



Cold Climate Air Source Heat Pump Specification (Version 4.0)

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 serve the load efficiently throughout the ambient temperature range, and to differentiate cold climate performance.

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

Scope

- Central Air Conditioning Heat Pump (HP) defined by federal regulation 10 CFR §430.2
 - Units must be certified by AHRI Standard 210/240: Performance Rating of Unitary Air-conditioning & Air-source Heat Pump Equipment.
 - Compressor must be variable capacity (three or more distinct operating speeds, or continuously variable).
 - Does NOT include ground source, water source or air-to-water heat pumps.
 - Ducting Configurations:

Non-ducted	Singlezone Non-ducted, Floor Placement
	Singlezone Non-ducted, Wall Placement
	Singlezone Non-ducted, Ceiling Placement
	Multizone All Non-ducted
Ducted	Multizone All Ducted
	Multizone Mix of Ducted and Non-ducted
	Singlezone Ducted, Compact Ducted
	Singlezone Ducted, Centrally Ducted
	Single Package Heat Pump

- Variable Refrigerant Flow (VRF) Multi-Split Heat Pump defined by federal regulation 10 CFR §431.92
 - Units must be certified by AHRI Standard 1230: Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment.
 - Ducting Configuration:
 - Ducted
 - Non-ducted
 - Mixed Ducted and Non-ducted
 - Does NOT include water-source systems.
- Packaged Terminal Heat Pump (PTHP) defined by federal regulation 10 CFR §431.92
 - Units must be certified by AHRI Standard 310/380: Packaged Terminal Air-conditioners and Heat Pumps.
 - Compressor must be variable capacity (three or more distinct operating speeds, or continuously variable).
- Single Package Vertical Heat Pump (SPVHP) defined by federal regulation 10 CFR §431.92
 - Units must be certified by AHRI Standard 390: Performance Rating of Single Package Vertical Air-conditioners and Heat Pumps.
 - Compressor must be variable capacity (three or more distinct operating speeds, or continuously variable).

Central Air Conditioning Heat Pump (HP)

Performance Requirements

- *For Non-ducted systems:*
 - HSPF2 \geq 8.5 (10 HSPF equivalent)
 - SEER2 \geq 15 (15 SEER equivalent)
- *For Ducted systems:*
 - HSPF2 \geq 7.7 (9 HSPF equivalent)
 - SEER2 \geq 14.3 (15 SEER equivalent)
- COP at 5°F \geq 1.75 at maximum capacity operation.
- Models rated under AHRI 210/240 with voluntary base pan heater engagement that do not meet the HSPF2 requirement shall qualify if the identical model without a base pan heater meets the HSPF2 requirement (and all other applicable requirements).
- Lab testing results OR engineering data for each system must be reported per the following Reporting Requirements.

Reporting Requirements (HP)

Brand Owner	
Brand Name	
Model Name/Product Line (if applicable)	
AHRI Certified Reference Number	
AHRI Type	
Outdoor Unit Model Number	
Indoor Unit Model Number(s)	
Ducting Configuration	
SEER2	
HSPF2	
ENERGY STAR Certified (Yes/No)	
ENERGY STAR Cold Climate Certified (Yes/No)	
Variable-Capacity (Yes/No)	
Sold In? (USA and/or Canada)	
Refrigerant	

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 or time-limited “boost” modes), during normal operation using the equipment’s built-in controls. Capacities in the “Rated” column should correspond to those listed on the AHRI certificate at 47°F and 17°F for heating, and 95°F for cooling. If the system is optionally rated per

the Appendix M1 H4 test at 5°F, that should also be reported in the “Rated” column, as well as the “Maximum” column.

Btu/h is total heating 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. “Lowest Cataloged Outdoor Dry Bulb” is defined as the lowest temperature at which the manufacturer offers published performance data in technical manuals or product documentation. If 5°F is the Lowest Cataloged ODB, please populate Lowest Cataloged ODB with 5°F performance.

Cooling Performance

			Capacity Level		
Outdoor Dry Bulb (°F)	Indoor Dry Bulb (°F)		Minimum	Rated	Maximum
95	80	Btu/h			
		kW			
		COP			
82	80	Btu/h			
		kW			
		COP			

Heating Performance

			Capacity Level		
Outdoor Dry Bulb (°F)	Indoor Dry Bulb (°F)		Minimum	Rated	Maximum
47	70	Btu/h			
		kW			
		COP			
17	70	Btu/h			
		kW			
		COP			
5	70	Btu/h		Optional	
		kW		Optional	
		COP		Optional	
Lowest Cataloged ODB	70	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 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 integrating 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 (e.g. meets ENERGY STAR "Connected" criteria, 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 this ASHP system to self-report or self-diagnose its operation or the quality of its installation, including whether the system meets any/all of ENERGY STAR's Installation Capabilities criteria.	

Variable Refrigerant Flow (VRF) Multi-Split Heat Pump

Performance Requirements

- IEER: See Table 1 for requirements based on outdoor unit capacity (AHRI rated at 95°F).
- COP @47°F, 17°F, 5°F: See Table 2 for requirements based on outdoor unit capacity (AHRI rated at 95°F).
- Lab testing results OR engineering data for each system must be reported per the following Reporting Requirements.

Table 1: IEER Requirements

Capacity (MBtu/h)	IEER
≥65 and <135	18.9
≥135 and <240	18.0
≥240	17.0

Table 2: COP Requirements

Capacity (MBtu/h)	COP at 47°F (rated capacity)	COP at 17°F (rated capacity)	COP at 5°F (maximum capacity)
≥65 and <135	3.40	2.25	1.55
≥135 and <240	3.25	2.07	1.50
≥240	3.20	2.05	1.45

Reporting Requirements

AHRI Certified Reference Number	
Brand Name	
Series Name	
AHRI Type	
Indoor Unit Type	
Outdoor Unit Model Number	
Indoor Unit Model Numbers	
IEER	
ENERGY STAR Certified (Yes/No)	
ENERGY STAR Cold Climate Certified (Yes/No)	
Simultaneous Cooling and Heating Efficiency (for heat recovery systems only)	
Refrigerant	
Sold In? (USA and/or Canada)	
Outdoor temperature at which drain pan heater turns on	
Drain Pan Heater Input Power (kW)	
Drain Pan Heater Sequence of Operation (Optional)	

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 or time-limited “boost” modes), during normal operation using the equipment’s built-in controls. Capacities in the “Rated” column should correspond to those listed on the AHRI certificate at 95°F for cooling, and 47°F and 17°F for heating. (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. For systems with modes that can optimize for high heat or high efficiency, report all data in the mode that is used for AHRI testing. “Lowest Cataloged Outdoor Dry Bulb” is defined as the lowest temperature at which the manufacturer offers published performance data in technical manuals or product documentation. If 5°F is the Lowest Cataloged ODB, please populate Lowest Cataloged ODB with 5°F performance.

Cooling Performance

			Capacity Level		
Outdoor Dry Bulb (°F)	Indoor Dry Bulb (°F)		Minimum	Rated	Maximum
95	80	Btu/h			
		kW input			
		COP			
82	80	Btu/h			
		kW input			
		COP			

Heating Performance

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

Packaged Terminal Heat Pump (PTHP) & Single Package Vertical Heat Pump (SPVHP)

Performance Requirements

- COP @5°F ≥ 1.5 (at maximum capacity operation).
- Lab testing results OR engineering data for each system must be reported per the following Reporting Requirements.

Reporting Requirements

Brand Owner	
Brand Name	
Model Name/Product Line (if applicable)	
Ducting Configuration	
AHRI Certified Reference Number	
AHRI Type	
Model Number	
EER	
Variable Capacity? (Yes/No)	
Refrigerant	
Sold In? (USA and/or Canada)	
Is there a low ambient temperature at which the compressor locks out and the unit switches to electric heat?	
What is the sequence of operation for electric heat?	
Is there an option to disable electric heat above a certain ambient temperature?	
How is condensate handled from dehumidification in cooling mode and defrost in heating mode?	

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 or time-limited “boost” modes), during normal operation using the equipment’s built-in controls. Capacities in the “Rated” column should correspond to those listed on the AHRI certificate at 47°F 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. “Lowest Cataloged Outdoor Dry

Bulb” is defined as the lowest temperature at which the manufacturer offers published performance data in technical manuals or product documentation. If 5°F is the Lowest Cataloged ODB, please populate Lowest Cataloged ODB with 5°F performance.

Cooling Performance

			Capacity Level		
Outdoor Dry Bulb (°F)	Indoor Dry Bulb (°F)		Minimum	Rated	Maximum
95	80	Btu/h			
		kW input			
		COP			
82	80	Btu/h			
		kW input			
		COP			

Heating Performance

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