

Space Heating Heat Pump Technical Requirements: Cold Climate Room Heat Pumps

(redline version appended to this document)

August 2023

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These requirements are limited to room heat pumps, and do not apply to split system air source pumps or ground source heat pumps. Room heat pumps include indoor-mounted heat pumps (vented through the wall) and packaged terminal heat pumps. Room heat pumps are anticipated to include window heat pumps in the future.

We recommend that, for simplicity and clarity, these requirements be copied and pasted onto drawings. A Word version of this document can be made available for this purpose.

Room Heat Pumps

- Must meet or exceed NYS Clean Heat requirements.
- Must have a minimum 12-month parts and labor warranty, with minimum extended 4-year warranty on the closed refrigeration system.
- Shall have variable speed compressors.

Sizing Requirements

- System shall be designed to meet Clean Heat “Full Load” requirements (heat pumps must serve \geq 90% of building load). Furthermore, heat pumps shall be used for all spaces, with limited exceptions in select areas (e.g. bathrooms). Heating is discouraged in spaces with limited duration of occupancy (e.g. corridors, stairwells, basements).
- Size systems to an indoor design heating temperature of 72 degrees, as allowed by the Energy Code. Note that NYC requires that systems be capable of ensuring that the indoor temperature is at least 68 degrees.
- Size systems to a design outdoor temperature of 13 degrees. Note Clean Heat Program Manual uses 99% threshold while this program requires sizing to 99.6% heat load threshold.
- Size the heat pump to the heating load, per code requirements and per requirements in this document.

Supplemental Heat

- Electric resistance backup shall not be used for heat pumps (e.g. in the same space). If the heat loss in a space exceeds available equipment heat pump capacities at the midwinter design outdoor temperature, project teams are encouraged to reduce heat loss by improving the space envelope (insulation, windows, etc.). In exceptional circumstances, the pilot will allow electric resistance heat in a space where the heat loss substantially exceeds what can be provide by a single heat pump, and cannot be reasonably reduced through envelope improvements. In no cases will electric resistance backup be allowed in a majority of apartments, or in the majority of rooms in any one apartment. Written approval must be obtained for any such exceptional use of electric resistance backup heat.
- Electric resistance heaters in minor spaces with short occupancy (e.g. bathrooms) shall have timer control to turn off automatically (crank timer or equivalent).
- Electric resistance heaters that are used for freeze protection (e.g. common area spaces with water piping, gas meter rooms, etc.) shall have temperature limits set at 50 degrees maximum or shall be set at 50 degrees and placed under a locking cover.

Wiring and Condensate Piping

- Condensate piping shall be minimum ¾" PEX or minimum ¾" PVC or CPVC. Vinyl tubing and corrugated tubing shall not be used. Note that code-approved materials (Mechanical Code 307.2.2) for condensate disposal does not include plain steel, and so abandoned steam piping can generally not be used for condensate disposal on its own.
- Fastening of condensate piping shall be hose clamp (worm drive clamp) or approved crimp rings, for PEX or approved connectors or approved adhesive for PVC or CPVC.
- Wiring and condensate piping penetrations of walls and roofs shall be sealed on both sides of the penetration. Sealing material used outdoors shall be UV-resistant. Sealing should be around and between all pipes and wires/conduit.
- Piping and wiring indoors shall be concealed unless otherwise approved. "Concealed" means: In chases, in ceiling or floor cavities, in basements or attics, or in drywall-finished soffits, or other approved means of concealment.
- Exposed wiring conduit and condensate piping on exterior walls shall be concealed in a cover in a color to match the wall. Cover type/color to be submitted and approved prior to ordering.
- Design should use gravity drainage of condensate from the units. Where gravity drainage is not possible, pumps are acceptable, but should be concealed to the extent feasible. Condensate discharge to building drainage shall be through indirect waste connection by means of an air gap.

System Commissioning

- Program room heat pump temperature controls to 70 F heating and 78 F cooling (occupied mode), unless provided written instructions otherwise.
- Ensure that filters on room heat pumps are clean and free of construction dust.

- For outdoor temperatures below 60 F, force heat pump into heating at maximum compressor speed (for example, by calling for heat at a high indoor setpoint temperature), and then record outdoor air temperature in the shade, total system electric current (amps), return air temperature, and supply air temperature.
- For outdoor temperatures above 60 F, force heat pump into cooling at maximum compressor speed (for example, by calling for cooling with low indoor setpoint temperature), and then record outdoor air temperature in the shade, total heat pump electric current (amps), return air temperature, return relative humidity (%), and supply air temperature.
- Provide a written report of test results (above) and manufacturer-required startup tests.
- For further commissioning requirements, refer to the Energy Code and to: https://taitem.com/Commissioning/NYC_Commissioning_Requirements_white_paper.pdf.

Removal of Fossil Fuel Equipment

Where existing fossil fuel equipment is being removed, comply with requirements in Appendix A.

Air Sealing and Insulation

- Interior wall-mounted room heat pumps typically need to be installed on a smooth wall surface, to rest perfectly against the wall so the weatherstripping on the back of the unit makes a tight seal against the wall sleeves. This may require a piece of plywood to be installed on the wall first.
- Air-seal wall penetrations on both the outside and inside with 30-year silicone caulk or approved alternate, using a backer rod if the gap is larger than 1/8", and foam if the gap is larger than 1/2". If air/water barrier is identified behind the facade material, seal to this barrier.
- Sleeves should typically be pitched to the outside. Follow manufacturer's instructions.
- Sleeves should be insulated in order to reduce heat loss and to prevent condensation inside the sleeves, unless they are penetrating solid insulation (such as an insulation-fully-filled wall cavity). For example, if they are installed in a masonry wall where the insulation is only on the outside of the building, the sleeve should be insulated.
- If a plenum is used to duct the room heat pump, it must be fully sealed and insulated. Furthermore, the outdoor intake and exhaust air streams must be properly separated all the way to the exterior (e.g. even through the louver), so there is no short circuiting.
- Future Housing Initiative projects will need to incorporate thermal breaks into any sleeves installed through the thermal boundary to ensure that passive house standards are met. Thermal bridge modeling will be required.
- Future Housing Initiative projects are required to perform air leakage testing on a mocked-up installation to confirm that the unit will comply with Passive House standards. Please work closely with your Certified Passive House Consultant to develop any modifications for Passive House compliance and confirm these modifications achieve the performance desired through air leakage testing.

Other

- Set unit level and true.

- A 7-day programmable thermostat is required, per energy code. Controls shall be fixed, wall- or unit-mounted types that are simple and easy to read. Controls shall be 60” above the floor, unless a lower height is required for accessibility (ADA); or unit-mounted. See Appendix B.
- Comply with all relevant codes and standards.

Not Mandatory

- Consider best practices as outlined in the following HPD/NYSERDA documents:
 - [Heat Pump System Design](#)
 - [Roof Considerations for Heat Pumps](#)

If you have questions or comments regarding Retrofit Electrification Pilot Program and Projects, please email electrificationpilot@hpd.nyc.gov

If you have questions or comments regarding the Future Housing Initiative Program and Projects, please email futurehousing@hpd.nyc.gov

Appendix A

Removal of Fossil Fuel Equipment

- Permanently seal the bottom and top of chimneys/vents and outdoor air combustion intake openings, and air-seal and insulate these penetrations per energy code. Permanently seal, ridged as with plywood or masonry, air sealed, waterproofed, insulated, and with a vapor barrier. If a chimney is being reused, for example for a smaller hot water flue, the sealing should occur around new flue at top and bottom.
- Permanently cap abandoned gas piping. Do not simply close shutoff valves.
- Remove oil tanks and oil piping and accessories
- For the removal of existing oil tank(s), GC will submit all DEP and FDNY decommissioning documents of the oil tank(s) to HPD. Tanks 1,100 gallons or larger must comply with NYC DEC Requirements.

Appendix B

Thermostats, Controls, and Power

Equipment:

- A 7-day programmable thermostat is required, per the energy code. Controls shall be fixed, wall-mounted or unit-mounted types that are simple and easy to read.

Thermostat Locations

- Either mounted on the heat pump, or on an interior wall, 60" above the finished floor.

Required Controls Information/Training for Residents

- Easy-to-read instructions must be provided to residents outlining thermostat settings, thermostat use, basic functions including overrides, "away" mode, information about energy savings, etc.
- A widely accepted approach is to "set and forget" indoor temperature settings, rather than to program them for occupied and unoccupied modes. This should only be done in situations for rooms in which unoccupied mode is predominantly at night. For rooms where unoccupied mode is during the day, setback can be used. Also, for rooms that are unoccupied for more than 24 hours (for example, a rarely used bedroom, or for periods of vacation), setback should be used.

Dual Power Systems

If it is proposed to provide dual power supplies to units, in order for metering to be switched between tenant meter (for example, for cooling) to the house meter (for example, for heating), the design team should be aware of safety concerns: Someone servicing a unit could turn off one power supply, assume power to the unit is off, and then be at safety risk if the second source of power is live. Accordingly, for such approaches, the pilot requires:

- A warning label on the unit.
- A warning label at both the house panel and apartment panel.
- A single disconnect at the unit that fully shuts power to the unit.

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