NYC Buildings

How-to Guide:
Supporting Documentation

In Compliance with

2016 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 2016 NYCECC; 2) Not to replace or represent the entire 2016 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 2016 NYCECC and related regulations of the City of New York and the Department of Buildings.

OPTIMAL EQUIPMENT SIZE

Residential Buildings

- **ACCA Manual J:** 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. *R403.7*

- **Sizing Statement:** The drawings must include a statement indicating the total Heating and Cooling design loads have been determined as such.

- **Minimum Efficiency:** New or replacement heating and cooling equipment must meet or exceed the minimum efficiency rating required by Federal law.

Commercial Buildings

- **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. *C403.2.1 C403.2.2 6.4.2.1*

- **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 Section 6.7.2.4) on the job is required or not. Refer to [OR-8] for the detailed requirements for System Commissioning.

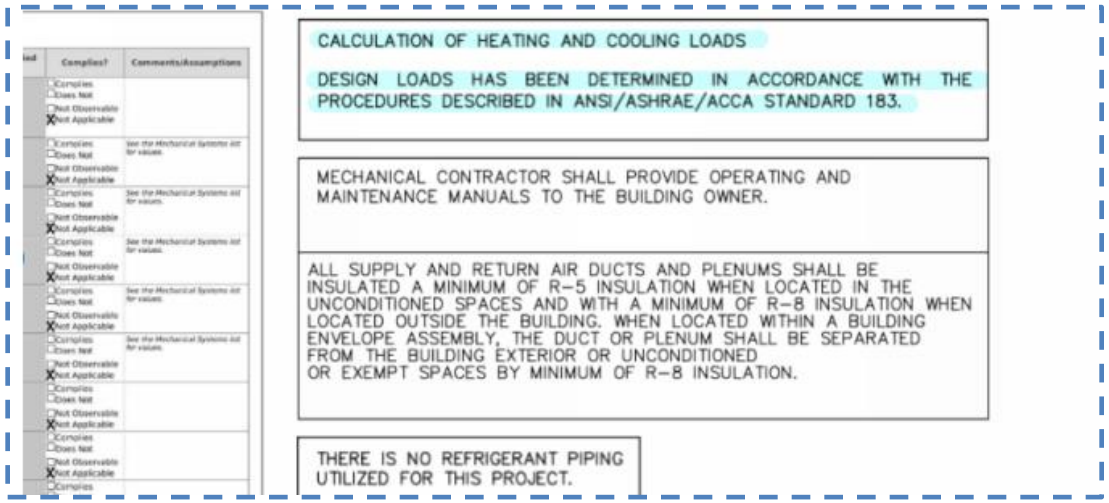

Figure MS-1. ***Sample Sizing Statement***

- *For definitions of "Residential Building" and "Commercial Building," refer to R202 & C202.*

MINIMUM EQUIPMENT EFFICIENCY/PERFORMANCE

Complete Equipment Specifications

For all proposed HVAC and Service Water Heating (SWH) equipment, the equipment schedule on construction drawings must clearly list the *equipment efficiency* or performance rating along with the type, size, capacity, and fuel type of all equipment, and any additional specifications pertaining to the energy use of the equipment. For all Energy-Code-regulated equipment, their rated efficiency/performance ratings identified in the equipment schedule must meet or exceed the corresponding Code-prescribed value.

R403.7
C403.2.3
C404.2
6.4.1

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)

VARIABLE REFRIGERANT FLOW - SPLIT TYPE - HEAT PUMP UNITS (OOOOOOOO OR APPI

OUTDOOR UNITS

TAG	LOCATION	MODEL	COOLING CAPACITY (@ 95 F) (BTUH)	HEATING CAPACITY (@ 47 F) (BTUH)	ELECTRICAL			WEIGHT LBS	REFRIGERANT	EER/ SEER	COP	HSPF	
					V/PH/HZ	MCA	REC. BREAKER SIZE						
HPC-1	ROOF	PURY-HP144SKMU-A-H	144,000	160,000	208/1/60	44	60	552	R410A	12.5	3.46		
					208/1/60	44	60	552					
HPC-2	ROOF	PURY-HP96TKMU-A-H	96,000	108,000	208/1/60	60	80	552	R410A	16.5	3.46		
HPC-3	ROOF	PURY-HP96TKMU-A-H	96,000	108,000	208/1/60	60	80	552	R410A	16.5	3.46		
HPC-4	ROOF	PURY-HP96TKMU-A-H	96,000	108,000	208/1/60	60	80	552	R410A	16.5	3.46		
HPC-5	ROOF	PURY-HP96TKMU-A-H	96,000	108,000	208/1/60	60	80	552	R410A	16.5	3.46		
HPC-6	ROOF	PURY-HP96TKMU-A-H	96,000	108,000	208/1/60	60	80	552	R410A	16.5	3.46		
HPC-7	ROOF	PURY-HP96TKMU-A-H	96,000	108,000	208/1/60	60	80	552	R410A	16.5	3.46		
HPC-8	ROOF	PURY-HP96TKMU-A-H	96,000	108,000	208/1/60	60	80	552	R410A	16.5	3.46		
HPC-9	ROOF	MUZ-HE24NA	22,500	20,000	208/1/60	17.1	20	119	R410A	18.0		8.5	

PROVIDE CENTRAL CONTROL FOR SYSTEM. SYSTEM SHALL CONTROL SETPOINTS AND OPERATION OF ALL UNITS. LOCATION ON CONTROLLER TO BE DETERMINED

GAS-FIRED, COMMERCIAL, HOT WATER HEATER

ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	INPUT (MBH)	EFFICENCY	GALLON CAPACITY	RECOVERY CAPACITY (GPH) AT 100 F RISE	WEIGHT	NOTES
HWH-1	OOOOO BTH-300 MXI	ROOF / HOT WATER HEATER RM.	DIRECT VENT	300	98%	119	698	825	PROVIDI
HWH-2	OOOOO BTH-300 MXI	ROOF / HOT WATER HEATER RM.	DIRECT VENT	300	98%	119	698	825	ON CON

COMcheck Software Version 4.0.5.2

Mechanical Compliance Certificate

Project Information

Energy Code:	2016 New York City Energy Conservation Code
Project Title:	New Transient Hotel
Location:	New York, New York
Climate Zone:	4a
Project Type:	New Construction

Mechanical Systems List

Quantity	System Type & Description
1	HPC-1 (Multiple-Zone): VRF, Air Cooled w/ Heat Recovery Heat Pump Heating Mode: Capacity = 160 kBtu/h, Proposed Efficiency = 3.46 COP, Required Efficiency = 3.20 COP Cooling Mode: Capacity = 144 kBtu/h, Proposed Efficiency = 12.50 EER, Required Efficiency: 10.40 EER (12.1 IEER) Fan System: GUEST ROOM | GUEST ROOM -- Compliance (Motor nameplate HP method) : Passes Fans: SUPPLY Supply, Constant Volume, 370 CFM, 0.2 motor nameplate hp, 0.7 fan efficiency
7	HPC-2 THROUGH 8 (Multiple-Zone): VRF, Air Cooled w/ Heat Recovery Heat Pump Heating Mode: Capacity = 108 kBtu/h, Proposed Efficiency = 3.46 COP, Required Efficiency = 3.30 COP Cooling Mode: Capacity = 96 kBtu/h, Proposed Efficiency = 16.50 EER, Required Efficiency: 10.80 EER (12.7 IEER) Fan System: GUEST ROOM | GUEST ROOM -- Compliance (Motor nameplate HP method) : Passes Fans: SUPPLY Supply, Constant Volume, 370 CFM, 0.2 motor nameplate hp, 0.7 fan efficiency
1	HPC-9 (Single Zone): Split System Heat Pump Heating Mode: Capacity = 20 kBtu/h, Proposed Efficiency = 8.50 HSPF, Required Efficiency = 8.20 HSPF Cooling Mode: Capacity = 23 kBtu/h, Proposed Efficiency = 18.00 SEER, Required Efficiency: 14.00 SEER Fan System: None
2	HWH-1 & 2: Gas Storage Water Heater, Capacity: 119 gallons, Input Rating: 399 Btu/h w/ Circulation Pump Proposed Efficiency: 98.00 % Et, Required Efficiency: 80.00 % Et

Figure MS-2. ***Sample Mechanical Equipment Schedules & Matching Mechanical COMcheck Report***

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

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.

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 prevent unnecessary supplemental heat operation.
- **Outdoor Temperature Setback for Hot Water Boilers:** Hot water boilers that supply heat to the building through one- or two-pipe heating systems must have an outdoor setback control.

Duct & Piping Insulation

- Notes for all ductwork must call out the insulation R-value that meets or exceeds the requirements in Section R403.3.1. *R403.3.1 R403.3.2 R403.4*
- Notes for all ducts, air handlers and filter boxes must clearly indicate sealing requirements.
- Notes for mechanical system pipes carrying fluids > 105°F or < 55°F must call out the minimum insulation of R-3, and protection of the piping insulation.

Duct Leakage Testing

- The drawings must include a statement specifying that duct leakage testing will be performed at either rough-in or post-construction, and the leakage will be ≤ 4 cfm/100 sf of conditioned floor area. *R403.3.3 R403.3.4*

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*
- **Demand Recirculation Systems:** Any *circulation pump* must be equipped *with controls* that automatically start/turn off the pump in response to the hot water demand and water temperature in the system.
- **Insulation:** Hot water pipes must be insulated with a minimum thermal resistance value of R-3.

Ventilation

- **Dampers:** Outdoor air intakes and exhausts must have *automatic or gravity* dampers that close when the ventilation system is not operating. *R403.6*
- **Fan Efficacy:** Mechanical ventilation system fans must meet or exceed the minimum efficacies of Table R403.6.1.

- *Systems serving multiple dwelling units must comply with Sections C403 and C404 of ECC in lieu of Section R403.*

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. *C403.2.4.1*
- The required controls include: *6.4.3.1*
  1) Heat pump supplementary heat controls *6.4.3.2*
  2) Minimum 5°F Deadband
  3) Setpoint overlap restriction.

  Note that many programmable thermostats meet this requirement.

Off-Hour Controls

Thermostatic setback controls that are controlled by either an automatic time clock or programmable control system must be provided in each zone. *C403.2.4.2* *6.4.3.3*

Narratives on Operations and Controls

A narrative must be provided for each mandatory control system describing its function and operation and specifying proper setpoints of equipment and controls. *1 RCNY §5000-01 (g)(2)*

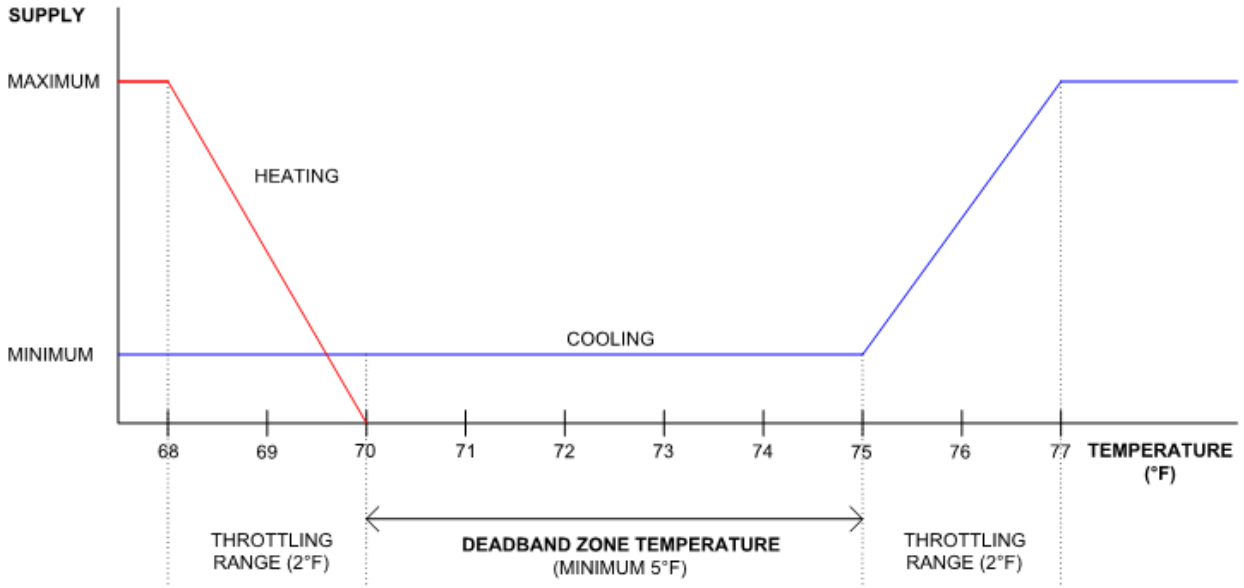

Figure MS-4.
Sample Deadband Control Setup

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

- 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. *C403.3 6.5.1*
- Each cooling system with a capacity ≥ 54,000 Btu/h and operating 20 hours or more per week must be equipped with air or water economizer, with some exceptions.
- Even if each cooling system meets an exception and doesn't require an economizer, out of the total fan-cooling systems in a building, only the greater of 300,000 Btu/h or 20% of the total supply capacity of all fan-cooling units, are allowed to be without an economizer - *only* when following NYCECC.

High-Efficiency Exemption

Cooling systems that are 42% more efficient than the minimum efficiency requirements are exempt from providing economizers – *only* when following ASHRAE. *Table 6.5.1-3*

Cooling Stage Requirements

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. *C403.3.1*

High-Limit Shutoff

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. *C403.3.3.3 6.5.1.1.3*

Economizer Fault Detection and Diagnostics (FDD)

Systems equipped with an economizer must include a *fault detection and diagnostics* (FDD) system equipped with specific sensors that detect and reports faults. *C403.2.4.7*

- *NOTE: The indoor unit capacity for split systems and VRF systems should be used to determine whether an economizer is required.*

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 spaces larger than 500 sf and with an average occupant load of at least 25 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.

C403.2.6.1
6.4.3.8

Energy Recovery Ventilation Systems (ERV)

C403.2.7
6.5.6.1

- Fan systems operating ≥ 8,000 hours/year with 10% or more of the design supply airflow coming from outdoor air are required to have *energy recovery ventilators* (ERV).
- For fan systems operating < 8,000 hours/year, energy recovery systems may be required depending on the design supply airflow rate.
- The ERV must have minimum of 50% total (sensible and latent) recovery effectiveness and controls that communicate with economizer operation and are documented in the equipment schedule and controls notes.
- In most cases, when multiple exhaust risers are within 30 feet of a supply air unit, an ERV is required.

TABLE 403.3
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE R_a CFM/FT^{2a}	DEFAULT OCCUPANT DENSITY #/1000 FT^{2a}	EXHAUST AIRFLOW RATE CFM/FT^{2a}
Education				
Auditoriums	5	0.06	150	—
Corridors (see public spaces)	—	—	—	—
Media center	10	0.12	25	—
Lecture hall (fixed seats)	7.5	0.06	150	—
Art classroom	10	0.18	20	0.7
Science laboratories[g, k]	10	0.18	25	1.0
Offices				
Conference rooms	5	0.06	50	—
Office spaces	5	0.06	5	—
Reception areas	5	0.06	30	—
Telephone/data entry	5	0.06	60	—

Figure MS-6.
Excerpt from Table 403.3 of NYC Mechanical Code Chapter 4

FAN 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.

C403.4.4
6.5.3.3

Fan Airflow Control

- Direct expansion (DX) cooling systems ≥ 65,000 Btu/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.
- 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.

C403.4.1.1
6.5.3.2.1

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).
- 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 C403.2.12.2.

C403.2.12.1
C403.2.12.2
6.5.3.1.1
6.5.3.1.2

Fan Efficiency

- Fans with a motor nameplate horsepower > 5 hp must be designed to have a *fan efficiency grade* (FEG) ≥ 67.
- The total efficiency of the fan at the design point of operation must be within 15 percentage points of the maximum total efficiency of the fan.

C403.2.12.3
6.5.3.1.3

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.

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.

C403.2.5

Hot-Water Temperature Reset Controls

Hot water systems with design output capacity ≥ 500,000 Btu/h (or, > 300,000 Btu/h when following ASHRAE) must be provided with automatic controls to reset supply water temperatures by representative building loads or outdoor air temperature.

C403.4.2.4
6.5.4.4

Modulating Burner

Hot water systems of a single boiler with input design capacity > 500,000 Btu/h must be equipped with either a multi-staged or *modulating burner*.

C403.4.2

Boiler Turndown

- A single boiler or boiler systems > 1,000,000 Btu/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.

C403.4.2.5
6.5.4.1

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.

C403.4.3.2
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 C403.4.3.2.2.

C403.4.3.2.2

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.

C403.4.3.4
6.5.5.4

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 ≥ 500,000 Btu/h (or, > 300,000 Btu/h when following ASHRAE) must be provided with automatic controls to reset supply water temperatures by representative building loads or outdoor air temperature.

C403.4.2.4
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.

C403.4.2.3.1
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.
- 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.

C403.4.2.6
6.5.4.3

ADDITIONAL HVAC 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.

Shutoff Dampers

- Class-I *motorized* shutoff dampers with a maximum air leakage rate of 4 cfm/ft² 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. *C403.2.4.3 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

Enclosed parking garage ventilation systems must have capacity to monitor contaminant (CO) levels and automatically throttle the fan power in response to the contaminant levels. *C403.2.6.2 6.4.3.4.5*

Pump Controls: Hydronic Variable Flow Systems

- HVAC pumping systems of a total pump power > 10 hp with modulating control valves must be designed for variable fluid flow, and be capable of reducing pump flow rates to 50% or less of the design flow rate. *6.5.4.2*
- Individual chilled-water pumps serving variable-flow systems having motors > 5 hp must have controls and/or devices (such as variable-speed controls) that will result in pump motor demand of a maximum 30% of design wattage at 50% of design water flow.

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. *C403.4.6 6.5.9*
- The capacity of the hot gas bypass, when permitted by Code, must be limited to maximum 50% of the total capacity for the rated capacity ≤ 240,000 Btu/h; and maximum 25% for the rated capacity > 240,000 Btu/h.

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.
- 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.

C404.6
7.4.4.2

Heat Recovery for Service Water Heating

Condenser heat recovery system must be installed for facilities as follows:
1) operating 24 hours/day,
2) the total installed heat capacity of water-cooled systems > 6,000,000 Btu/h of heat rejection, *and*
3) the total design service water heating load > 1,000,000 Btu/h.

C403.4.5
6.5.6.2.1

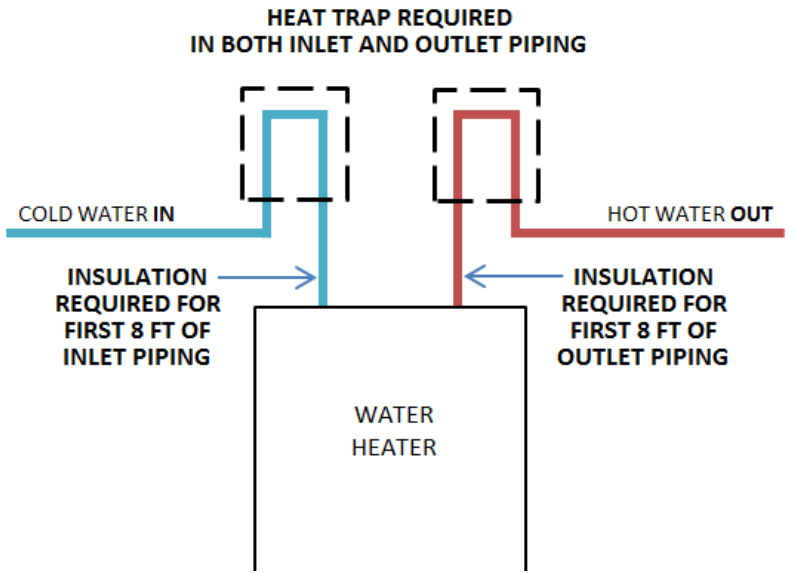

Figure MS-12.
Heat Traps and Insulation Requirements for Non-Circulating Systems

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:

C403.2.9
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

Duct System Sealing

C403.2.9.1
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

C403.2.10
C404.4
6.4.4.1.3

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

Maximum Pipe Length/Volume

C404.5

Heater water supply piping systems must be designed so that a) the piping length from the nearest source of heated water to the terminal fixture is within the maximum allowable pipe length, *or* b) 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.

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

Systems to provide heat outside a building must be radiant systems; the heating systems must be controlled by an occupancy sensing device or timer switch.

C403.2.13
6.5.8.1

Hotel Guest Rooms

In each guestroom in hotels and motels with greater than 50 guestrooms, automatic setback control for HVAC systems during unoccupied hours and/or a captive key card system must be provided.

C403.2.18
6.4.3.3.5

Refrigeration Equipment and System

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 C403.2.14
- Design of factory-built walk-in coolers/freezers and refrigerated warehouse coolers/freezers – Section C403.2.15
- Design of site-built walk-in coolers/freezers – Section C403.2.16
- Design of site-built refrigerated display cases – Section C403.2.17
- Design of refrigeration systems with remote compressors/condensers not located in a condensing unit – Section C403.5

C403.2.14
C403.2.15
C403.2.16
C403.2.17
C403.5
6.5.11

Pools and Spas

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.

C404.9
C404.10
C404.11
7.4.5

Snow- and Ice-Melt System Controls

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.

R403.9
C403.2.4.5
6.4.3.7

Freeze Protection System Controls

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.

C403.2.4.6
6.4.3.7

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 ≥ 300,000 Btu/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*

Door Switches

For doors separating conditioned space from the outdoors, controls must be provided to disable or reset mechanical heating and cooling operations within 5 minutes of the door opening. *6.5.10*

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

R303.3
C303.3
C408.2.5.2
4.2.2.3

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

System Balancing Report

C408.2.5.3
C408.2.2
6.7.2.3

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

C408.2.5.4
6.7.2.4

- 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
- 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-8] for further information on the mechanical systems commissioning.