



Cold Climate Air-Source Heat Pump Specification (Version 3.1)

As facilitated by Northeast Energy Efficiency Partnerships (NEEP)

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The following specification defines a set of performance requirements and reporting requirements to meet the voluntary “Cold-climate Air-Source Heat Pump Specification” (ccASHP Specification). The specification was designed to identify air-source heat pumps that are best suited to heat efficiently in cold climates (IECC climate zone 4 and higher). The specification is intended as a model equipment specification to be used broadly by energy efficiency program administrators in cold climates as a minimum requirement for program qualification. It also is intended for engineers, contractors, and other practitioners who need assurance that the equipment they select will have the required heating capacity at design temperature without unnecessary oversizing, and will serve the load efficiently throughout the ambient temperature range.

Stakeholders should be aware that simply meeting the performance requirements does not necessarily mean a product is appropriate for all cold climate applications. Consumers, contractors, and designers should review building loads, equipment capacities at design temperatures, and other important factors before selecting equipment.

Scope

- Air-to-air heat pumps defined by federal regulation 10CFR §430.2 as a *central air conditioning heat pump*
- Indoor and outdoor units must be part of an AHRI matched system, tested under AHRI 210/240 performance rating procedure
- Compressor must be variable capacity (three or more distinct operating speeds, or continuously variable)
- Non-ducted ASHP systems¹
 - Single-zone ASHP systems with non-ducted indoor units (i.e. wall, ceiling, floor, etc.)
 - Multi-zone systems rated with non-ducted indoor units
- Ducted ASHP systems²
 - Centrally ducted
 - Single-zone systems with compact-ducted indoor unit
 - Multi-zone systems rated with all ducted or mixed (ducted and non-ducted) indoor units
- Does NOT include ground-source, water-source, or air-to-water heat pump systems

¹ Often referred to as “ductless” ASHP system. These systems do not utilize any air-ducts for distribution.

² System utilizes some form of air ducts for distribution.

Performance Requirements

- For Non-Ducted systems: HSPF ≥ 10
- For Ducted systems: HSPF ≥ 9
- COP @5°F ≥ 1.75 (at maximum capacity operation)
- SEER ≥ 15
- Lab testing results OR engineering data for each system must be reported through the attached “Cold Climate Air-Source Heat Pump Performance Information Tables”. Incomplete tables will not be considered.

Cold Climate Air-Source Heat Pump Performance Information Tables

Manufacturers must complete the following “Cold Climate Heat Pump Performance Information Tables” for each qualifying system. This information will support the cold climate specification and aid in appropriate equipment selection for installations in cold climates.

| | |
|---|--|
| Manufacturer | |
| Brand | |
| Model Name/Product Line (if applicable) | |
| AHRI Certified Reference Number | |
| AHRI Type | |
| Outdoor Unit Model Number: | |
| Indoor Unit Model(s) ³ Number: | |
| Variable-Capacity (Yes/No) | |
| HSPF (Region IV): | |
| SEER: | |
| EER (@ 95°F): | |
| ENERGY STAR Certified (Yes/No) | |
| Sold In? (USA/USA, Canada) | |
| Single-zone or Multi-zone configuration? | |
| Indoor Unit type/configuration? If Single-zone, select: centrally-ducted, compact-ducted, non-ducted: wall, non-ducted: floor, non-ducted: ceiling cassette If Multi-zone, select: non-ducted, ducted or mixed indoor | |
| If the system utilizes any form of air ducts for distribution (compact or central for single-zone, or ducted or mixed for multi-zone configurations), please classify as DUCTED. Otherwise, please classify as NON-DUCTED | |

³ Manufacturers should report specific indoor units as rated with the specific outdoor unit, OR use the “ducted”, “non-ducted” or “mixed ducted and non-ducted” to describe the rated configuration of indoor units (typical for multi-zone), as applicable.

Provide laboratory testing data or engineering data for the conditions shown below. “Minimum” and “Maximum” refer to the steady-state heating (and cooling) capacities and input power at each condition that the rated *outdoor equipment* model can deliver *continuously (without cycling)*, during normal operation using the equipment’s built-in controls (e.g. not using fixed-speed test modes). Capacities in the “Rated” column should correspond to those listed on the AHRI certificate at 47°F and 17°F ODB for heating and 95°F ODB for cooling. (In some cases these may be equal to the “Maximum” capacity values, but shall still be reported.) Btu/h is total heat or cooling capacity, and kW is power input. Do not include the power required for defrost cycling or drain pan heater operation in the table.

Heating Performance

| | | | Capacity Level | | |
|------------------------------------|----------------------|-------|----------------|-------|---------|
| Outdoor Dry Bulb (°F) | Indoor Dry Bulb (°F) | | Minimum | Rated | Maximum |
| 47°F | 70°F | Btu/h | | | |
| | | kW | | | |
| | | COP | | | |
| 17°F | 70°F | Btu/h | | | |
| | | kW | | | |
| | | COP | | | |
| 5°F | 70°F | Btu/h | | | |
| | | kW | | | |
| | | COP | | | |
| Lowest Catalogued ODB ⁴ | 70°F | Btu/h | | | |
| | | kW | | | |
| | | COP | | | |

Cooling Performance

| | | | Capacity Level | | |
|-----------------------|----------------------|-------|----------------|-------|---------|
| Outdoor Dry Bulb (°F) | Indoor Dry Bulb (°F) | | Minimum | Rated | Maximum |
| 95°F | 80°F | Btu/h | | | |
| | | kW | | | |
| | | COP | | | |

⁴ Lowest Catalogued Outdoor Dry Bulb (ODB) is defined as the lowest catalogued outdoor temperature published within technical manual/product catalogue performance table. Common LCTs are -4°F and -13°F.

| | | | | |
|------|------|-------|--|--|
| 82°F | 80°F | Btu/h | | |
| | | kW | | |
| | | COP | | |

If a pan heater is integrated with, or is available as an accessory to, the outdoor unit, provide its standalone input power and a description of what determines when pan heater(s) operates. If the pan heater is available as an accessory, provide the model #.

| | Integrated or Accessory (provide model #) | Input Power (kW) | What determines when heater operates? |
|------------|---|------------------|---------------------------------------|
| Pan Heater | | | |

OPTIONAL- Manufacturers are strongly encouraged to provide additional information related to the following capabilities/functionalities:

| | |
|---|--|
| Integration- Describe any capabilities this ASHP system or its controller(s) have related to integration other heating systems/third-party thermostats including “works with”, etc. | |
| Connectivity- Describe any capabilities this ASHP system or its controller(s) have related to communication with the consumer or utility (i.e. Does the system/controller have an interface that allows for remote communication with the consumer or utility, wi-fi connected, etc.) | |
| Operational diagnostics- Describe any capabilities of the ASHP System to self-report or self-diagnose its operation or the quality of its installation | |
| Refrigerant- List the refrigerant(s) used | |