Heat Pump Water Heater (HPWH) Technical Requirements

(redline version appended to this document)

August 2023

The following practices shall be followed for all projects. These are in addition to all requirements outlined in NYC codes, zoning, NYS/ConEd Clean Heat Program Requirements, and the HPD specifications. In some cases, these requirements are more stringent than required by codes or by the NYS/ConEd Clean Heat requirements, and in those cases, these requirements shall be followed.

Integrated (Hybrid)/Packaged Systems (<120 gallons storage)

- Must meet or exceed Energy Star Residential Water Heater requirements
- Energy Factor (EF) or Uniform Energy Factor (UEF) => 3.3
- Minimum 10-year warranty on parts, 1-year warranty on labor
- Alternate for units with > 30A current rating
    - COP => 4.2
    - Minimum 3-year tank and 1-year parts/compressor warranty, 1-year warranty on labor
- Provides visual notification of need for filter cleaning or replacement
- Design requirements
    - Locate the HPWHs in the basement or mechanical rooms, not in apartments, and where sound transmission will not be an issue
    - Consider locating HPWHs where they can draw air from spaces with waste heat from other systems (e.g., boilers) or basements.
    - Size the hybrid HPWH plant using the capacity of the heat pumps only; do not include capacity of the electric resistance elements
    - Ensure the air temperature of the space the HPWHs will draw air from can be maintained at 40°F or higher all year, including cooling impacts of the HPWHs, and that all manufacturer requirements for room volume and clearances are met
    - Set water storage temperature for 140°F and include a mixing valve in the design
- Installation requirements
    - Spaces from which HPWHs draw air cannot be heated with electric resistance
    - Air intakes must be at least 10' from the exhaust outlets of other units
    - For ducted installations:
        - Ducts must not be run to or from outdoors
    - Cold air exhaust from HPWH must not be delivered directly to a dwelling unit or other areas where the cold air is likely to cause comfort problems or affect the thermostat reading
    - Set the units to operate with heat pump only setting as default

- Refer to the System Commissioning section of the ASHP Technical Requirements

Split Systems

- Must meet or exceed a COP of 3.0 at AHRI 340/360 testing conditions.
- Comply with NYC Noise Code
- Minimum 1-year warranty on parts and 5 years on the compressor, 1-year warranty on labor
- Include load calculations in construction documentation. Load calculations shall include:
  - total heating load
  - recirculation (distribution) heat loss
  - recirculation flow rate
  - daily DHW draw (gallons per day)
  - peak DHW flow (gallons per hour).
- Include a Sequence of Operations in the construction documentation, detailing performance setpoints and integration of all components of the plant, and indicating:
  - storage tank setpoint and sensor location,
  - swing tank setpoint and sensor location, (where applicable)
  - defrost mode operation,
  - freeze protection protocol; provide a freeze protection plan for power outage occurrences, such as including glycol or a drain down system,
  - intended operation during various load scenarios (peak DHW load, low/no DHW load) during design heating and cooling ambient temperatures,
    - Notes on intended operation should sufficiently show that peak load is met by the DHW HPWH during conditions that require frequent use of defrost mode, and that low/no DHW loads do not cause short cycling of the DHW HPWH or excessive use of the Swing Tank electric resistance element.
  - consideration of maximizing efficiency of system performance,
  - reducing risk of legionella,
  - and call for providing a copy of the sequence of operations, including a schematic drawing, framed in mechanical room.
- Provide expansion tanks for all hydraulically separated parts of the system; confirm that all manufacturer's check valves are accounted for.
- Multi-pass heat pump design requirements
  - Minimize the use of electric resistance heating
  - If electric resistance heating is planned as backup or as a redundant system, include in the Sequence of Operations a manual or programmed switchover
- Single-pass heat pump design requirements
  - Minimize the use of electric resistance heating
  - If electric resistance heating is planned as backup or as a redundant system, include in the Sequence of Operations a manual or programmed switchover
  - Design system to minimize EWT to heat pump to maximize efficiency while maintaining good water quality

- Design requirements (multi- and single-pass heat pumps)
    - System (heat pump and storage) must be capable of storing minimum 140°F water at 5°F outdoor air temperature and include mixing a valve
    - Include heat traps on both sides of the storage tank in designs where the recirculation load bypasses the storage tanks
    - Storage tank layout must be designed to optimize stratification (e.g., piped in series, not parallel)
    - Locate outdoor units to minimize length of outdoor piping
- Installation requirements (multi- and single-pass heat pumps)
    - Outdoor units must be installed 18" above exterior mounting surface to avoid snow loading.
    - Outdoor units must be located to avoid melting condensate from one unit dripping onto another or from other sources of excessive moisture (e.g., melting snow from roof edge)
    - Outdoor piping must be insulated with minimum 2.5" insulation and covered with continuous metal jacketing with all laps sealed with silicone caulking and pointed down to limit rain intrusion. Heat trace must be included under the insulation, on any water piping in exterior and unconditioned spaces.
    - If refrigerant piping is part of the installation, refer to the Refrigerant Charging and Leak Prevention section of the Heat Pump Technical Requirements, and provide as-built shop drawings of refrigerant lines.
    - Refer to the System Commissioning section of the Heat Pump Technical Requirements

REMOVAL OF FOSSIL FUEL EQUIPMENT

Where existing fossil fuel equipment is being removed, comply with Appendix B of the Heat Pump Technical Requirements.

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

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