered cold climates. In the Northwest, this usually includes high elevations, areas on the east side of the Cascade Mountains, and much of Montana and Idaho.

BETTER BUILT COLD CLIMATE DUCTLESS HEAT PUMP SPECIFICATIONS*

- Compressor must be variable capacity (inverter type)
- Indoor and outdoor units must be part of an AHRI matched system
- The AHRI matched system must be rated at or above 10.0 HSPF
- The AHRI matched system must have a Coefficient of Performance (COP) at or above 1.75 at 5°F
- Must deliver at least 80% of rated heating capacity at 5°F
- If a drain pan heater is present, it may only run as part of the defrost cycle

* Northeast Energy Efficiency Partnerships maintains a list of cold climate rated air source heat pumps at www.ashp.neep.org/#/. To determine if a system meets the Better Built specification, review a listed unit's HSPF and ensure it meets 80% rated capacity at 5°F.

LOCATION OF THE OUTDOOR UNIT IMPACTS PERFORMANCE

1. Avoid Installing outdoor units on walkways and patios

Defrost cycle melt water can re-freeze on ground surfaces and create a dangerous slip hazard.



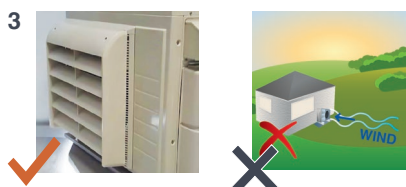
2. Do not install outdoor units under a roof's driplines

Rain, ice fall and snow melt from roof overhangs and driplines can re-freeze on the compressor's coil surface and overwhelm the unit's defrost cycle. When needed, outdoor units should be installed with drip caps or shields.



3. Don't install outdoor units facing into the wind

If the outdoor unit is facing into dominant wind direction, this could cause counter-rotation of the outdoor fan and lead to failure of the fan motor, fan circuit board or both.



TIP: If you cannot avoid the dominant wind direction, install an optional wind baffle offered by the manufacturer

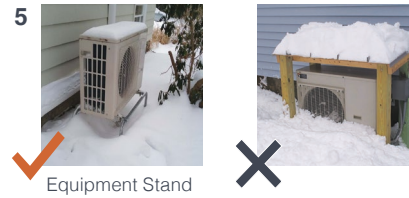
4. Locate outdoor units where noise will not disturb occupants

In colder climates, defrost cycle and full power operations occur frequently and run at higher decibels than typical operations. In homes with little or no insulation or single pane windows, full power noise may bother occupants.



5. Install outdoor units above average snowfall depths

Outdoor units need free-flowing air at all times. Install using wall brackets or an equipment platform that will raise the outdoor unit above average snow levels.



Equipment Stand

TIP 1:

Remind the homeowner to regularly clear snow away from their outdoor unit and to keep an eye on the unit during extreme weather

TIP 2:

Install vibration absorbers when mounting the unit using wall brackets. Use double-ended vibration absorbers to reduce noise from transmitting through the wall.



TIP 3:

Or, if ground clearance allows, use brackets designed to attach to the foundation wall.

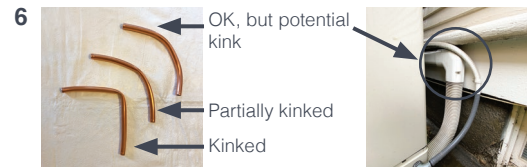
Foundation Mounted Wall Bracket



ADDITIONAL INSTALLATION CONSIDERATIONS

6. Avoid any kinks or partial kinks in the lineset

Even a partial kink can result in reduced capacity in low temperatures and may result in a callback. This can be a very difficult problem to solve. Adding more refrigerant will only exacerbate the problem. Locating a kink requires removing the line, feeling along the lineset to locate hot spots, and potentially replacing the entire lineset.



7. Ensure outdoor units stay level

The outdoor unit must be level (front-to-back and side-to-side) and remain so for its useful life. This is important to ensure the defrost cycle works properly and to prevent ice buildup in the outdoor unit.



TIP: For ground pad-secured units with snow-level risers, create a strong, long-lasting foundation by removing grass, topsoil, and mulch and getting down to base soil. Then build backup using dry cement or 1/4" minus gravel before adding a ground pad to prevent saturated soils from shifting

8. Ensure insulation covers the entire lineset including the flare fittings

Make sure insulation covers the flare nuts, as well as the entire lineset length. This ensures liquid or frost will not develop under the flare nut and cause cracks. Full insulation coverage also retains heat and improves system efficiency.



9. Air-seal and insulate the wall penetrations

Unsealed holes cause internal temp sensor errors which can lead to serious performance issues. Low temperature conditions will exacerbate these issues.



TIP: This is a common installation oversight. Add it to your installation checklist.