How-to Guide:
Supporting Documentation

In Compliance with

2025 New York City Energy Conservation Code

- GENERAL
- BUILDING ENVELOPE
- **MECHANICAL SYSTEMS**
- LIGHTING & ELECTRICAL POWER
- OTHER REQUIREMENTS

NOTE: In this *How-To Guide: Supporting Documentation*, selected Energy Code provisions have been generalized, summarized, rephrased, and/or highlighted. This guide is intended: 1) To provide general guidance for the job applications seeking compliance with the 2025 NYCECC; 2) Not to replace or represent the entire 2025 NYCECC and related regulations of the City of New York and the Department of Buildings; and 3) Not to provide complete compliance solutions for any particular type of job or work. Comprehensive mandates, applicability, exemptions, exceptions and options will be found in the 2025 NYCECC and related regulations of the City of New York and the Department of Buildings.

Requirements for all Buildings - Minimum Equipment Efficiency/Performance

- **Complete Equipment Specifications**
  Construction documents must include for all HVAC and Service Water Heating (SWH) equipment:

  103.2

  - Equipment type, size, capacity, and fuel type
  - Equipment efficiency or performance rating
  - Any additional energy-related specifications

- **Compliance Requirement**
  Equipment efficiency ratings must:

  - Meet or exceed code-prescribed minimums
  - Values must be clearly shown in the Equipment schedules on construction drawings

👉 Equipment efficiency standards are primarily set at the Federal level (DOE)
👉 The Energy Code adopts and enforces these minimum efficiency requirements

Statutory Authorities

The authority to develop, revise, and implement minimum energy conservation standards for appliances and equipment was established by Congress in Part B of Title III of the Energy Policy and Conservation Act (EPCA), Public Law 94-163, as amended by the:

- National Energy Conservation Policy Act, Public Law (P.L.) 95-619;
- National Appliance Energy Conservation Act, P.L. 100-12;
- National Appliance Energy Conservation Amendments of 1988, P.L. 100-357;
- Energy Policy Act of 1992, P.L. 102-486;
- Energy Policy Act of 2005, P.L. 109-58 (EPACT 2005); and the
- Energy Independence and Security Act of 2007, P.L. 110-140 (EISA 2007).

These laws are codified in the United States Code, Title 42, Chapter 77, Subchapter III, Part A—Energy Conservation Program for Consumer Products Other Than Automobiles and Part A-1—Certain Industrial Equipment.

See: https://www.energy.gov/cmei/buildings/standards-and-test-procedures

REQUIREMENTS FOR ALL BUILDINGS - MINIMUM EQUIPMENT EFFICIENCY/PERFORMANCE

- **Values on Construction Drawings First, and then on Energy Analysis**

  Values and descriptions for HVAC and SWH equipment reported on Energy Analysis (on EN- labeled sheets) must be quoted from those in the equipment schedules and specifications on the relevant construction drawings – e.g., M- , or P- labeled drawings.

1 RCNY §5000-01 (f),(g)

SPLIT SYSTEM AIR CONDITIONING SCHEDULE "A"

MARK	AREA SERVED	TON	OUTDOOR MODEL#	INDOOR MODEL#	COOLING CAPACITY	HEATING CAPACITY		POWER SUPPLY	INDOOR UNIT	
					RATED CAPACITY BTUH	RATED CAPACITY (BTUH) @ 47 F	@ 17 F		MCA (A)	MO
CU-C-1 AHU-C-1	UNIT # 1	4 T.	XXXX-XXXXXX	XXXX-XXXXX	47,500	52,500	38,000	208V, 1 PH , 60HZ,	2.8	15

OUTDOOR UNIT			EER	SEER	HSPF	COP @
ND PRESSURE EL	WEIGHT (LBS)	EXTERNAL DIMENSIONS (H x W x D)				
58 dB	283	52-15/16X35-7/16X12-5/8	--	14.40	8.8	2.6

Generated by COM*check-Web* Software

Mechanical Compliance Certificate

Energy Code: **2025 NYCECC**
Project Title:
Project Type: New Construction

Construction Site: Owner/Agent: Designer/Contractor:

Mechanical Systems List

Quantity **System Type & Description**

1 HVAC System_CU-C-1 (Single Zone):
Split System Heat Pump
Heating Mode: Capacity = 53 kBtu/h,
Proposed Efficiency = 8.80 HSPF, Required Efficiency = 8.20 HSPF
Cooling Mode: Capacity = 48 kBtu/h,
Proposed Efficiency = 14.40 SEER, Required Efficiency: 14.00 SEER
Fan System: AHU-C-1 | 1ST FLOOR -- Compliance (Motor nameplate HP method) : Passes

Fans:
AHUC1 Supply, Single-Zone VAV, 1307 CFM, 0.5 motor nameplate hp, 0.7 fan efficiency grade

Figure MS-2.
Sample Mechanical Equipment Schedules & Matching Mechanical COMcheck Report - SPLIT SYSTEM HEAT PUMP

- *Efficiency value of individual equipment should be listed in the same measurement unit prescribed in the corresponding efficiency requirements table in the Code*

REQUIREMENTS FOR ALL BUILDINGS - MINIMUM EQUIPMENT EFFICIENCY/PERFORMANCE

AIR COOLED CONDENSING UNIT SCHEDULE

UNIT NO.	SERVICE	LOCATION	NOMINAL COOLING CAPACITY,TON	NOMINAL HEATING CAPACITY,BTU	ELECTRICAL DATA MCA / MFS	VOLTS	PH	MANUFACTURER AND MODEL No.	IEER/EER	CODE REQUIRED EFFICIENCY EER	COP	CODE REQUIRED EFFICIENCY COP	WEIGHT LBS	REMARKS
ACCU-L-1	LOBBY	ROOF-BLDG. B	10	135,000	46 / 1 @ 60	208	3	XXXXX- XXXXXXX	24.4/12.7	11.0	3.84	3.3	765	HEAT PUMP

AIR HANDLING UNIT SCHEDULE

UNIT NO.	SERVICE	LOCATION	CFM	O.A. CFM	EXT.S.P. IN.W.C.	NOMINAL COOLING CAPACITY TON	NOMINAL HEATING CAPACITY BTU/HR	POWER CONSUM. COOL/HEAT WATTS	ELECTRICAL DATA MCA AMPS	MFA AMPS	VOLTS	PH	WEIGHT (LBS)	MANUFACTURER AND MODEL	REMARKS	AIR COOLED CONDENSING UNIT SERVED
AC-L-1	LOBBY	1ST FLOOR	1200	-	0.8	4	54,000	259	5.3	15	208	1	106	XXXX- XXXXXX	CEILING TYPE DUCTED	ACCU-L-1
AC-L-2	LOBBY	1ST FLOOR	800	-	-	2.5	34,000	57	0.9	15	208	1	57	XXXX- XXXXXX	4 WAY CASSETTE	

Generated by COM*check-Web* Software

Mechanical Compliance Certificate

Energy Code: **2025 NYCECC**
Project Title:
Project Type: New Construction

Construction Site: Owner/Agent: Designer/Contractor:

Mechanical Systems List

Quantity	System Type & Description
1	ACCU-L-1 (Single Zone): VRF Condensing Unit, Air Cooled Heat Pump Heating Mode: Capacity = 135 kBtu/h, Proposed Efficiency = 3.84 COP, Required Efficiency = 3.30 COP Cooling Mode: Capacity = 120 kBtu/h, Proposed Efficiency = 12.70 EER, Required Efficiency: 11.00 EER + 14.6 IEER Fan System: None
1	AC-L-1 (Single Zone): Cooling: 1 each - VRF Zone Fan Unit, Capacity = 48 kBtu/h, No Economizer, Economizer exception: Low Capacity Residential No minimum efficiency requirement applies Fan System: Unspecified
2	AC-L-2 (Single Zone): Cooling: 1 each - VRF Zone Fan Unit, Capacity = 30 kBtu/h, No Economizer, Economizer exception: Low Capacity Residential No minimum efficiency requirement applies Fan System: Unspecified

Figure MS-3.
Sample Mechanical Equipment Schedules & Matching Mechanical COMcheck Report
- VRF HEAT PUMP :
AIR-COOLED CONDENSER & ZONED FAN UNITS

RESIDENTIAL - BUILDING-SPECIFIC REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Optimal Equipment Size

R403.3.1
R403.7

- **Equipment Sizing per ACCA Manual S:** Heating and Cooling equipment of a Residential job application must be sized in accordance with ACCA Manual S based on building loads calculated per ACCA Manual J, or other approved calculation methodologies.
- **Sizing Statement:** The drawings must include a statement indicating the total Heating and Cooling design loads have been determined as such.
- **Duct Sizing per ACCA Manual D:** Ducts in a Residential job application must be sized in accordance with ACCA Manual D.
- **Minimum Efficiency:** New or replacement heating and cooling equipment must meet or exceed the minimum efficiency rating required by Federal law.
- **Electric Resistance Space Heating:** Electric-resistance heating in dwelling and similar spaces is limited to ≤ 2.0 kW total capacity or requires installation of a heat pump in the largest non-bedroom space.

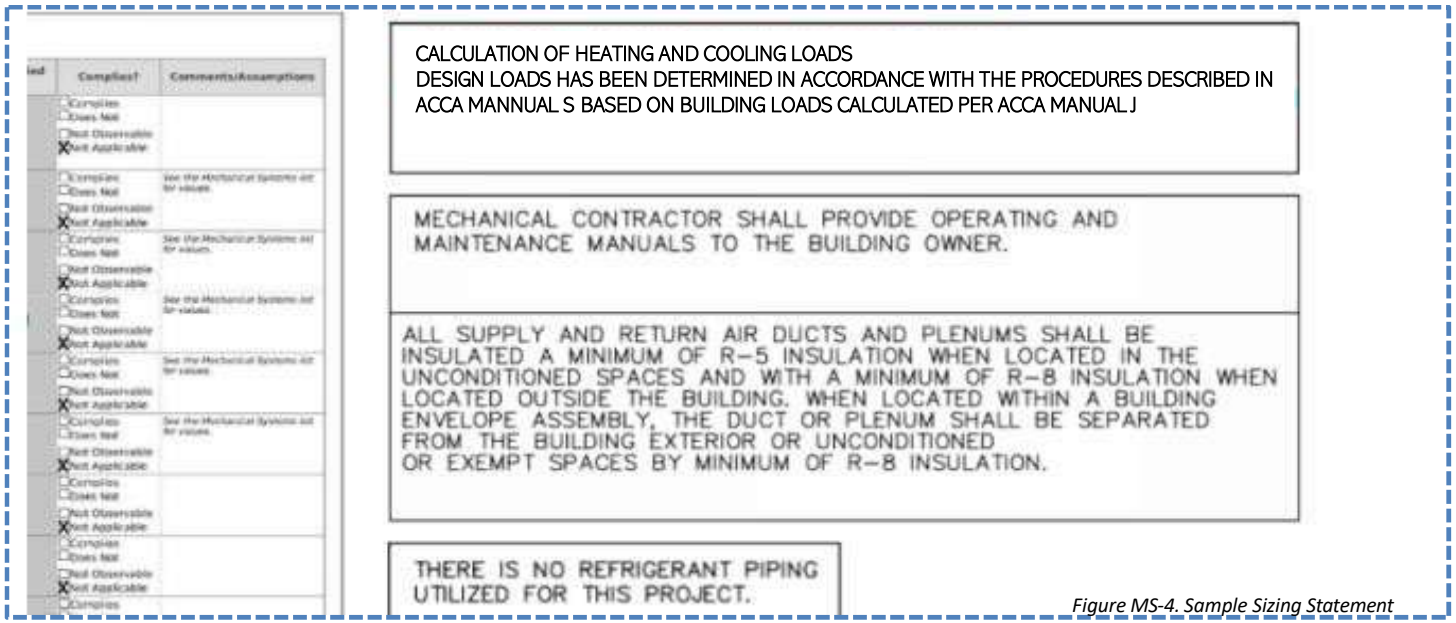


Figure MS-4. Sample Sizing Statement

RESIDENTIAL - BUILDING-SPECIFIC REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Systems for Multiple Dwelling Units

- **Systems serving** multiple dwelling units must comply with Sections C403 and C404 and C408 (Commercial Buildings section) of ECC in lieu of Section R403.

R403.8
R408

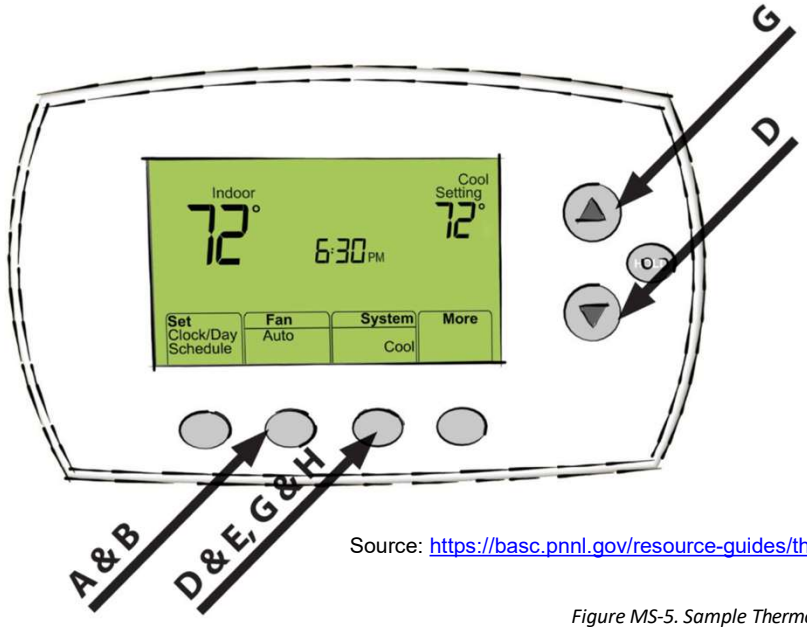
Controls

- **Programmable Thermostat:** At least one thermostat for each separate heating and cooling system must be provided with controls, setback capabilities and temperature set points prescribed by this section of the Code.

R403.1.1
R403.1.2
R403.2

- **Heat Pump Supplementary Heat:** Heat pumps having supplementary electric-resistance heat must have controls that limit supplemental heat operation to only certain scenarios.

- **Hot Water Boiler Temperature Reset:** Hot water boilers must automatically reset supply water temperature in response to load, using outdoor, indoor, or water temperature sensing.



Source: https://basc.pnnl.gov/resource-guides/thermostat-controls

Figure MS-5. Sample Thermostat

RESIDENTIAL - BUILDING-SPECIFIC REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Duct & Piping Insulation

R403.3.1
R403.3.2
R403.3.3
R403.3.4
R403.3.5
R403.4

- New ductwork shall not be located outside conditioned space.
- Existing and return ductwork located outside conditioned space in alterations must satisfy minimum R-values listed in R403.3.3 depending on the size and location of the ducts.
- For heating/cooling system pipes carrying fluids > 105°F, or < 60°F, drawings must specify the pipe insulation thickness in accordance with Table R403.4.1. The thickness and conductivity of the piping insulation must result in R-3 or greater.
- **For ducts to be considered in conditioned space:**
  - Ducts are considered in conditioned space only if fully within the building thermal envelope.
  - Ducts in attics must be buried in insulation and meet leakage limits.
  - Ducts in wall/floor assemblies may comply if separated from unconditioned space by a continuous air barrier and insulation (≥ R-10 or ≥ 50%).
  - For performance paths (R405/R406), ducts in assemblies are not considered fully inside conditioned space.
  - Ductwork buried within ceiling is not considered to be within conditioned space; however, it is allowed when it complies with section R403.3.5.

- *NOTE: Building framing cavities shall not be used as ductwork or plenums.*

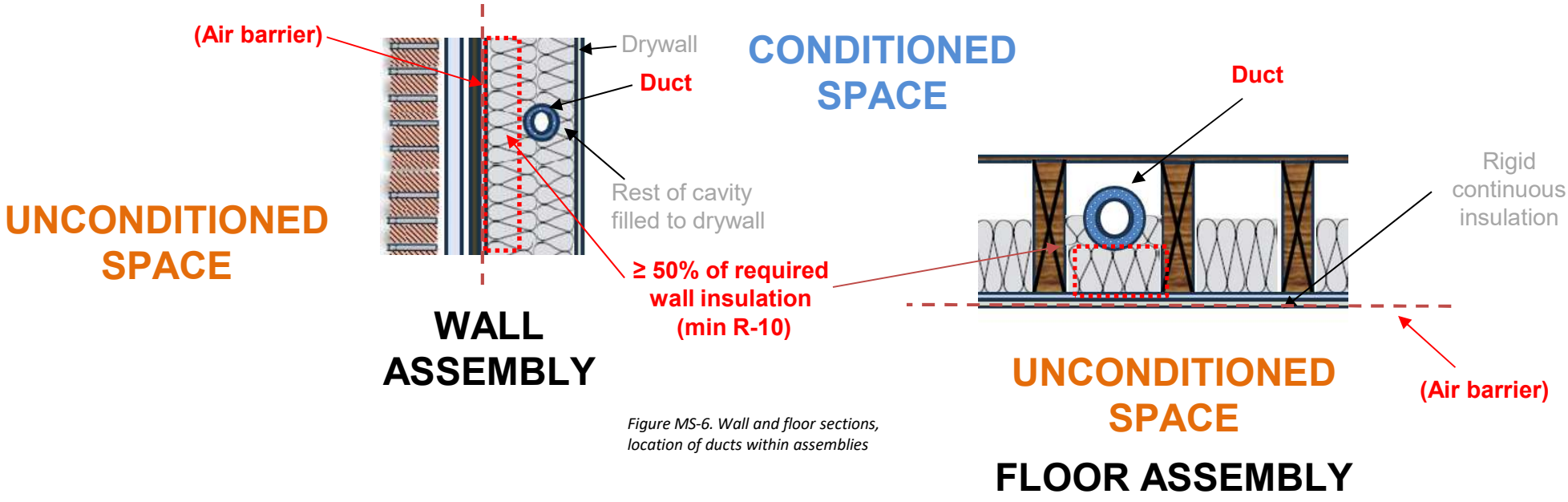


Figure MS-6. Wall and floor sections, location of ducts within assemblies

RESIDENTIAL - BUILDING-SPECIFIC REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Duct Leakage Testing

R403.3.7
R403.3.8
R403.3.9

- **Mandatory Duct Leakage Testing:** All duct systems must be tested (ANSI/RESNET/ICC 380 or ASTM E1554) at 0.1 in. w.g. (25 Pa), measuring total supply + return leakage and providing a signed report.
- **Limited Exceptions:** Testing not required for (1) standalone ventilation ducts, or (2) very short duct runs (≤ 10 ft) fully within conditioned space without cavity plenums.
- **Leakage Limits Supply**: Maximum allowable leakage is based on floor area, system configuration, and number of returns (see Table R403.3.8), with stricter limits when systems are fully installed and/or outside conditioned space.
- **Sampling & Enforcement:** In multifamily buildings, a sample of units must be tested; if failures occur, additional units are tested until compliance is achieved.

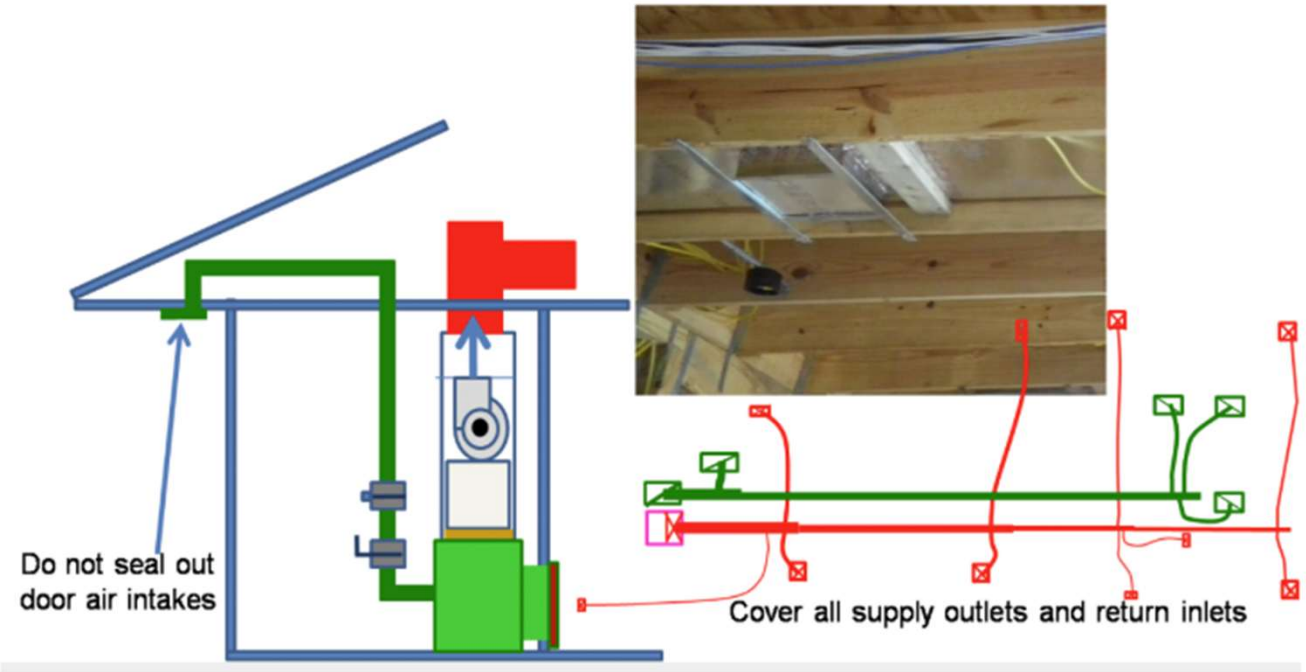


Figure MS-7. To prepare for a total duct test at rough-in, cover all of the supply outlets and return inlets.

Source: https://basc.pnnl.gov/resource-guides/total-duct-leakage-tests#edit-group-description

RESIDENTIAL - BUILDING-SPECIFIC REQUIREMENTS

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Service Water Heating

- **Heat Trace Temperature Control:** Any electric heat trace systems must be provided with controls that automatically adjust the energy input to the heat tracing to maintain the desired water temperature in response to the occupant's hot water use. *R403.5.1 R403.5.2 R403.5.3 R403.5.5*
- **Demand Recirculation Systems:** Any *circulation pump* must be equipped *with controls* that operate on demand, automatically starting with user/sensor input and shutting off once hot water delivery is achieved or after a limited run time.
- **Insulation:** Hot water pipes must be insulated in accordance with Table R403.5.2.
- **Demand Responsive Water Heating:** All electric storage water heaters with a rated water storage volume of 40 gallons (150L) to 120 gallons (450L) and a nameplate input rating equal to or less than 12kW shall be provided with demand responsive controls.
- **Supply of Heated Water:** Service hot water supply piping must be designed in accordance with one of the following:

  (a) Maximum allowable pipe length method
  (b) Maximum allowable pipe volume method
  (c) Drain water heat recovery units
  (d) Recirculation systems

Ventilation

R403.6

- **Dampers:** Outdoor air intakes and exhausts must have *automatic or gravity* dampers that close when the ventilation system is not operating.
- **Fan Efficacy:** Fans used to provide whole-house mechanical ventilation must meet or exceed the minimum system efficacies of Table R403.6.2.
- **Ventilation System Design:** Ventilation system of every dwelling unit must be designed with:

  (a) Supply and exhaust ventilation with heat recovery ventilator (**HRV**) or energy recovery ventilator (**ERV**), Or
  (b) Balanced ventilation system satisfying air flow rates of Table R403.6.2(1), and fan capacities adjusted per Table R403.6.2(2)
- **Testing:** Mechanical ventilation systems must be tested to verify required airflow and reported to the building official, with limited exceptions and unit sampling allowed in multifamily buildings.
- **Bathroom Exhaust Systems:** Bathroom exhaust systems operating intermittently must have automatic controls (e.g., timer, occupancy, humidity, or contaminant-based) with shutoff ≤ 30 minutes, unless part of a continuous ventilation system.

RESIDENTIAL - BUILDING-SPECIFIC REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

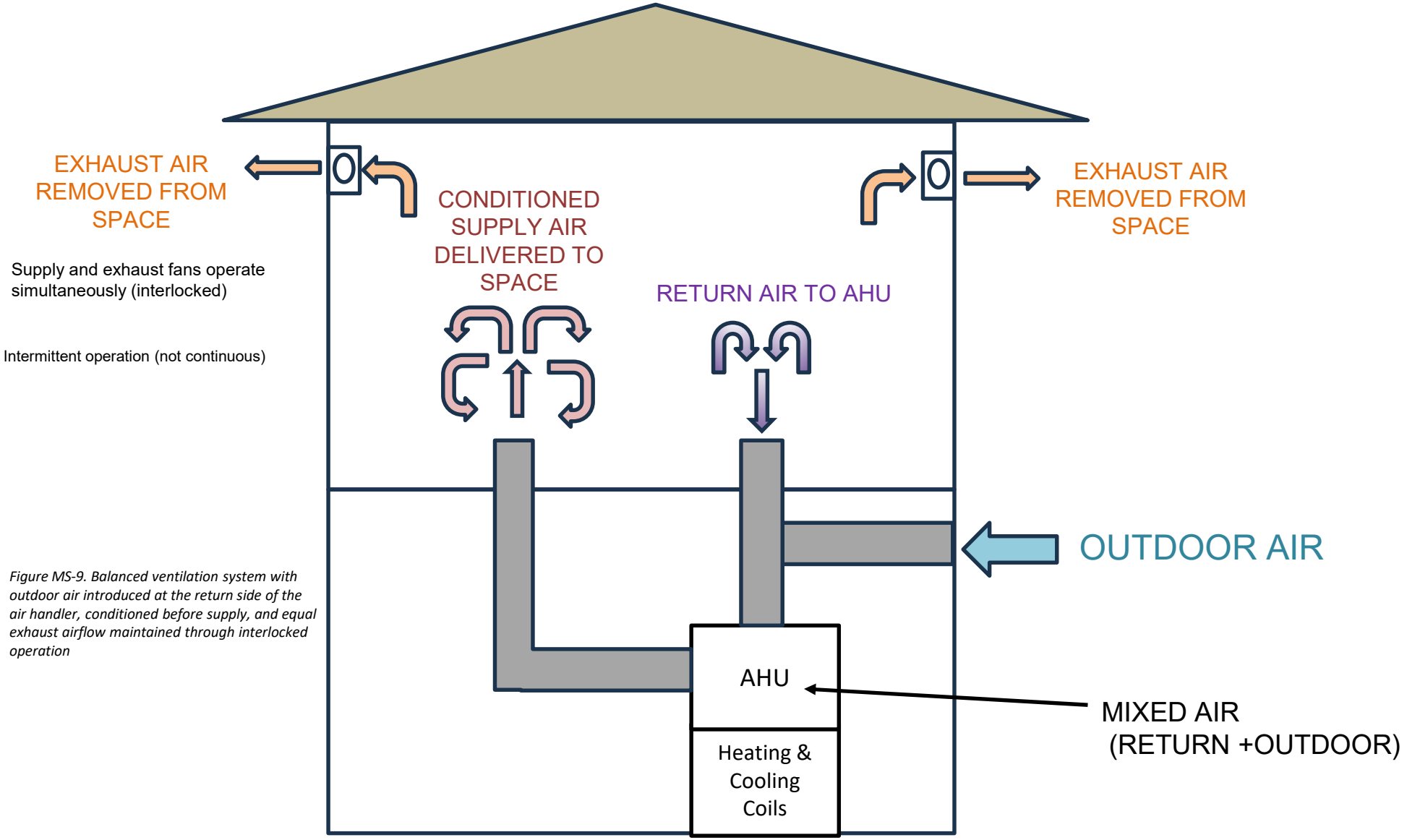


Figure MS-9. Balanced ventilation system with outdoor air introduced at the return side of the air handler, conditioned before supply, and equal exhaust airflow maintained through interlocked operation

COMMERCIAL - MECHANICAL SYSTEMS COMPLIANCE PATHWAYS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Compliance options (ECC)

C403.1
6.2.2

- **Fully Prescriptive:** C403.1.1 and Sections C403.2 through C403.17
  - Applies to most projects
  - Requires full compliance with all applicable prescriptive requirements (controls, economizers, piping, etc.)
- **HVAC Total System Performance Ratio (TSPR):** Section C409
  - A system-level performance tradeoff method (HVAC-only)
  - Allows flexibility by demonstrating improved system performance instead of meeting all prescriptive requirements
  - Only permitted for systems serving occupancies listed in Table C409.4
  - Systems must still comply with selected prescriptive requirements per C409.3, including:
    - Economizers
    - VAV requirements
    - Hydronic system controls
    - Multiple chiller/boiler plant requirements
    - Cooling tower turndown
    - Refrigeration requirements
    - Other key system controls

- *NOTE: Both codes treat data centers/computer rooms separately*
- ***Practical Guidance for Submissions:***
  - *Clearly identify the selected compliance path on drawings*
  - *Do not mix paths unless explicitly allowed*
  - *Verify system eligibility before selecting:*
    - *TSPR (ECC) → check Table C409.4 and exclusions*
    - *ASHRAE Performance → check Appendix L applicability*

Compliance options (ASHRAE)

- **Baseline Approach (similar to ECC prescriptive path)**
  - Applies to most projects
  - Requires compliance with all mandatory and prescriptive provisions
- **Simplified Approach (Section 6.3)**
  - Limited to: Buildings ≤ 2 stories < 25,000 ft²
  - Applies only to simple HVAC systems meeting strict criteria
- **Mechanical System Performance Path (ASHRAE TSPR): Section 6.6.2 + Normative Appendix L**
  - Comparable to ECC's TSPR path, uses the same software
  - Demonstrates compliance by comparing Proposed system performance vs. reference system
  - Adjusted by Mechanical Performance Factors (MPF)

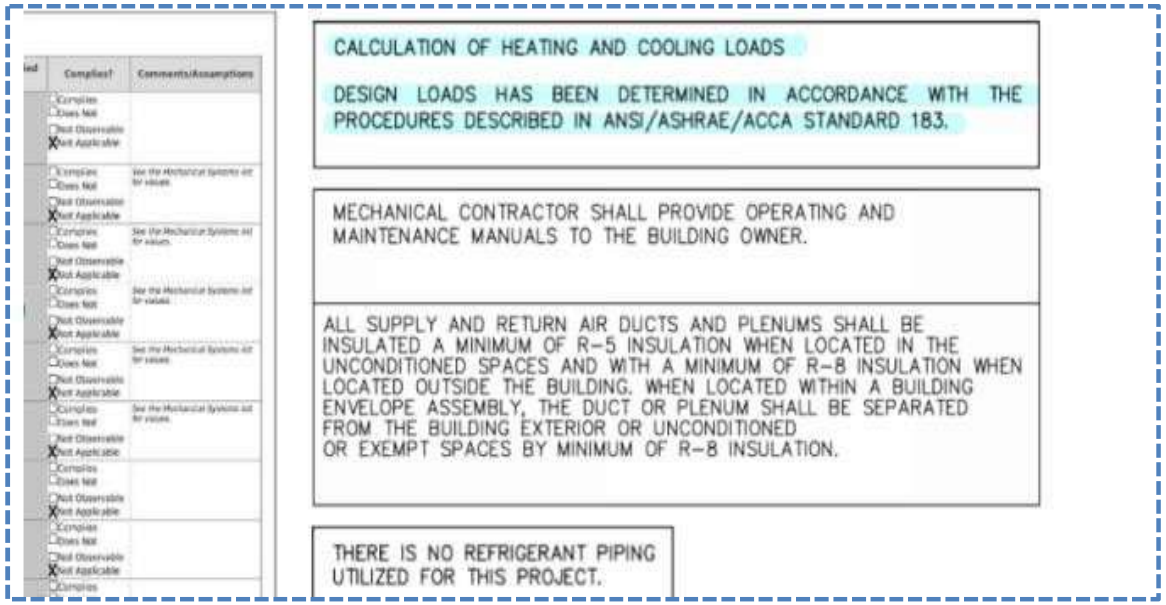
COMMERCIAL - BUILDING-SPECIFIC REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Optimal Equipment Size

C403.1.1
C403.3.1
C403.1.3
6.4.2.1
6.10

- **ANSI/ASHRAE/ACCA Standard 183:** Design loads associated with Heating, Ventilating and Air Conditioning (HVAC) of a Commercial job application must be determined in accordance with ANSI/ASHRAE/ACCA Standard 183, or by an approved equivalent computational method.
- **Equipment Sizing:** Heating and cooling equipment must be sized as close as possible to the calculated load (not oversized) and meet minimum efficiency requirements, with limited exceptions for standby systems and properly controlled multiple-unit systems.
- **Sizing Statement:** The drawings, preferably in an EN- labeled sheet, must include a statement indicating the total HVAC design loads have been determined as such.
- **Design Loads and System Commissioning:** Total HVAC design loads combined with Service Water Heating loads of a job application largely dictate whether System Commissioning (per Section C408 and Sections 4.2.5 and 6.7.3.3) on the job is required or not. Refer to [OR-7] for the detailed requirements for System Commissioning.
- **Electric Resistance Space Heating:** Electric-resistance heating is limited to ≤ 2.0 kW per dwelling unit and, for other spaces, to ≤ 2.5 W/ft² or ≤ 5% of building heating capacity/area (whichever is less), with specific exceptions.



NOTE: Nonstandard chiller ratings (ECC & ASHRAE)

- *Same adjustment method ($K_{adj} = A \times B$) for FL & IPLV/NPLV*
- *Minor differences: ECC tighter ranges; ASHRAE broader applicability*

Figure MS-11. Sample Sizing Statement

COMMERCIAL - BUILDING-SPECIFIC REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Zone Isolation

C403.2
6.4.3.3.4
6.5.3.8

- Large HVAC zones (> 25,000 ft² or multi-floor, non-simultaneous use) must be divided into isolation areas.
- Each area requires automatic shutoff controls for supply, outdoor air, and exhaust.
- Systems must be able to operate while serving only the smallest isolation area.
- Exceptions: small fans (< 5,000 cfm), minor exhaust (< 10%), or continuously operating zones

Ventilation

- Ventilation must comply with NYC Mechanical Code (Chapter 4).
- Systems must be capable of reducing outdoor air to minimum required levels.

Fault Detection & Diagnostics (ECC only)

- Required for buildings ≥ 100,000 ft² (except for R-1 and R-2) with DDC systems, must include:
  - Continuous monitoring via sensors
  - Sampling at least every 15 minutes
  - Automatic fault detection, reporting, and alerts
  - Prioritized repair recommendations (including remote access)

NOTES:

- *When a ventilation system is not required or not voluntarily provided. Commercial buildings are not required to provided ERVs*
- *ASHRAE does not require fault detection and diagnostics, but it is offered as an additional efficiency credit option*

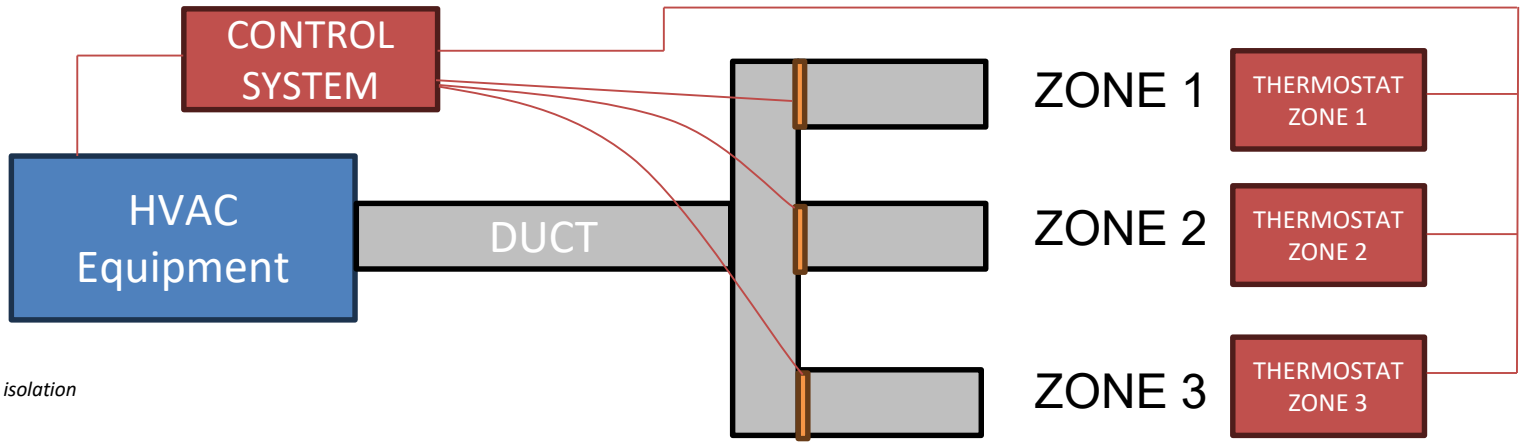


Figure MS-12. Zone isolation

COMMERCIAL - HVAC SYSTEM CONTROLS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Thermostatic Controls

- All mandatory thermostatic controls applicable to the proposed system must be specified on drawings. *C403.4 6.4.3 6.3.2 6.10*
- The required controls include:

1) Heat pump supplementary heat controls

- Supplemental heat must be limited to necessary operation (e.g., low outdoor temps, defrost, or system issues)
- Supplemental heat ≤ 25% of total design load

2) Deadband

- Minimum 5°F deadband required; controls must maintain at least 1°F deadband after user adjustments
- Within the deadband, heating/cooling must be shut off or reduced to minimum

3) Setpoint controls

- Separate heating and cooling setpoints required
- Occupant adjustments must maintain minimum deadband
- Heating and cooling setpoints must be displayed or accessible

4) Setpoint overlap restriction

- Controls must prevent simultaneous heating and cooling

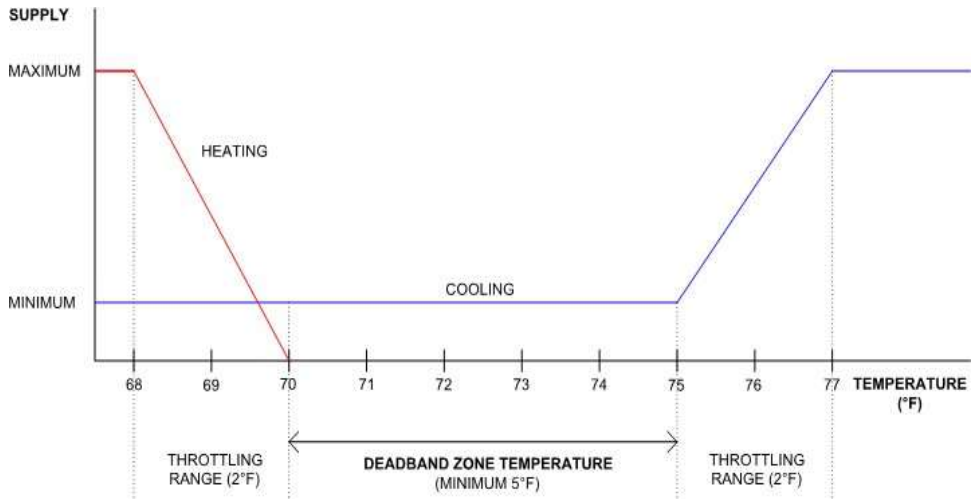


Figure MS-13.
Sample Deadband Control Setup

COMMERCIAL - HVAC SYSTEM CONTROLS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Off-Hour Controls

- HVAC systems must provide automatic shutdown or setback during unoccupied periods using time-based or programmable controls. *C403.4.2 6.4.3.3*
- Controls must support scheduling, power-loss retention, and temporary manual override (≈2 hours).
- Systems must include temperature setback/setup and optimum start controls to maintain comfort while minimizing energy use.
- ASHRAE allows alternatives such as occupancy sensors or system interlocks; exceptions apply for continuous or small systems.

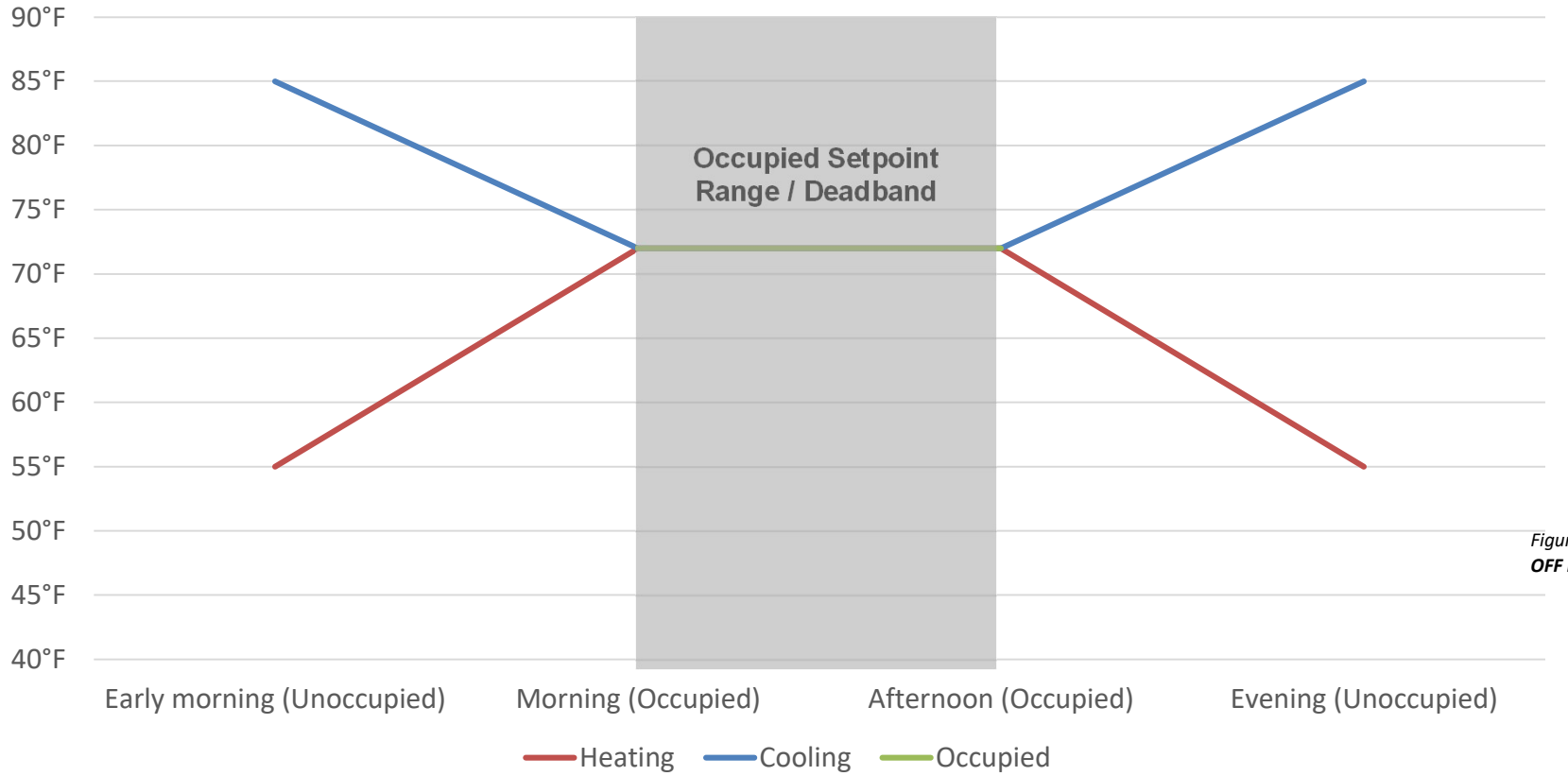


Figure MS-14.
OFF HOUR Control Setup

COMMERCIAL - HVAC SYSTEM CONTROLS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Heating & Cooling Controls – Operable Openings/Door Switches

C403.4.7
6.5.10

- Doors and operable openings > 40 ft² must be interlocked with HVAC systems.
- Within 5 minutes of opening, systems must:
  - Disable heating or reset heating setpoint to ≤ 55°F.
  - Disable cooling or reset cooling setpoint to ≥ 90°F: Cooling may remain if outdoor air is cooler than space.
- Applies to prevent energy waste from open doors/windows in conditioned spaces

Humidification & Dehumidification Controls

C403.4.8
6.4.3.6

- Dehumidification: Systems must not use mechanical cooling to reduce humidity below:
  - 55°F dew point or 60% RH (with limited exceptions)
  - Humidification: Systems must not use fossil fuels or electric resistance to raise humidity above 30% RH
- Control interlock: Systems must prevent simultaneous humidification and dehumidification.

Narratives on Operations and Controls

1 RCNY §5000-01 (g)(2)

A narrative must be provided for each mandatory control system describing its function and operation and specifying proper setpoints of equipment and controls.

COMMERCIAL - ECONOMIZERS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Requirement for Each Cooling System

C403.5
6.5.1

- Most commercial buildings have spaces that need cooling all year long. If it is colder outside than inside, economizers provide "free cooling" by bringing in the outdoor air to cool the space in lieu of activating mechanical cooling equipment.

- Air or water economizer must be provided on individual fan-cooling units

≥ 270 kBtu/h for Group R occupancies, and
≥ 54 kBtu/h for all other occupancies

- For **ECC-following jobs**:
  - Even if each fan cooling unit serving **Group R** occupancies is < 270 kBtu/h, the total supply capacity of all fan cooling units not provided with economizers must be ≤ 20 % of the total supply capacity, or **1,500 kBtu/h**, whichever is greater.
  - Even if each fan cooling unit serving **all other** occupancies is < 54 kBtu/h, the total supply capacity of all fan cooling units not provided with economizers must be ≤ 20 % of the total supply capacity, or **300 kBtu/h**, whichever is greater.

  NOTE: For split systems or VRF systems, the indoor cooling unit capacity must be used to calculate the total supply capacity.

High-Efficiency Exemption

Table C403.5(2)
Table 6.5.1-2

- **ECC**-following jobs: Individual cooling systems with minimum **20%** efficiency improvement (IPLV or EER) are exempt from providing economizers.

- **ASHRAE**-following jobs: Individual cooling systems with minimum **42%** efficiency improvement (IPLV, IEER, SEER, or alternatively EER) are exempt from providing economizers.

Cooling Stage Requirements

C403.5.1

Cooling systems with economizers are required to have two-, three- or four-stage cooling, depending on the size of the cooling system. The economizers are required to provide partial cooling even if the outdoor air is not cool enough to satisfy the entire cooling load.

High-Limit Shutoff

C403.5.3.3
6.5.1.1.3

Economizers in lieu of mechanical cooling can save energy significantly when the outdoor air is cool and has low humidity. The Code sets the temperature and enthalpy limits when economizers are to shut off; these high-limit shutoffs must be noted in the construction documents.

Economizer Fault Detection and Diagnostics (FDD)

C403.5.5
6.4.3.12

Systems equipped with an economizer must include a *fault detection and diagnostics* (FDD) system equipped with specific sensors that detect and reports faults.

COMMERCIAL - VENTILATION

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Demand Controlled Ventilation (DCV)

- **For ECC:** Spaces with ventilation provided by single-zone systems where an air-side economizer is provided and for spaces larger than 500 sf and with an average occupant load of at least 15 people/1,000 sf of floor area, *demand control ventilation* (DCV) must be specified. For the average occupant load, Table 403.3 of NYC Mechanical Code must be referenced. See Figure below for example. *C403.7.1 6.4.3.8*

- **For ASHRAE:** DCV is required for high-occupancy spaces above Table 6.4.3.8 thresholds, based on occupant outdoor airflow. It applies to systems with economizers, modulating outdoor air, or > 3,000 cfm outdoor air, with exceptions for certain systems and occupancies.

TABLE 403.3.1.1
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT²[a]	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE R_a CFM/FT²[a]	EXHAUST AIRFLOW RATE CFM/FT²[a]
Correctional facilities				
Booking/waiting	50	7.5	0.06	—
Cells				
without plumbing fixtures	25	5	0.12	—
with plumbing fixtures[g]	25	5	0.12	1.0
Day room	30	5	0.06	—
Correctional facilities				
Dining halls				
(see food and beverage service)	—	—	—	—
Guard stations	15	5	0.06	—
Dry cleaners, laundries				
Coin-operated dry cleaner	20	15	—	—
Coin-operated laundries	20	7.5	0.06	—
Commercial dry cleaner[i]	30	30	—	—
Commercial laundry	10	25	—	—
Storage, pick up	30	7.5	0.12	—

Figure MS-17.
Excerpt from Table 403.3.1.1 of 2022 NYC Mechanical Code Chapter 4

COMMERCIAL - VENTILATION

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Energy Recovery Ventilation Systems (ERV)

C403.7.4
6.5.6.1

- ERVs are required where supply airflow and % outdoor air exceed code thresholds as shown under tables C403.7.4.2(1), C403.7.4.2(2), 6.5.6.1.2-1 and Table 6.5.6.1.2-2 based on system operating hours (< or ≥ 8,000 hrs/yr). **All Nontransient** dwelling units shall be provided with outdoor air energy recovery ventilation systems.

- Performance requirements vary by space type:
  - **Nontransient dwelling units**: ≥ 50% enthalpy recovery (cooling) and ~≥ 60% (heating), or equivalent sensible recovery
  - **All other spaces**:
    - ≥ 50% energy recovery (enthalpy or sensible, depending on system)
    - ERVs must include controls or bypass to allow economizer operation
    - ERVs are required where ≥ 75% of exhaust airflow (within ~30 ft) can be recovered

Occupied-Standby Controls

C403.7.8
6.5.3.9

- Required for select space types to reduce conditioning and ventilation during partial occupancy

- Systems must, within ~5 minutes:
  - Reset heating/cooling setpoints (± 1°F)
  - Shut off airflow when within the deadband

- **Ventilation:**
  - ECC: requires outdoor air reset to zero for standby zones
  - ASHRAE: allows ventilation reduction to zero where permitted by Standard 62.1

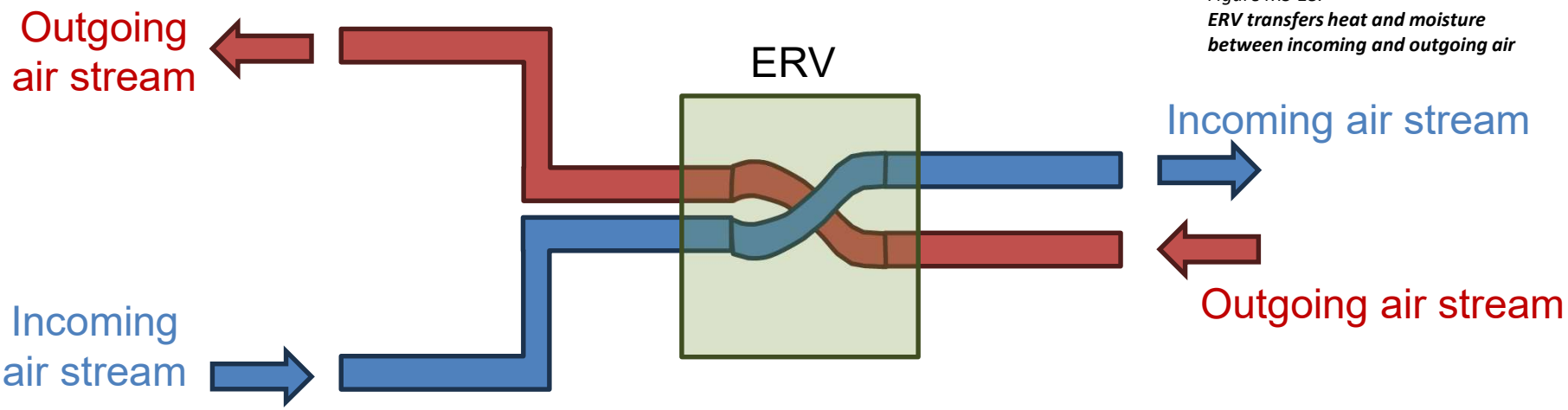


Figure MS-18.
ERV transfers heat and moisture between incoming and outgoing air

COMMERCIAL - FAN EFFICIENCY & CONTROLS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

VAV System Controls for Multiple Zones

Supply air systems serving multiple zones must be *variable air volume* (VAV) systems that, during periods of occupancy, are capable of being controlled to reduce primary air supply before reheating, re-cooling or mixing.

C403.6
6.5.3.3

Fan Airflow Control

- Direct expansion (DX) cooling systems ≥ 65 kBtu/h must have a minimum of two stages of fan speed control. For example, variable speed drive (VSD) or variable frequency drive (VFD) must be specified in the equipment schedule for these systems.

C403.8.6
6.5.3.2.1

- Chilled-water and evaporative cooling systems with fan motor power ≥ 1/4 hp must also have a minimum of two stages of fan speed control.

- **Intermittent bathroom exhaust (ECC):** Intermittent bathroom exhaust must include manual-on and automatic shutoff controls (timer, sensor, or humidity/contaminant). Fans must shut off within ~30 minutes and cannot use an "off" setting to meet control requirements.

Fan Motor Power Limitation

- Drawings must indicate (ideally in the Fan Schedule) that each individual fan system power in the HVAC system does not exceed the allowable fan system *motor nameplate horsepower* (Option 1), *or* fan system *brake horsepower* (Option 2).

C403.8.1
C403.8.2
C403.8.3
6.5.3.1.1
6.5.3.1.2
6.5.3.1.3

- The fan brake horsepower for each fan listed on the schedule must be ≤ the first available motor size greater than the hp value calculated per Section C403.8.2.

COMMERCIAL - FAN EFFICIENCY & CONTROLS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Fan Efficiency

C403.8.3
6.5.3.1.3

- Fans and fan arrays must be designed to have a *fan energy index* (FEI) ≥ 1 at design point of operation.
- Fans and fans arrays used for VAVs must have a *fan energy index* (FEI) ≥ 0.95 at design point of operation.
- FEI as determined in accordance with AMCA 208 by an approved independent testing laboratory and labeled by the manufacturer.
- FEI for fan arrays must calculated in accordance with AMCA 208 Annex C.

Low-capacity Ventilation/Low Power Fans

C403.8.5
6.5.3.7

Low-capacity ventilation fans (< 1/12 hp) must meet minimum efficiency requirements based on tested and rated airflow, with limited exceptions for certain equipment and intermittent-use fans.

Large Diameter Ceiling Fans

C403.9
Table 6.8.1-21

- Must be tested and labeled per AMCA 230 and comply with minimum efficiency requirements.
- Fans must meet CFEI ≥ 1.0 at full speed and ≥ 1.31 at ~40% speed.
- Efficiency is based on the Ceiling Fan Energy Index (CFEI), comparing actual fan power to a reference fan.

COMMERCIAL - BOILER CONTROLS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Combustion Air Controls (ECC only)

- Boilers ≥ 2,500,000 Btu/h must include combustion air positive shutoff — *C403.3.4*
- Applies where boilers operate with nonpositive vent static pressure or are connected to common vents

Fan Motor Controls

Boilers with combustion air fan motors ≥ 10 hp must include: — *C403.3.4*

- Variable speed control, OR
- Modulating airflow controls down to ≤ 50% of design air volume
- **ASHRAE:** Requires variable speed/part-load fan control, but not specific to combustion air systems

Boiler Oxygen Concentration Controls (ECC only)

Boilers ≥ 5,000,000 Btu/h must use oxygen-based combustion controls to limit flue gas oxygen and optimize combustion efficiency (no linkage/jackshaft controls allowed) — *C403.3.4.1*

Outdoor Temperature Setback Control

For one- or two-pipe systems, drawings must specify setback controls that automatically lower the boiler water temperature based on the outdoor air temperature. — *C403.4.1.6 6.5.4.4*

NOTE:

- *In NYC, new buildings generally cannot install combustion-based heating systems due to electrification laws (e.g., Local Law 154)*
- *However, these provisions remain relevant for:*
  - *Equipment replacement in existing buildings*
  - *Projects where combustion systems are still permitted*

Source: https://www.energy.gov/sites/prod/files/2014/11/f19/ba_case_study_boiler_control_multifamily.pdf

Figure MS-21
Three boilers with updated boiler controls that achieved between 10 and 34% energy savings

COMMERCIAL - BOILER CONTROLS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Hot-Water Temperature Reset Controls

Hot water systems with design output capacity ≥ 300 kBtu/h must be provided with automatic controls to reset supply water temperatures by representative building loads or outdoor air temperature.

C403.4.4
6.5.4.4

Modulating Burner

Hot water systems of a single boiler with input design capacity > 500 kBtu/h must be equipped with either a multi-staged or *modulating burner*.

C403.4.3

Boiler Turndown

C403.3.4.2
6.5.4.1

- A single boiler or boiler systems ≥ 1,000 kBtu/h must have a turndown ratio of 3 to 1, 4 to 1, or 5 to 1, as defined by the Code.
- The turndown ratio may be met by a single boiler, modulating boilers or a combination of the two.

Condensing Boilers

For space heating gas-fired condensing boilers with rated thermal efficiency (E_t) of ≥ 90%, the distribution system must be designed so that the hot water return temperature (entering water temperature) is ≤ 120°F, when the boiler is firing.

C403.3.5
6.4.1.6

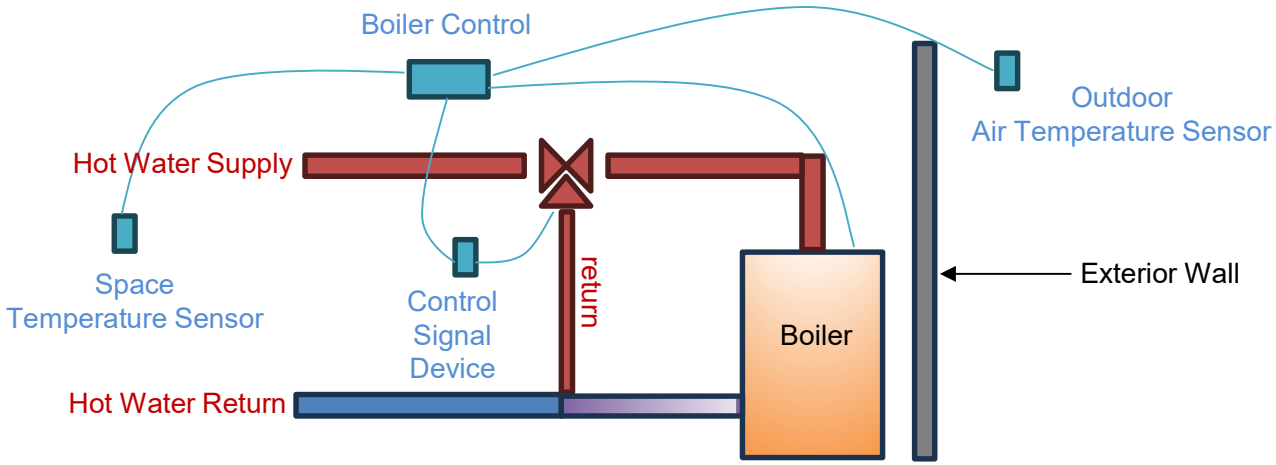


Figure MS-22-a
Boiler control system

Figure MS-22-b
Boiler control

Source: https://basc.pnnl.gov/

COMMERCIAL - HEAT REJECTION CONTROLS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Heat Rejection Fan Power

Heat rejection fans with motors ≥ 7.5 hp must be equipped with controls to reduce the fan power to operate the fan at two-thirds of full speed or less.

C403.11.1
6.5.5.2

Multiple-Cell Cooling Towers

Heat rejection systems with multiple cells and equipped with VFD (variable frequency drive) controls must be operated in sequence as described in Section C403.11.2.

C403.11.2
6.5.5.2.2

Cooling Tower Flow Turndown

Heat rejection systems operating with water-cooled chillers and configured with VFD condenser water pumps must be designed so that all open-circuit cooling tower cells are capable of running in parallel with sequencing as provided by the Code.

C403.11.4
6.5.5.4

Heat Recovery for Space Conditioning in Healthcare Facilities

- Heat recovery is required in certain healthcare facilities where simultaneous heating and cooling occurs, and system capacity exceeds defined thresholds.

C403.11.6

- Systems must use heat recovery chillers sized to recover a portion of cooling load, with exceptions where reheat is largely met by renewable or site-recovered energy.

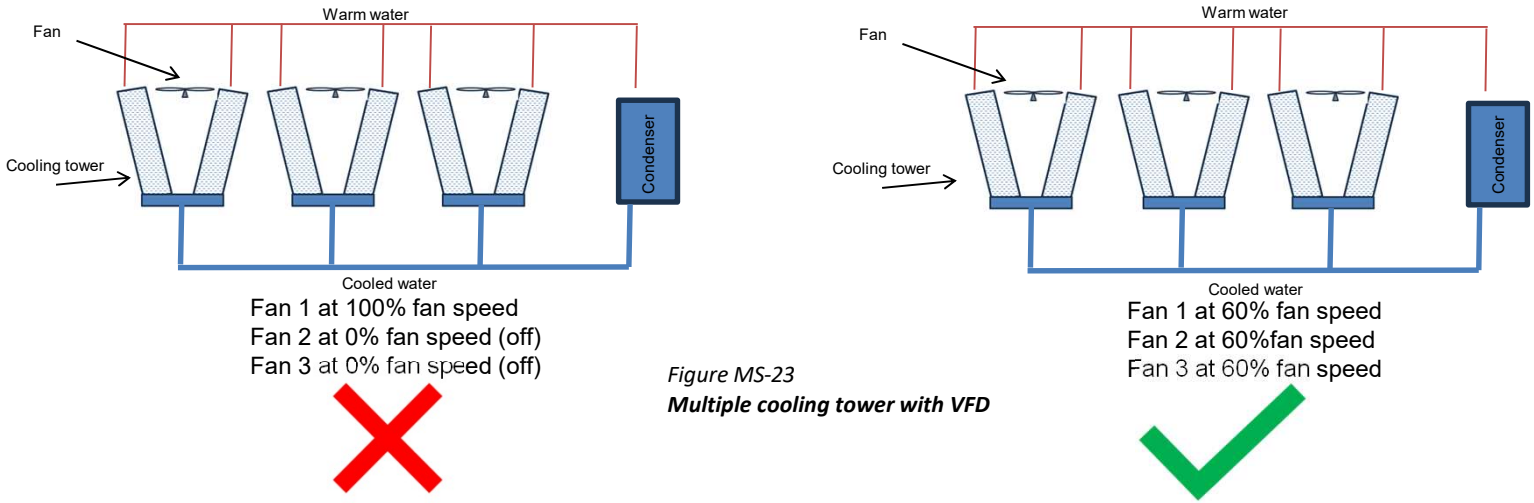


Figure MS-23
Multiple cooling tower with VFD

COMMERCIAL - Chiller Controls

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Chilled-Water Temperature Reset Controls

Chilled water systems with a design output capacity ≥ 300 kBtu/h must be provided with automatic controls to reset supply water temperatures by representative building loads or outdoor air temperature.

C403.4.4
6.5.4.4

Supply Temperature Reset and Deadband

Hydronic systems of heating fluids that have been previously mechanically cooled, and hydronic systems of cooling fluids that have been previously mechanically heated, must be provided with supply temperature reset controls and/or a supply temperature deadband between changeovers based on the system type.

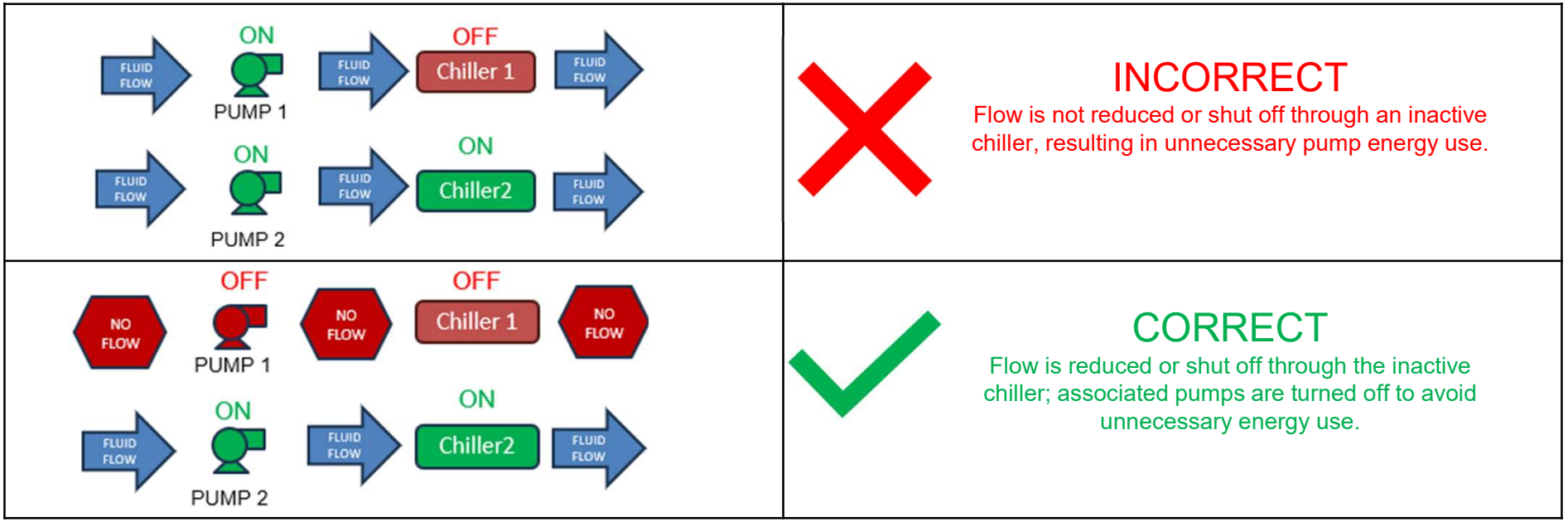
C403.4.3.3.1
6.5.2.2

Chiller Isolation

- A chilled-water plant including more than one chiller must be configured so that all fluid flow through the chiller is automatically reduced or shut off when the chiller is shut down.

C403.4.5
6.5.4.3

- A boiler plant including more than one boiler must be configured so that the flow through the boiler is automatically reduced or shut off when the boiler is shut down.



COMMERCIAL - ADDITIONAL HVAC CONTROLS & REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Shutoff Dampers

- Class-I *motorized* shutoff dampers with a maximum air leakage rate of 4 cfm/ft^2 at 1.0-inch water gauge must be provided in outdoor air intakes, exhaust openings, and stairway/shaft vents. Alternatively, where permitted by the Code, *gravity* (non-motorized) dampers may be provided in lieu of motorized dampers. *C403.7.7 6.4.3.4.2*
- Alternatively, *gravity* (non-motorized) dampers may be provided in lieu of motorized dampers in buildings less than 3-stories above grade plane, or where the design exhaust capacity is ≤ 300 cfm. – *Only* when following NYCECC.
- See Section 6.4.3.4.2 for exceptions where non-motorized dampers are permitted when following ASHRAE.

Enclosed Parking Garage Ventilation

C403.7.2 6.4.3.4.5

- System configuration:
  - Separate ventilation and control systems required for each garage section
- Airflow control:
  - ECC: Reduce airflow to 0.05 cfm/ft² and ≤ 20% of design capacity
  - ASHRAE: Reduce airflow to ≤ 20% of design capacity with contaminant-based controls
- Fan energy control:
  - Controls must limit fan power to ≤ 30% of design wattage at 50% airflow

Figure MS-24
Mechanical Damper

Source: EPA

COMMERCIAL - ADDITIONAL HVAC CONTROLS & REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

HVAC Systems Serving Guestrooms

- Hotels/motels > 50 guestrooms — *C403.7.6 6.4.3.3.5*
- Setpoint control (3 modes):
  - Rented & unoccupied: ± 4°F setback/setup (ECC: 30 min | ASHRAE: 20 min)
  - Unrented & unoccupied: reset to ≥ 80°F cooling / ≤ 60°F heating
  - Occupied: return to setpoints upon occupancy
- Ventilation control:
  - Shut off ventilation/exhaust within ~20 minutes of vacancy
  - Allow pre-occupancy purge cycle (~1 hour or equivalent air change)

Dwelling Unit Ventilation System

Fans serving heating or cooling systems in dwelling units cannot be used for outdoor air ventilation, unless they meet minimum efficiency (≥ 1.2 cfm/W) and operate only when there is no heating or cooling demand. — *C403.7.9 6.5.3.7*

Kitchen Exhaust Systems

- Direct replacement air into hood limited to ≤ 10% of exhaust airflow — *C403.7.5 6.5.7.2*
  - ECC: Limits total supply air based on load and available transfer air
- High-capacity systems (> 5,000 cfm):
  - ECC: Requires demand control kitchen ventilation (DCKV) with ≥ 50% airflow reduction
  - ASHRAE: Allows compliance via transfer air (≥ 50–75%), DCKV, or energy recovery (≥ 40%)
- System performance & design:
  - ECC: Requires listed hoods and max exhaust rates by hood type
  - ASHRAE: Emphasizes performance testing and capture/containment verification

COMMERCIAL - ADDITIONAL HVAC CONTROLS & REQUIREMENTS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Hydronic Systems

- **Pump Controls: Hydronic Variable Flow Systems (ASHRAE):** *6.5.4.2*
  - Systems with ≥ 3 modulating valves must be designed for variable flow and capable of reducing flow to ≤ 25% of design (or minimum required by equipment).
  - Pumps ≥ 5 hp must include variable speed controls to limit pump power to ≤ 30% of design wattage at 50% flow.
  - Systems must include differential pressure control and reset based on valve position to minimize pumping energy.
- **Hydronic Systems Controls (ECC):**
  - Hydronic systems must be designed to avoid inefficient configurations, including prohibition of 3-pipe systems. *C403.4.3*
  - Systems must include controls for mode changeover, temperature deadband, and loop operation (e.g., ≥ 20°F deadband for water loop heat pumps.
  - Heat pump loop systems must include controls for heat rejection, flow isolation, and pump/valve operation to limit unnecessary energy use.

Hot Gas Bypass Limitation

- Cooling systems must not use hot gas bypass or other evaporator pressure control systems unless the system is designed with multiple steps of unloading or continuous capacity modulation. *C403.3.3* *6.5.9*
- The capacity of the hot gas bypass, when permitted by Code, must be limited to:
  - For ECC-followings jobs, maximum 50% of the total capacity for the rated capacity ≤ 240 kBtu/h; and maximum 25% for the rated capacity > 240 kBtu/h.
  - For ASHRAE-following jobs, maximum 15% of the total capacity for the rated capacity ≤ 240 kBtu/h; and maximum 10% for the rated capacity > 240 kBtu/h.

Vestibule Heating/ Cooling

C403.4.1.5 *6.4.3.9*

- The heating system must be provided with controls to shut off the source when the outdoor temperature is > 45°F.
- The heating and cooling systems must have a thermostat in the vestibule to limit heating to ≤ 60°F and cooling to ≥ 85°F.

COMMERCIAL - DUCTS AND PIPING

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Duct and Plenum Insulation

Supply and return air ducts and plenums must be designed as follows:

C403.13.1
6.4.4.1.2

Location	Requirement
In Unconditioned space	Insulated with min. R-6 insulation
Outside the building	Insulated with min. R-8 insulation
Within a building envelope assembly	Separated from the building exterior or unconditioned space by min. R-8 insulation

- Ducts located underground beneath buildings shall be insulated or have an equivalent thermal distribution efficiency.

Duct System Sealing

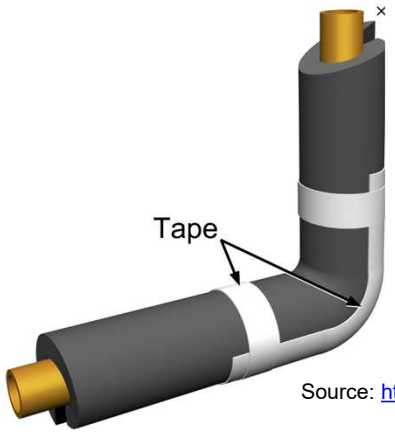
C403.13.2
6.4.4.2.1

- Joints, seams and connections of ducts, air handlers, and filter boxes must be sealed.
- Drawings must clearly indicate pressure classifications of the proposed duct systems in accordance with NYC Mechanical Code.
- For high-pressure duct systems that operate at a *static pressure > 3 inches water gauge*, drawings must specify the *duct leakage test* requirements in accordance with the SMACNA HVAC Air Duct Leakage Test Manual.

Piping Insulation

C403.13.3
C404.4
6.4.4.1.3

- Piping to service heating, cooling systems must be thermally insulated.
- Minimum pipe insulation thicknesses depending on the fluid temperature range must be specified on drawings.



Source: https://www.pnnl.gov/

Figure MS-28-a
Tubular pipe insulation sleeves

Figure MS-28-b
Finished raised ceiling duct chase

Source: basc.pnnl.gov

COMMERCIAL - REQUIREMENTS FOR SPECIFIC USE AND FUNCTION

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Radiant Heating for Outside

C403.14.1
6.5.8.1

- Systems to provide heat outside the building thermal envelope must be radiant systems, e.g., electrical unit heaters in parking garage.

- The heating systems must be controlled by an occupancy sensing device or timer switch.

Roof and Gutter Deicing Controls

C403.14.3
6.4.3.7

Roof and gutter deicing systems must include automatic controls to shut off when outdoor temperatures exceed 40°F. Systems must also shut off when no moisture is present or during daylight hours (e.g., via moisture or daylight sensors).

Pools and Spas

7.4.5

Energy use of pools and permanent spas must be controlled by 1) Heaters with readily accessible on-off switch and centrally set thermostat, 2) Time switches that automatically turn on and off heaters and pump motors, and 3) Vapor-retardant cover for outdoor heated pools.

Snow- and Ice-Melt System Controls

C403.14.2
6.4.3.7

Snow- and ice-melting systems must be provided with automatic and/or manual controls capable of shutting off the system in response to the pavement temperature and outdoor weather conditions.

Freeze Protection System Controls

C403.14.4
6.4.3.7

Freeze protection systems, such as heat tracing of outdoor piping and heat exchangers, including self-regulating heat tracing, must have controls to automatically shut off the system in response to the outdoor temperature (> 40°F) and the protected fluid conditions.

COMMERCIAL - REQUIREMENTS FOR SPECIFIC USE AND FUNCTION

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Dehumidification in Spaces for Plant Growth and Maintenance

C403.15
6.5.2.3

- Dehumidification systems for indoor grow/greenhouse spaces must meet efficiency requirements through tested equipment, heat recovery (≥ 75%), or desiccant systems.
- Systems must be designed to minimize energy use, particularly for reheat during dehumidification.

Service Water Pressure-booster Systems

C403.16
10.4.2

- Service water booster systems must use pressure sensors and variable controls to modulate pump operation based on demand and maintain required pressure.
- Systems must avoid unnecessary pressure reduction and ensure pumps do not operate when there is no water flow.

Clean Water Pumps

C403.17
10.4.8

- Clean water pumps must meet minimum efficiency requirements (PEI ≤ 1.0 in ECC) and comply with defined performance criteria at the best efficiency point (BEP).
- ASHRAE defines applicability based on flow, head, temperature range, motor type, and pump configuration, with similar exemptions for specialized pumps (e.g., fire, self-priming, and industrial applications).

Refrigeration & Commercial Kitchen Equipment and System

C403.12
C405.12
6.4.1.1
6.4.5
6.4.6
6.5.11
10.4.9

- Refrigeration equipment and systems must be installed and provided in accordance with applicable Code provisions:
- Maximum allowable daily energy use in kWh per equipment type – Section C403.12
- Design of factory-built walk-in coolers/freezers and refrigerated warehouse coolers/freezers – Section C403.12.1 or Section 6.4.1.1
- Design of site-built walk-in coolers/freezers – Section C403.12.2 or Section 6.4.5
- Design of site-built refrigerated display cases – Section C403.12.3 or Section 6.4.6
- Design of refrigeration systems with remote compressors/condensers not located in a condensing unit – Section C403.12.3 or Section 6.5.11
- Commercial kitchen equipment – Section C405.12 or Section 10.4.9

ASHRAE-Specific Requirements

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Direct Digital Control (DDC)

DDC controls and display are required for new buildings with chilled-water and hot-water plants ≥ 300 kBtu/h, or fan systems ≥ 10 hp. See Table 6.4.3.10.1 for extensive DDC requirements applicable per building types and system types. *6.4.3.10*

Chilled-Water Plant Monitoring

- For electric-motor-driven chilled-water plants in new buildings, or for new plants in existing buildings, devices to measure and monitor the electric energy use and efficiency (in kW/ton) of the chilled-water plant must be installed for: *6.4.3.11*

  a) water-cooled chilled-water plants of > 1,000 tons peak cooling capacity
  b) air-cooled chilled-water plants of > 570 tons peak cooling capacity

- The chiller plant electrical energy use efficiency must be graphically displayed with data trending every 15 minutes.

Key Differences from ECC

- ASHRAE emphasizes system-level integration and monitoring
- ECC focuses on prescriptive control requirements

POST-INSTALLATION DOCUMENTATION

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Operating and Maintenance Manual

- Drawings must specify that an *operating and maintenance manual* is to be provided to the building owner within 90 days of the issuance of the certificate of occupancy (C/O) or letter of completion.

  R303.3
  C408.1.1
  C408.2.5.2
  4.2.2.3

- The *operating and maintenance manual* must document all HVAC/Service Water Heating equipment and controls and also Lighting equipment and controls.

System Balancing Report

- Drawings must specify that HVAC/SWH systems are required to be tested, adjusted and balanced in accordance with ASHRAE 111 or other approved standards.

  C408.2.2
  C408.2.5.3
  6.7.3.5.5.3
  6.7.3.4

- Subsequently, within 90 days of the issuance of the certificate of occupancy or letter of completion, the System Balancing Report describing the completed activities and measurements must be provided to the building owner.

Final Commissioning Report

- When System Commissioning is required in accordance with Section C408.2, drawings must specify that a Final Commissioning Report is to be provided to the building owner, and

  C408.2.5.4
  6.7.3.5.5.4

- The Commissioning Report Certification must be submitted to the Department:
  - **Within 30 months** of the issuance of the C/O or letter of completion for *new buildings ≥ 500,000 sf in conditioned space area*, excluding R-2 occupancies; and
  - **Within 18 months** of the issuance of the C/O or letter of completion for *all other buildings*.
- Refer to 'Other Requirements' section of this How-To Guide, page [OR-6] for further information on the mechanical systems commissioning.

COMMERCIAL - SERVICE WATER HEATING SYSTEMS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Heat Traps

For water-heating equipment not supplied with integral heat traps and serving non-circulating systems, heat traps must be specified on *both supply and discharge* piping associated with the heating equipment.

C404.3
7.4.6

Circulation Pumps and Heat Trace Systems

- Heated-water circulation systems must be provided with circulation pumps that are automatically turned on and off by the hot water demand in the system.

C404.6
7.4.4

- Electric heat trace systems must have controls to automatically adjust the energy input to maintain the desired water temperature in the piping, and to be automatically turned off when there is no hot water demand.

Heat Recovery for Service Water Heating

Condenser heat recovery system must be installed for facilities as follows:

C403.11.5
6.5.6.2

1) operating 24 hours/day,
2) the total installed heat capacity of water-cooled systems > 6,000 kBtu/h of heat rejection, *and*
3) the total design service water heating load > 1,000 kBtu/h.

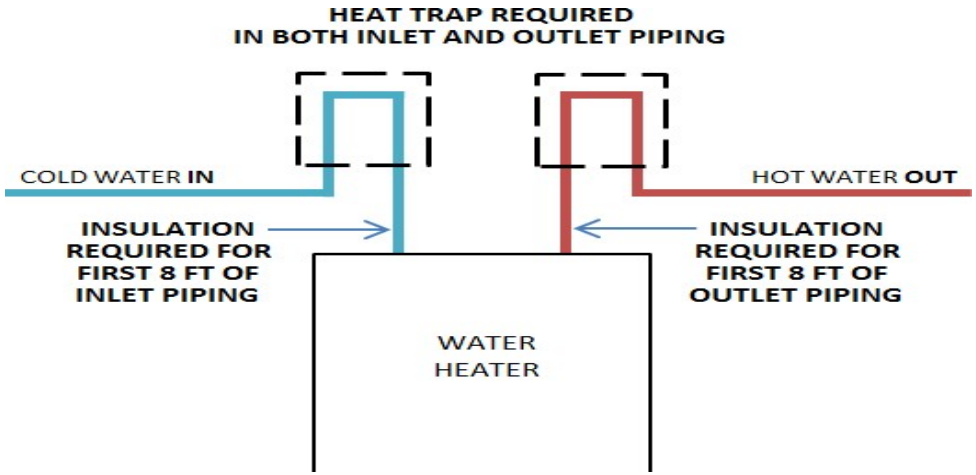


Figure MS-33.
Heat Traps and Insulation Requirements for Non-Circulating Systems

COMMERCIAL - SERVICE WATER HEATING SYSTEMS

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Service Water Heating System Piping Insulation

C404.4
7.4.3

- Service hot water piping must be insulated to minimum thicknesses based on temperature and pipe size.
- Applies to recirculation piping, tank connections, and heated piping, with allowances for alternative materials meeting equivalent thermal resistance.
- Exceptions include small piping, factory-installed piping, and certain retrofit or space-limited conditions.

Maximum Pipe Length/Volume

C404.5.1
C404.5.2
Table 6.8.3-1
Table 6.8.3-2

Heater water supply piping systems must be designed in accordance with:

a) Maximum allowable pipe length method: The piping length from the nearest source of heated water to the terminal fixture is within the maximum allowable pipe length per Table C404.5.1, *or*

b) Maximum allowable pipe volume method: The water volume from the nearest source of heated water (i.e., hot water riser) to the terminal fixture is within the maximum allowable pipe volume calculated per C404.5.2.1.

COMMERCIAL - ALTERNATIVE COMPLIANCE PATH- TSPR

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

Total System Performance Ratio

C403.1
C409
6.6.2
Appendix L

- TSPR is a system-level performance metric comparing proposed HVAC energy use to a reference system
- Used as an alternative compliance path to prescriptive HVAC requirements
- Code references:
  - ECC: Section C409 (TSPR method)
  - ASHRAE: Section 6.6.2 + Normative Appendix L (Mechanical System Performance Rating Method)

What TSPR captures

- Total HVAC energy use
  - Fans, pumps, heating, cooling, and heat rejection
- Includes:
  - Controls, part-load performance, and system interactions

Key Requirements / Limitations

- Applies to HVAC systems only (no envelope/lighting trade-offs)
- Not all HVAC systems are eligible for the performance path (See ECC C409.2.1/ASHRAE Appendix L)
- Compliance must use the NYC-specific TSPR tool: https://energycode.pnl.gov/HVACSystemPerformance/

COMMERCIAL - ALTERNATIVE COMPLIANCE PATH - TSPR

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

TSPR Submission & Review Process

1. Review Inputs

- Verify building inputs and system assignments
- Check each block for completeness and consistency
- Resolve any warnings or missing information
- **Confirm the correct energy code is selected (2025 NYCECC or 2025 NYC ASHRAE 90.1)**

2. Submit for Simulation

- Run the TSPR calculation using the modeling engine
- **Simulation is not immediate — results may take several minutes depending on model complexity**
- **An email notification will be sent once the simulation is complete**

3. Review Results

- Confirm TSPR compliance (pass/fail)
- Check system level outputs

4. Download Report

- Export PDF report **(required for DOB)**
- Optional: download model file for further review

COMMERCIAL - ALTERNATIVE COMPLIANCE PATH - TSPR

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

How to Show Compliance with TSPR

- **Demonstrate:** Proposed TSPR ≥ Reference TSPR / MPF
  - ECC:
    - TSPR calculated per C409.4 – C409.6
    - Uses Mechanical Performance Factors (MPF) by building type and climate zone
  - ASHRAE adds:
    - Must follow Appendix L modeling rules
    - Baseline and proposed systems modeled identically
    - MPF values from Table 6.6.2.2 (area-weighted if mixed-use)
    - Requires compliance with mandatory provisions (Section 6.4)

What Must Be Submitted

- TSPR PDF report (required)
- Inputs and assumptions
- System configuration
- Results showing compliance

⚠️ Common Mistakes

👉 Email notification ≠ submission

👉 Screenshot of results ≠ submission

👉 Only the downloaded PDF report is acceptable for DOB

👉 Review the TSPR user guide for more information:
https://help.buildingenergyscore.com/support/solutions/8000049323

COMMERCIAL - ALTERNATIVE COMPLIANCE PATH - TSPR

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

TSPR Report – Key Checks

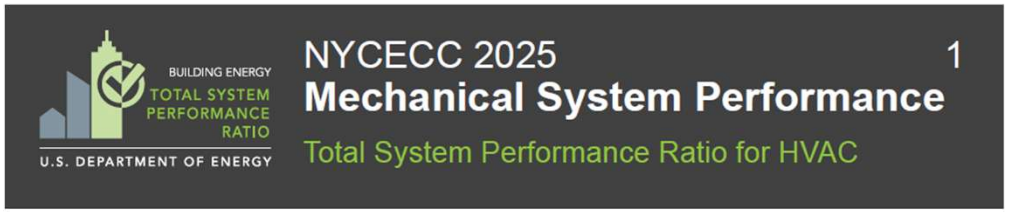
- Project info matches filing (area, systems, etc.)
- TSPR passes required target
- Correct code and climate zone

Equipment Schedule Consistency

- Equipment in TSPR = equipment in drawings
- Capacities, efficiencies, system types align

Red Flag Issues

- Mismatched system types
- Missing equipment
- Unrealistic efficiencies



BUILDING INFORMATION

TSPR Example - MidRise Apt: Split AC-Gas Furnace- DOAS-ERV; NYC ECC 2025...	Building Type:	**Multi-family**	Analysis Date:	**04/09/2026**
123 Example Street	Gross Floor Area:	**33,700 ft²**	Building ID #:	**27415**
New York City, NY 10001	Year of Construction:	**N/A (New)**	Software Release:	2025.0.0.18

Whole Building Total System Performance Ratio

Proposed Building TSPR ($TSPR_p$)	3.6
Reference Building TSPR ($TSPR_r$)	1.3
Target Building TSPR ($TSPR_t$)	2.5
MPF	0.53

The Proposed Building TSPR exceeds the Target Building TSPR and thereby complies with New York City Energy Conservation Code - 2025.

Total System Performance Ratio (TSPR) is the ratio of the sum of a building's annual heating and cooling load in thousands of BTUs to the sum of the site energy consumption in kBTUs from the building's HVAC systems.

SUBMITTED BY

Name	Example Auditor
Organization	Example Organization
Email	example@email.com
Phone Number	

ANALYSIS PARAMETERS

Energy Code	New York City Energy Conservation Code - 2025
ASHRAE Climate Zone	4A, Mixed - Humid
Weather Station	New York J F Kennedy IntL Ar NY USA TMY3 WMO#=744860

COMMERCIAL - ALTERNATIVE COMPLIANCE PATH - TSPR

The relevant construction drawings (e.g., M- , P- labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

BUILDING ENERGY TOTAL SYSTEM PERFORMANCE RATIO
U.S. DEPARTMENT OF ENERGY

NYCECC 2025
Mechanical System Performance
Mechanical Equipment Schedule - Air Handlers

11

Building ID #: **27415**

Gross Floor Area - **Building: 33,744 ft²**

Cooling System Information

Equipment ID	Quantity	System Type	Cooling Source	Number of Stages	Rated Capacity (Btu/h)	Rated Efficiency	Calculated Efficiency	Air Handler
DOAS-ERV	1	Dedicated Outdoor Air System	No Cooling	NA	NA	NA	NA	Air Handler 2
HP-1	4	Pkgd or Split Heat Pump	Central DX	Single Stage	58000.0	15.0 SEER2	4.1 COP	Air Handler Heat Pump

Heating System Information

Equipment ID	Quantity	System Type	Heating Source	Fuel Type	Rated Capacity (Btu/h)	Rated Efficiency	Calculated Efficiency	Air Handler
DOAS-ERV	1	Dedicated Outdoor Air System	No Heating	NA	NA	NA	NA	Air Handler 2
HP-1	4	Pkgd or Split Heat Pump	Heat Pump	Electricity	56000.0	8.5 HSPF2	4.2 COP	Air Handler Heat Pump

System Controls

Equipment ID	Quantity	Distribution Type	Fan Control	Economizer	DCV	ERV	SAT Reset	Air Handler
DOAS-ERV	1	Single Zone	Constant Volume	N/A	N/A	Yes	N/A	Air Handler 2
HP-1	4	Single Zone	Constant Volume	No	N/A	No	N/A	Air Handler Heat Pump

Equipment schedule must match construction documents.