



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.

OVERVIEW

What is *Supporting Documentation*?

1 RCNY §5000-01(g)
1 RCNY §5000-01(e)
ECC 101.5.2.3
ECC 103

■ A Requirement to Demonstrate Compliance with NYCECC

- Supporting Documentation is required for all job applications that are *not* exempt from the NYCECC in accordance with 1 RCNY §5000-01 (e)(3).
- Exempt from the NYCECC Job applications claiming exemption from the 2025 NYCECC must :
 - Complete DOB NOW application must indicate exemption.
 - On drawings, provide Professional Statement for exemption, and specify the basis for exemption in accordance with 1 RCNY §5000-01 (e)(3).
 - On drawings, provide a simple Tabular Analysis listing the proposed work types and summary work scope to validate the exemption.
- Partially exempt from the NYCECC Historic buildings may claim partial exemption from the 2025 NYCECC , they must :
 - Completed DOB NOW application must indicate Historic Building.
 - On drawings, provide Professional Statement for partial exemption, and specify the basis for exemption in accordance with 1 RCNY §5000-01 (e)(2).
 - A full energy analysis must be submitted for scope not claimed as part of the exemption.
 - A report describing the character defining feature that could be negatively affected by compliance with the ECC and an explanation why compliance would affect this feature must be submitted as a supporting document in DOB NOW.

■ Essentially, Construction Documents

- To be submitted to the Department of Buildings for approval.
- To inform means and methods of construction for all energy design elements in the form of technical drawings, schedules, specification notes, etc.
- To prove that all proposed energy design elements will match or exceed the requirements of the NYCECC in their quality, quantity, size, capacity, efficiency, performance, location, configuration, composition, etc.

■ Must Match the Proposed Work Type and Scope

Supporting Documentation (Construction Documents) must provide construction data to match all proposed Work Types and work scope indicated in

- DOB NOW filed Work Types, such as Mechanical Systems (MS), Plumbing (PL), and Boiler Equipment (BE)
- DOB NOW progress inspections

■ Must Support Energy Analysis

- Construction Documents must support the Energy Analysis reports. Specifically, the values and attributes of any energy-code-regulated element proposed in the construction documents must match or exceed those of the same element listed in the Energy Analysis (e.g., Tabular analysis, REScheck, COMcheck, TSPR and EN1).
- Supporting Documentation and Energy Analysis must be submitted along with its associated work type through DOB NOW as required.
- Job applications with Energy Modeling analysis must submit the completed EN1 workbook along with the primary job filed through DOB BIS.

KEY PRINCIPLES

How Should *Supporting Documentation* be Prepared?

1 RCNY §5000-01(g)
ECC 101.5.2.3
ECC 103

■ Identify a Correct Code Version to Follow

- Job applications filed on and after March 30, 2026 must comply with the [2025 NYCECC](#).
- Job applications filed between May 12, 2016 and March 29, 2026 must comply with the [2020 NYCECC](#).
- Refer to '[What Codes, Rules & Forms Apply When](#)' to identify which ECC Code version is applicable for a particular job application.

■ Identify Correct Code Sections to Follow

- Applicable Code sections must be carefully identified and selected according to the job application/project type.
- For a Commercial building application, the *Single* chosen Code (NYCECC or ASHRAE; indicated as the Code compliance path on DOB NOW) must be referenced throughout the entire set of construction documents.

Figure GE-2.

2025 NYCECC and Applicable Job Types

2025 NYCECC		Residential Buildings		Commercial Buildings w. NYCECC as Code Compliance Path		Commercial Buildings w. ASHRAE as Code Compliance Path	
		New Buildings	Existing Buildings	New Buildings	Existing Buildings	New Buildings	Existing Buildings
Chapter 1	Administration	v	v	v	v	v	v
Chapter R2	Definitions	v	v				
Chapter R3	General Requirements	v	v				
Chapter R4	Residential Energy Efficiency	v					
Chapter R5	Existing Buildings		v				
Chapter R6	Referenced Standards	v	v				
Chapter C2	Definitions			v	v		
Chapter C3	General Requirements			v	v		
Chapter C4	Commercial Energy Efficiency			v			
Chapter C5	Existing Buildings				v		
Chapter C6	Referenced Standards			v	v		
2025 NYC ASHRAE 90.1	Modified Energy Standard for Buildings, Except for Low-Rise Residential Buildings (2025 NYS ASHRAE 90.1 with NYC Modifications)					v	v

KEY PRINCIPLES

How Should *Supporting Documentation* be Prepared?

1 RCNY §5000-01(g)
ECC 101.5.2.3
ECC 103

■ Supporting Partially exempt status

1. **Statement on Plans:** “To the best of my professional knowledge and ability, this building is listed as a national historic landmark and contains character-defining features that may claim exemption from compliance with the 2025 NYCECC”
2. **Identify Character-Defining Features:** Features that justify the exemption must be clearly listed and shown on plans.
3. **Plans Must Clearly Show the Features:**
 - Features claiming exemption must be **identified and labeled on drawings**
 - Plans must include **references to the sheets where the features appear**

Character-Defining Feature	Location on Plans
Ground Floor Windows	See Sheet A-100.00
Original masonry façade	Sheet A-201
Decorative cornice	Sheet A-301

KEY PRINCIPLES

How Should *Supporting Documentation* be Prepared?

1 RCNY §5000-01(g)
ECC 101.5.2.3
ECC 103

■ Supporting Partially exempt status (Continued)

Applicants must submit a **Historic Building Report** to DOB NOW

The report must include:

1. Proof the Building is Listed:

Screenshot from the **CRIS system** showing:

- Building address
- USN
- Status as “Listed”

2. Character-Defining Features

The report must identify which features are character-defining using documentation such as

- LPC designation report
- NR listed building documentation
- Other historic documentation

3. Explanation for Any Exemption

If a feature is used to claim exemption, the report must explain why complying with the NYCECC requirement would negatively affect the historic feature.

4. Report must be signed and sealed.

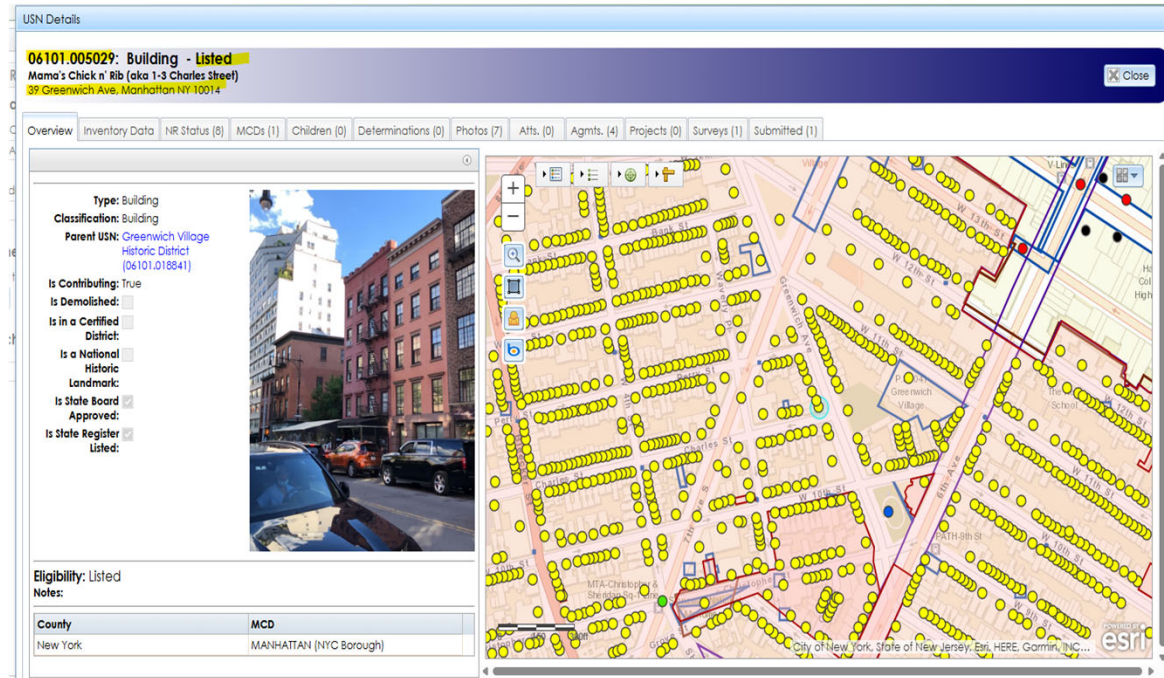


Figure GE-3. Screenshot from Cultural Resource Information System

Source: cris.parks.ny.gov

Character Defining Feature	Source	Claiming Exemption	Explanation
Sheet-metal awnings	LPC Designation Report (Attached, page 38)	NO	N/A
Arched openings in the base	LPC Designation Report (Attached, page 36)	Yes	Insulation would alter historic masonry profile

KEY PRINCIPLES

How Should *Supporting Documentation* be Prepared?

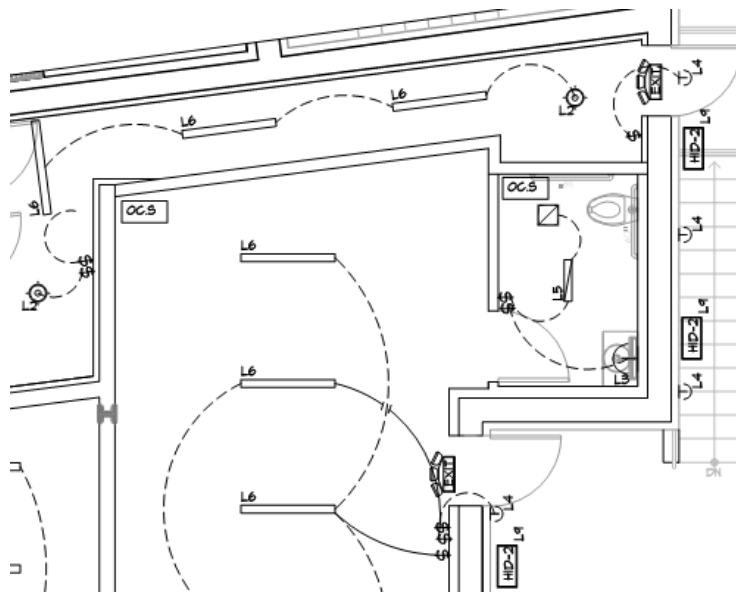
1 RCNY §5000-01(g)
ECC 101.5.2.3
ECC 103

Label Energy Design Elements Consistently Among Drawings

- Identification keys for all proposed energy design elements, such as wall types, window/door types, light fixture types, mechanical equipment system types, etc., must be consistent between Supporting Documentation and Energy Analysis.

Values and Attributes Must Match

- Specifications (in values and attributes) of energy design elements reported in Energy Analysis must be validated through Supporting Documentation. For example, Energy-Code-relevant specifications (e.g., insulation type, R-value, U-factor, luminaire type, luminaire wattage, equipment size, equipment efficiency, etc.) declared in the COMcheck energy analysis, but not identified in the construction documents will *not* be accepted for Energy Code compliance.
- Total numbers reported in Energy Analysis must be validated through Supporting Documentation. For example, the gross values such as exterior wall/fenestration areas, roof/floor areas, luminaire/equipment counts, area-weighted average values, etc. listed in the Tabular energy analysis must be easily identified in the drawings, schedules, and/or diagrams provided in the construction documents.



LEGEND FOR ALL LIGHT FIXTURES USED ENTIRELY FOR THE BUILDING			QUANTITY RESIDENTIAL	QUANTITY RETAIL
TAG	DESCRIPTION	FIXTURE WATT.		
L1	HIGH HAT 4" SQUARE TRIM LED	13 W	44	
L2	CEILING LIGHT ROUND LIGHT FIX COMPACT FLORESCENT	40W	21	7
L3	BATHROOM SCONCE LED	11W	18	4
L4	EXTERIOR SCONCE COMPACT FLORESCENT BALCONIES/ EXTERIOR DOORS	28 W	2/ EXT DOORS 29/ BALC.	7/ EXT DOORS
L5	CLOSET FIXTURE FLUORESCENT T8 24"	17W	30	4
L6	TEMP. FLUORESCENT T8 32W, 2 LAMPS PER FIXTURE, 48"	64W	20	79

Proposed Interior Lighting Power				
Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	A	B	C	D
		Lamps/ Fixture	# of Fixtures	Fixture Watt.
				(C X D)
<u>1-Multifamily</u>				
LED 1- L1 HIGH-HAT 4" FIX: LED PAR 13W:		1	44	13
				572
<u>2-Retail</u>				
Linear Fluorescent L8: 48" T8 32W: Electronic:		2	79	64
				5056
Compact Fluorescent -L2: Twin Tube 40W: Electronic:		1	7	40
				280
Linear Fluorescent L5: 24" T8 17W (Super T8): Electronic:		1	4	17
				68
L3-BATHROOM SCONCE: LED A Lamp 11W:		1	4	11
				44
Total Proposed Watts =				11538

Figure GE-5.
Sample Lighting Fixture Layout Plan (top left),
Matching Fixture Schedule (top right), and
Matching Interior Lighting COMcheck Report (bottom right)

KEY PRINCIPLES

How Should *Supporting Documentation* be Prepared?

1 RCNY §5000-01(g)
ECC 101.5.2.3
ECC 103

■ Specific Design Data in Proper Locations

- *Specific* design values and characteristics proposed for the work scope in the application must be provided in the construction documents in sufficient detail and clarity. For example, window schedules on drawings must list each proposed window assembly's U-factor, SHGC, air leakage rating, and Visible Transmittance (as required) values furnished/published by the respective window manufacturer.
- Notes directly *relevant* to achieve the proposed design must be provided in the construction documents in sufficient detail and clarity. In other words, mere duplicates of general Energy Code sections placed on the drawings will *not* be construed as Energy Code compliance.
- In *proper locations* within construction documents, construction data must be presented. For example, 1) HVAC mechanical equipment schedules and a sequence-of-operations narrative must be found on Mechanical drawings; 2) Lighting control notes must be placed in conjunction with lighting fixture plans and schedules on drawings (typically on RCP drawings).

■ List of Progress Inspections on EN- Sheet

- All *applicable* progress inspections required for Energy Code compliance must be listed on an EN- labeled sheet in tabular format as shown in 1 RCNY §5000-01(h), and must match those identified on the TR8.

AIR HANDLING UNIT SCHEDULE																											
TAG	LOCATION	AREA SERVED	AIR FLOW	AIR FLOW			SUPPLY FAN				CHILLED WATER								HOT WATER						RECOVERY WHEEL		
				SUPPLY	MIN OA	RETURN	TSP	BHP	HP	PH/V/RPM	EAT Db	EAT Wb	LAT Db	LAT Wb	TOT. CAP	SENS. CAP.	FLOW	EWT	LWT	EAT	LAT	TOT. CAP	SENS. CAP	FLOW	EWT	LWT	ENTHALPY
				CFM	CFM	CFM	IN			CFM	°F	°F	°F	°F	MBH	MBH	GPM	°F	°F	°F	°F	MBH	MBH	GPM	°F	°F	%
AHU-1	ROOF	3 NORTH	VAV	26000	5500	20500	4.7	23.5	25	3/460/175 0	80	67	55	54	380	270	47	42	58	45	90	480	270	49	160	140	NOTE 3

NOTES:

1. PROVIDE MOTORIZED SHUT-OFF DAMPER AT THE OA INTAKE WITH MAXIMUM LEAKAGE RATE OF 4 CFM/SF AT 1 IN. WG. DAMPER SHALL CLOSE WHEN THE UNIT IS OFF.
2. IN ECONOMIZER MODE, MINIMUM OCCUPIED AIRFLOW SETPOINT ON VAV TERMINALS SHALL BE AUTOMATICALLY RESET BASED ON PERCENTAGE OF OUTSIDE AIR ABOVE DESIGN MINIMUM.
 - A. AS PERCENTAGE OF OA DAMPER AT 100% AND AS ECONOMIZER OUTPUT INCREASES FROM 0-100%, MINIMUM AIRFLOW SETPOINT AT TERMINAL UNITS SHALL PROPORTIONATELY RESET LOWER TO MAINTAIN REQUIRED MINIMUM FRESH AIR VENTILATION.
 - B. RESETTING SHALL OCCUR BASED ON INCREMENTS OF 10% CHANGE OF VALUE OF ECONOMIZER OUTPUT.
3. PROVIDE HEAT WHEEL THAT SHALL RECOVER MINIMUM 50% OF THE ENTHALPY. HEATWHEEL SHALL CONTAIN A BYPASS FOR ECONOMIZER MODE.
4. AT A MINIMUM, ALL VAV TERMINAL UNITS SERVED BY AN AHU SHALL BE LINKED WITH ASSOCIATED VAV AHU CONTROLLER TO PERFORM THE FOLLOWING FUNCTIONS.
 - A. ZONE OCCUPANCY SCHEDULE (USER DEFINED FROM GRAPHIC INTERFACE) SHALL NORMALLY AUTOMATICALLY SELECT THE OCCUPIED OR UNOCCUPIED OPERATING MODE OF AIR HANDLING UNIT.
 - 1) ACTIVATION OF TIMED OVERRIDE SWITCH ON ZONE THERMOSTATS SHALL ONLY RESET ZONE HEATING AND COOLING SETPOINTS TO "OCCUPIED" VALUES, BUT SHALL NOT AFFECT OTHERWISE SCHEDULED UNOCCUPIED OPERATING MODE OF AIR HANDLING UNIT.
 - B. DUCT STATIC PRESSURE RESET AS DESCRIBED IN FAN CONTROL SECTION.
 - C. DISCHARGE AIR TEMPERATURE SETPOINT –OPTIMIZED AS DESCRIBED IN THE DISCHARGE TEMPERATURE CONTROL SECTION.
1. FAN POWER LIMITATION CHECK -- PER Table C403.2.12.1(1)

HP	≤	CFM x 0.0015	
25	≤	26000 x 0.0015 = 39	>> OK

Figure GE-6. Sample Mechanical Equipment Schedule and Notes

KEY PRINCIPLES

*Identify the type of building, **Residential** or **Commercial***

Residential Building:

Must meet ALL of the following:

- Be of R2 or R3 occupancy
- Have less than 3 or less stories above grade plane

Commercial Building:

Any building that does NOT meet the Residential definition.

Key Implications

👉 **A building can be residential in use but classified as Commercial if > 3 stories above Energy Grade Plane**

👉 **Story count must be determined FIRST based on Energy Grade Plane.**

👉 **Low-rise (3 stories or less) Mixed-use buildings.**

Commercial portions → Commercial provisions

Residential portions → Residential provisions

👉 **Building classification depends on BOTH occupancy AND number of stories above Energy Grade Plane.**

C202
R202

KEY PRINCIPLES

Identify the Energy Grade Plane and Stories Above Grade Plane

C202
R202

Energy Grade Plane (NYCECC): Reference plane representing the **average finished ground level at exterior walls**

⚠️ **Use the Energy Grade Plane for Energy Code compliance.**

👉 **Do not use:**

- Zoning base plane
- Building Code grade plane

ENERGY GRADE PLANE 
BC GRADE PLANE 
FINISHED GRADE 

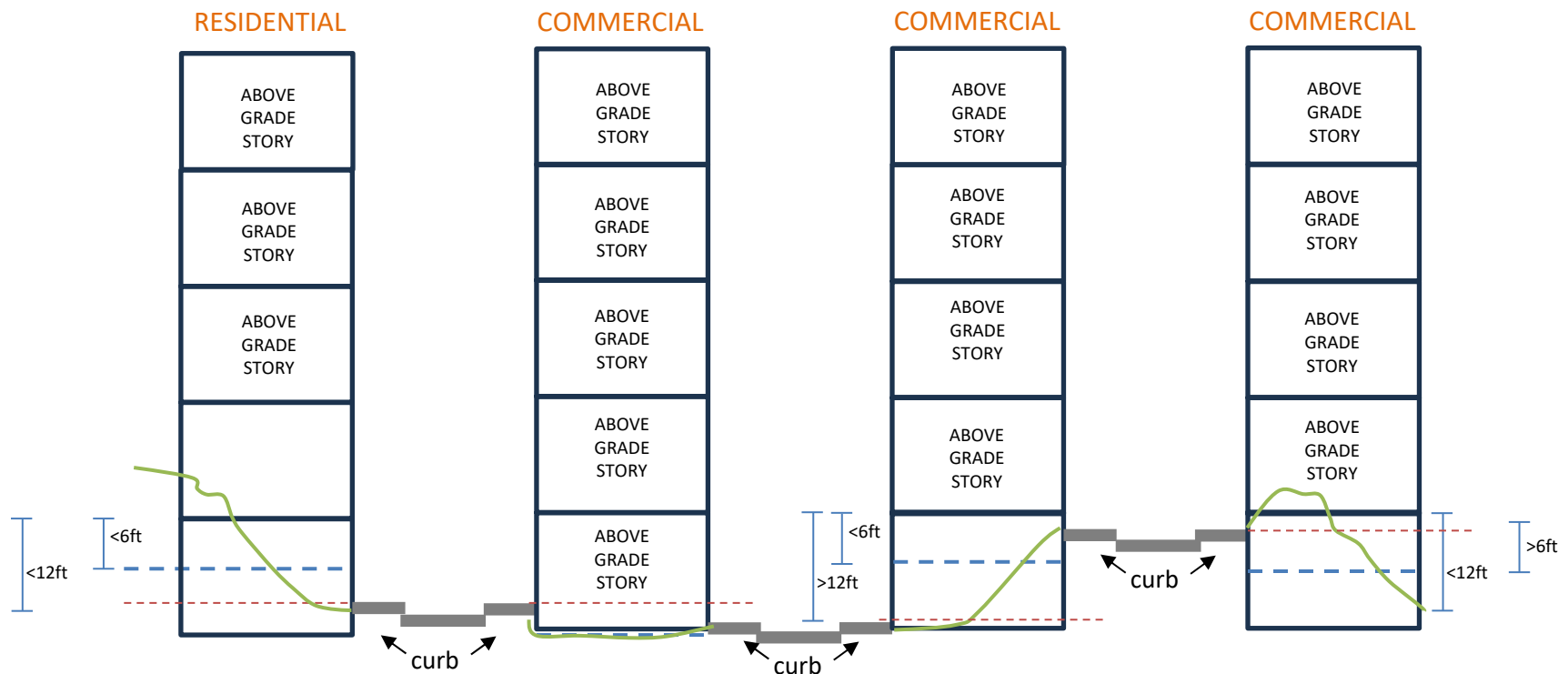


Figure GE-8. Determining Story above Energy Grade Plane

ENERGY ANALYSIS BUILDINGS

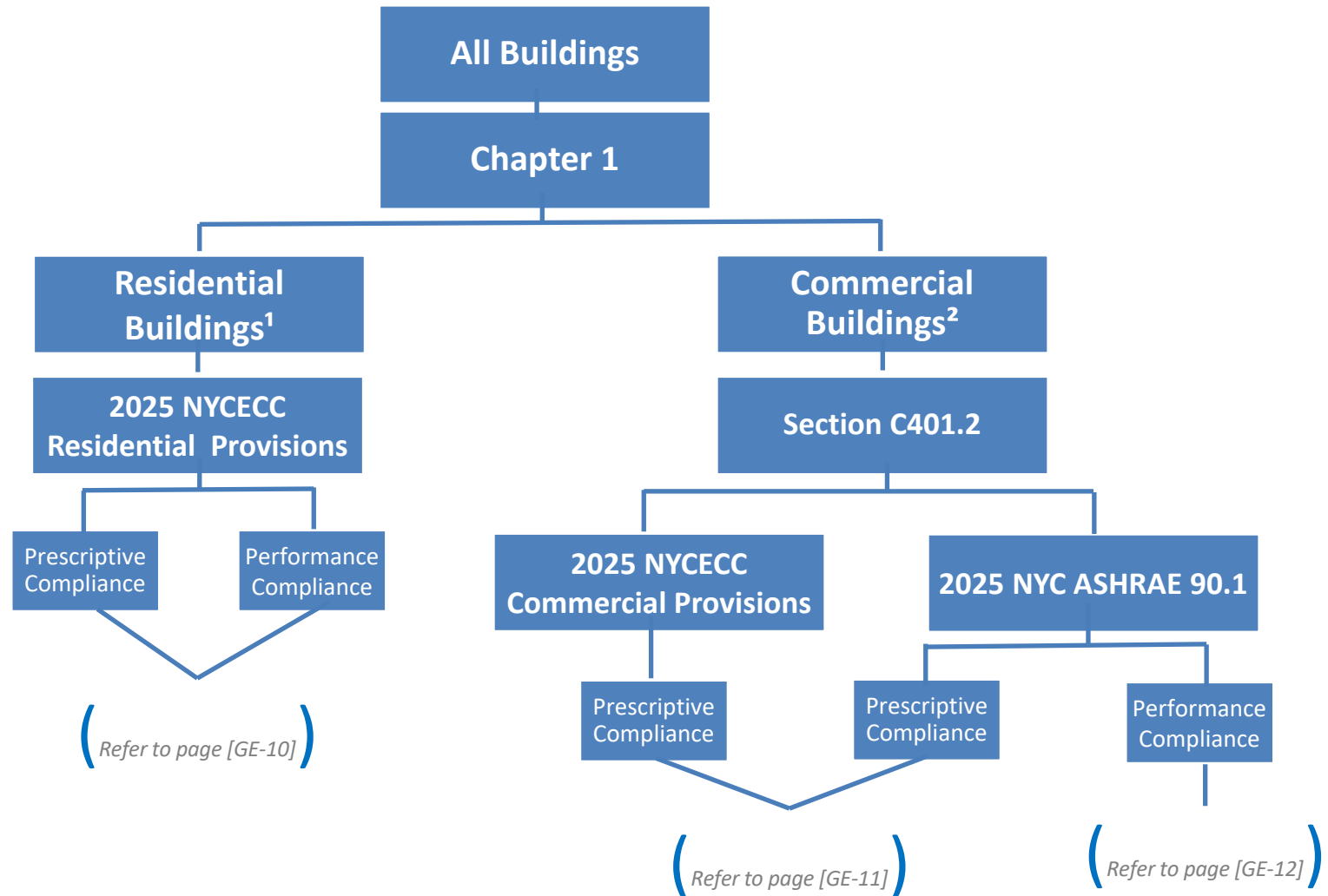
to Demonstrate ECC Compliance in conjunction with Supporting Documentation

* Refer to [Quick Reference Guide: How to Demonstrate Energy Code Compliance](#) for more information.

R401.2

C401.2

4.2.1



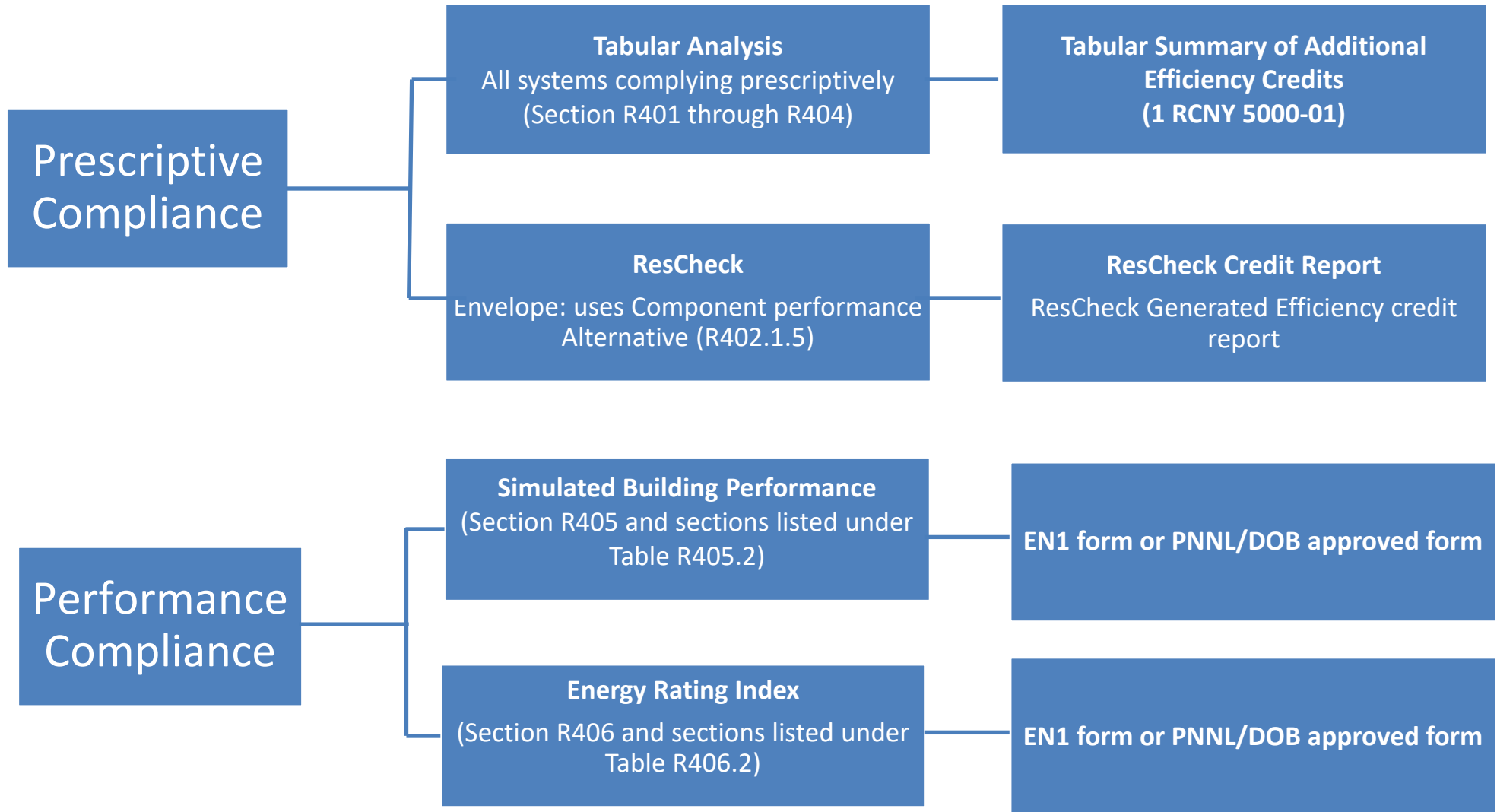
1. Residential buildings as defined under Chapter R2 of the 2025 NYCECC
2. Commercial Buildings as defined under Chapter C2 of the 2025 NYCECC

Figure GE-9.
Compliance Paths

ENERGY ANALYSIS RESIDENTIAL BUILDINGS

to Demonstrate ECC Compliance in conjunction with Supporting Documentation

R401.2



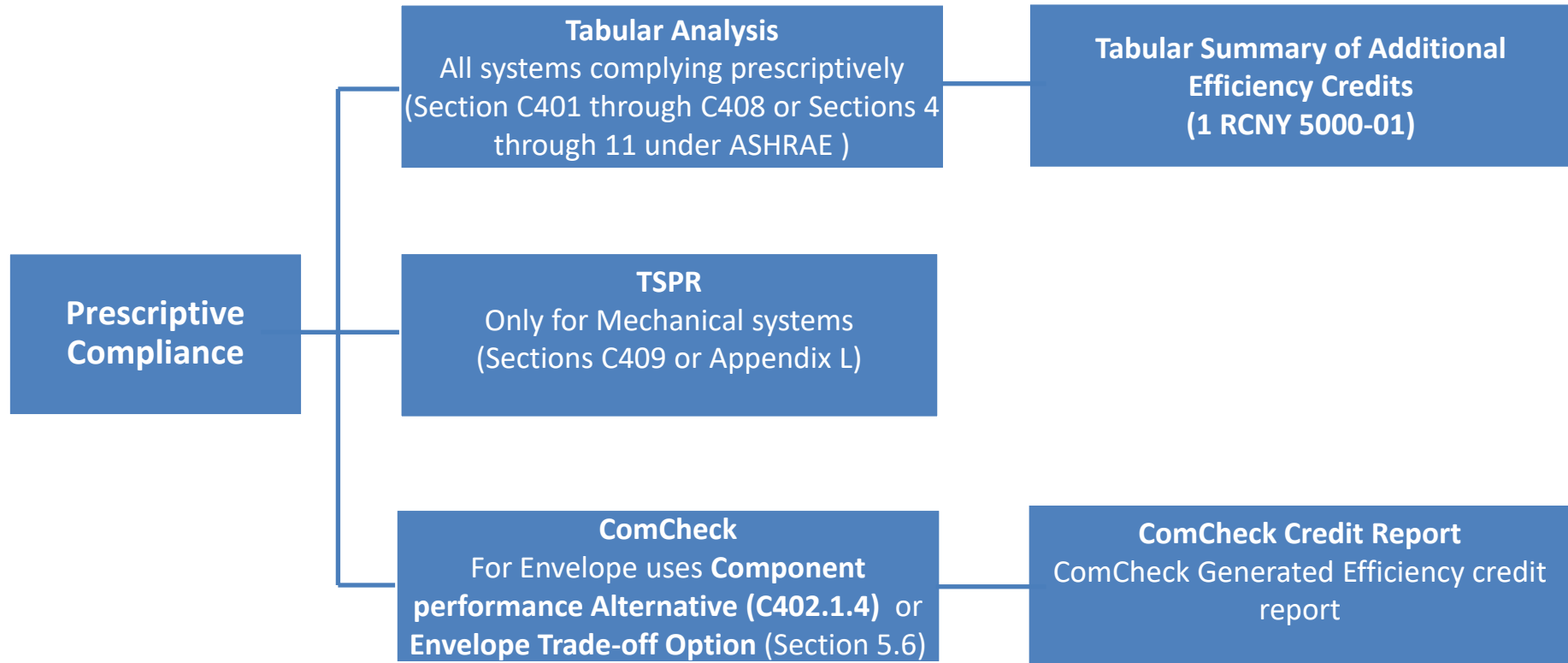
Chapters 1, R2 and R3 and Section R401.2 apply to all Residential buildings

Figure GE-10.
Energy Analysis Methods Residential Buildings

ENERGY ANALYSIS COMMERCIAL BUILDINGS

to Demonstrate ECC Compliance in conjunction with Supporting Documentation

C401.2



Chapter 1, and Section C401.2 apply to all Commercial buildings

Figure GE-11.
Energy Prescriptive Energy Analysis Commercial Buildings

ENERGY ANALYSIS COMMERCIAL BUILDINGS

to Demonstrate ECC Compliance in conjunction with Supporting Documentation

C401.2

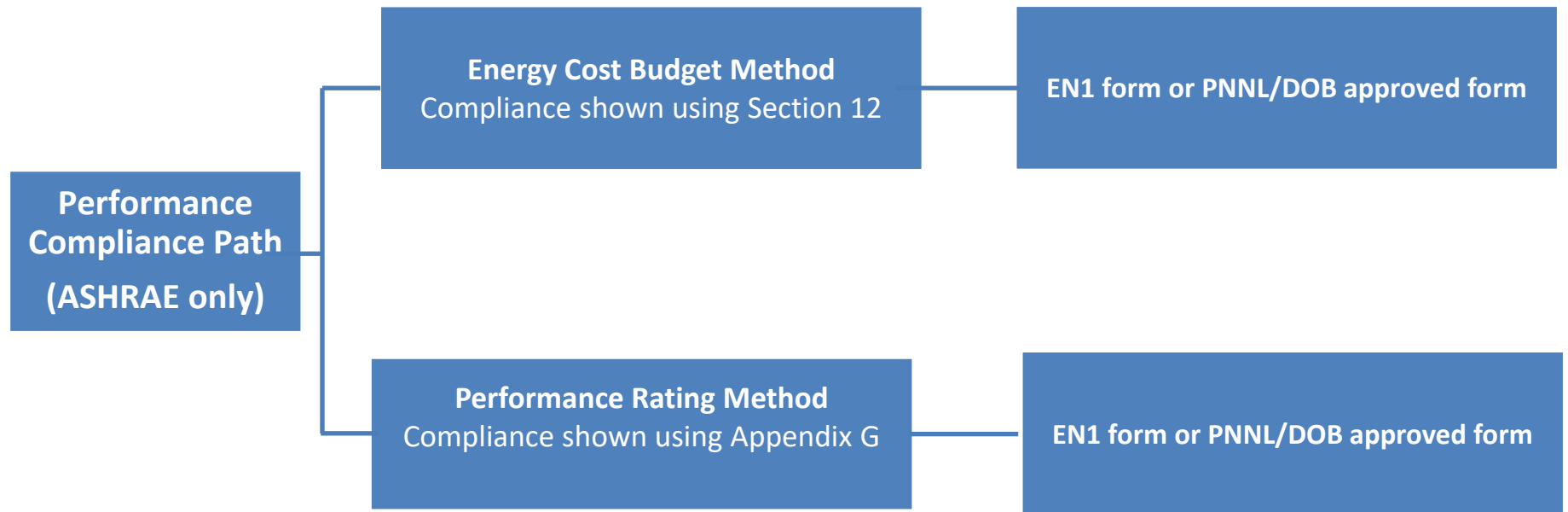


Figure GE-12.
Energy Performance Energy Analysis Commercial Buildings

Chapter 1, and Section C401.2 apply to all Commercial buildings



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How-to Guide:

- **BUILDING ENVELOPE COMPLIANCE ADDRESSES:**
 - **THERMAL PERFORMANCE**
 - OPAQUE ASSEMBLIES
 - FENESTRATION
 - THERMAL BRIDGES
 - **AIR LEAKAGE**
 - THERMAL ENVELOPE/AIR BARRIER (GENERAL)
 - INSTALLATION REQUIREMENTS
 - TESTING AND MAXIMUM AIR LEAKAGE RATE
 - ADDITIONAL INSULATION AND SEALING REQUIREMENTS

OPAQUE ENVELOPE ASSEMBLIES PRESCRIPTIVE COMPLIANCE PATH OPTIONS

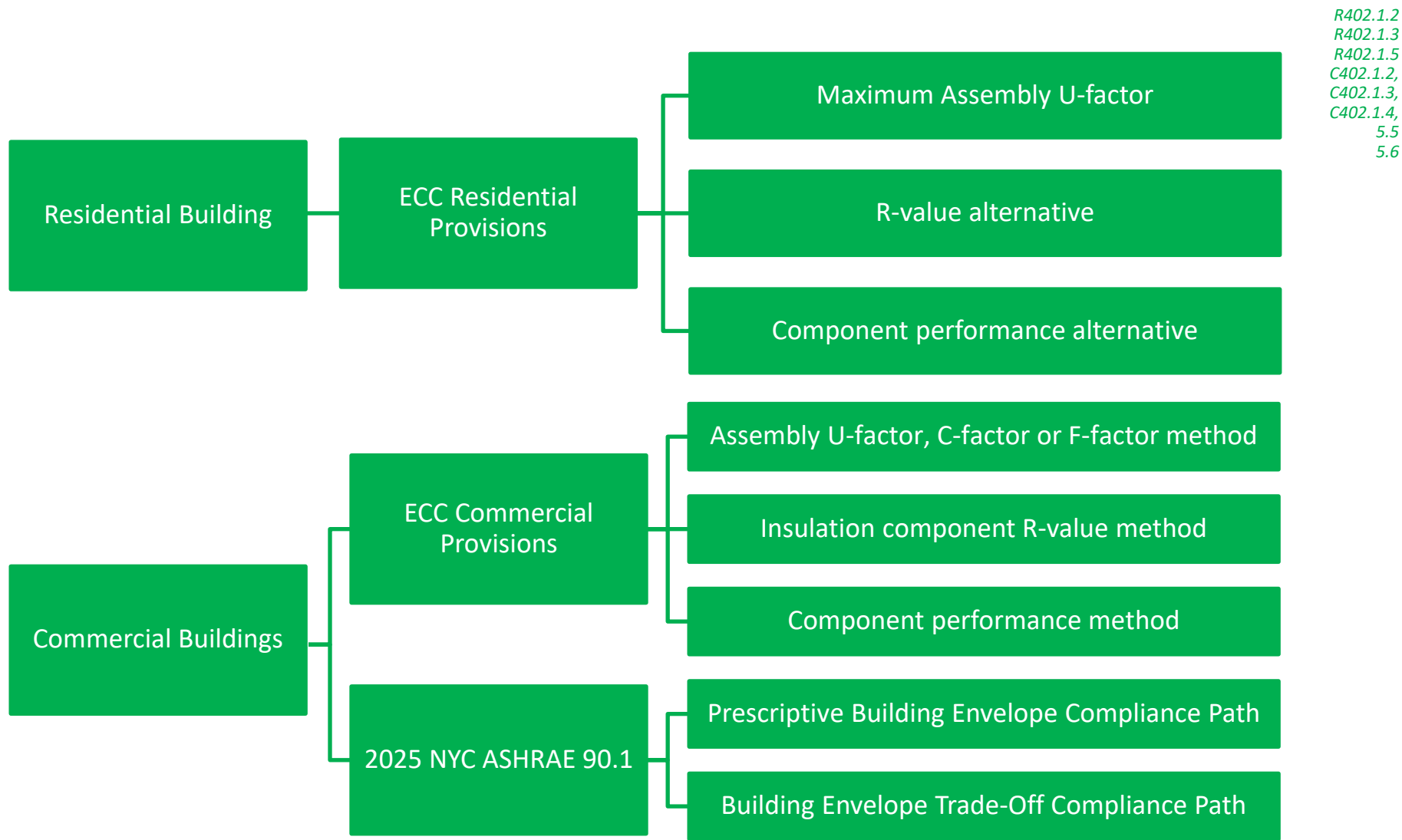


Figure BE-2.
Envelope Compliance Pathways

ENVELOPE-THERMAL PERFORMANCE (PRESCRIPTIVE)

■ MAXIMUM ASSEMBLY U-FACTOR, C-FACTOR, F-FACTOR

- Tables R402.1.2, C402.1.2 and 5.5-4 establish maximum U-factors, C-factors, and F-factors for building envelope assemblies. Compliance involves calculating the U-factor for the entire assembly, considering all materials contributing to thermal performance.
- Construction types with reduced framing or thermal breaks may benefit from U-factor calculations.
- Multiple assemblies within one construction class enclosing the same space conditioning category can demonstrate compliance with an area-weighted U-factor of the assembly or by meeting the strictest requirement.
- This method applies to both opaque assemblies and fenestration.

R402.1.2
TABLE R402.1.2
C402.1.2,
TABLE C402.1.2
5.5.3
TABLE 5.5-4

NOTE:

- Unlike R-values, which focus solely on insulation, U-factors account for all assembly components, such as exterior siding, gypsum board, and air films.
- One common error in the U-factor calculation is misrepresenting thermal values of assembly layers (e.g., face brick, gypsum board, air films, etc.) from unapproved sources.

Example:

Steel-Framed Wall 16" on center		Steel-Framed Wall 24" on center	
DEPTH	6"	DEPTH	6"
CAVITY INSULATION	R-13	CAVITY INSULATION	R-11
CONTINUOUS INSULATION	R-10	CONTINUOUS INSULATION	R-10
ASSEMBLY U-FACTOR*	0.054	ASSEMBLY U-FACTOR*	0.053

NOTE INSULATION R-VALUE IS ABOVE TABLE 5.5-4 (ASHRAE) OR TABLE C402.1.3 (NYCECC)

MAXIMUM U-FACTOR REQUIRED BY CODE

0.061

Both assemblies comply with code

NOTE CONTINUOUS INSULATION AND CAVITY INSULATION R-VALUES DIFFER FROM WHAT IS PRESCRIBED BY TABLE 5.5-4 (ASHRAE) OR TABLE C402.1.3 (NYCECC)

*The U-factor is already set and can be found in Table A3.3.3.1 of Appendix A from 2025 NYC ASHRAE 90.1. However, if your assembly is different from the assumed one, you need to calculate the U-factor using the procedure in Appendix A, Section A9.

BUILDING ENVELOPE ASSEMBLIES-THERMAL PERFORMANCE (PRESCRIPTIVE)

How to calculate assembly U-factor

Acceptable methods for calculating an assembly's U-factor include:

- Predetermined values from 2025 NYC ASHRAE 90.1 Appendix A (Chapters A2 through A8) or Appendix RF.
- Two- or three-dimensional finite difference and finite volume computer models.
- Calculation based on methodology and assumptions from 2025 NYC ASHRAE 90.1 Appendix A Chapter A9.
- Testing:
 - For material R-values or thermal conductivity: ASTM C177, ASTM C518, or ASTM C1363.
 - For assembly U-factors: ASTM C1363.

Appendix RF
Appendix A

Example:

A wood frame wall 16" on center, 5.5 deep with cavity insulation R-21 and continuous insulation R-9 can have its U-factor determined with Table A3.4.3.1

Table A3.4.3.1 Assembly U-Factors for Wood-Frame Walls

Framing Type and Spacing Width (Actual Depth)	Cavity Insulation R-Value: Rated (Effective Installed [see Table A3.4.3])	Overall U-Factor for Entire Base Wall Assembly	Overall U-Factor for Assembly of Base Wall Plus Continuous Insulation (Uninterrupted by Framing)																			
			Rated R-Value of Continuous Insulation																			
			R-1.00	R-2.00	R-3.00	R-4.00	R-5.00	R-6.00	R-7.00	R-8.00	R-9.00	R-10.00	R-11.00	R-12.00	R-13.00	R-14.00	R-15.00	R-20.00	R-25.00	R-30.00	R-35.00	R-40.00
Wood Studs at 16 in. on Center																						
3.5 in. depth	None (0.0)	0.292	0.223	0.181	0.152	0.132	0.116	0.104	0.094	0.086	0.079	0.073	0.068	0.064	0.060	0.056	0.053	0.042	0.035	0.030	0.026	0.023
	R-11 (11.0)	0.096	0.087	0.079	0.073	0.068	0.063	0.059	0.056	0.053	0.050	0.048	0.046	0.044	0.042	0.040	0.038	0.032	0.028	0.024	0.022	0.020
	R-13 (13.0)	0.089	0.080	0.074	0.068	0.063	0.059	0.056	0.053	0.050	0.047	0.045	0.043	0.041	0.040	0.038	0.037	0.031	0.027	0.024	0.021	0.019
	R-15 (15.0)	0.083	0.075	0.069	0.064	0.060	0.056	0.053	0.050	0.047	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.030	0.026	0.023	0.020	0.019
5.5 in. depth	R-19 (18.0)	0.067	0.062	0.058	0.054	0.051	0.048	0.046	0.044	0.042	0.040	0.038	0.037	0.036	0.034	0.033	0.032	0.027	0.024	0.021	0.019	0.018
	R-21 (21.0)	0.063	0.058	0.054	0.051	0.048	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.032	0.031	0.030	0.026	0.023	0.021	0.019	0.017
+ R-10 headers	R-19 (18.0)	0.063	0.059	0.055	0.052	0.049	0.047	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.033	0.031	0.027	0.024	0.021	0.019	0.017
	R-21 (21.0)	0.059	0.055	0.051	0.049	0.046	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.026	0.023	0.020	0.018	0.017

*Under section A3.4.1, appendix A indicates assumptions for the base assembly wall these U-factors are based on, these include 0.625" gypsum board on the interior, a second layer of 0.625" gypsum board on the exterior (R-0.56 each) and a stucco later with R-0.08

Figure BE-4.
Appendix A U-factor Table

BUILDING ENVELOPE ASSEMBLIES-THERMAL PERFORMANCE (PRESCRIPTIVE)

TABLE R402.1.2
C402.1.2.1
Appendix A

Maximum Assembly U-factor supporting documents

Sections of walls, ceilings, floors, and slabs forming the building envelope must:

- Display and label every layer of the assembly.
- Specify the calculated U-factor.
- Include R-values for each component, along with their sources, in the U-factor calculations.
- Alternatively, if the U-factor is obtained from an approved source, provide the reference.
- Additional supporting documents for fenestration products can be found in the fenestration section.

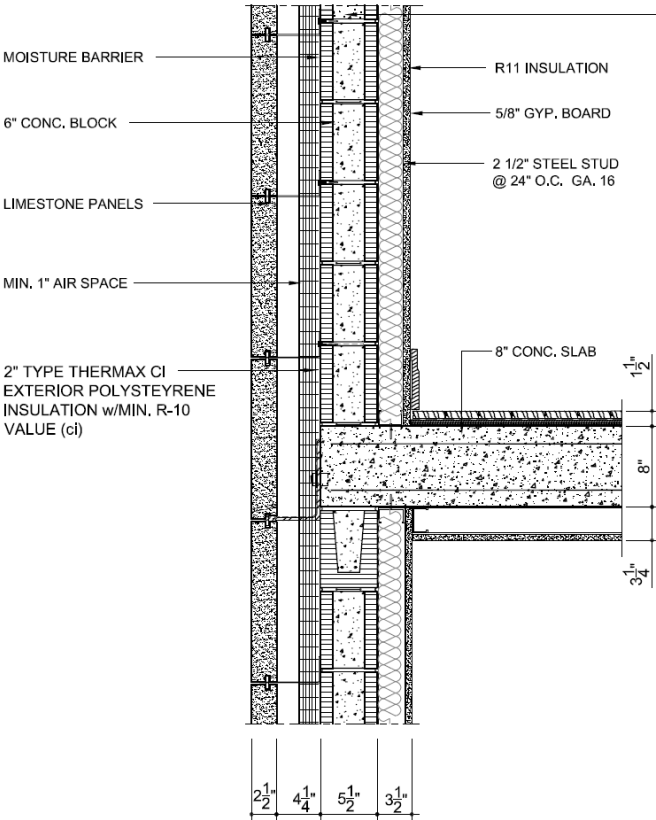


Figure BE-5.
Wall Section and U-factor Calculation

WALL TYPE T			16" THICK 4 HR RATED MASS.
UL DESIGN # U902 U FACTORS WALL CONTRUCTION			
U-FACTOR CALCS	ELEMENT	R-VALUE	U-FACTOR*
Base Wall U-factor Calculations	2" R-10 Continuous Insulation	10.00	
	6" CMU, normal weight, partly grouted, cells empty (Table A3.1-3)	1.67	
	2.5" steel framing at 24" o.c. w/R-11 Batt Insulation (Table A3.1-4)	3.60	
	Wall Assembly Value	15.27	0.0655
Slab Assembly U- factor Calculations	2" R-10 Continuous Insulation	10.00	
	Concrete Slab Uninsulated (8"). Normal weight	1.35	
	Wall Assembly Value	11.35	0.0881

WALL TYPE T			
Weighted Wall assembly U-factor calculation derated for differentiation in thermal properties at slab edge			
Typical 10'-0" Floor to Floor Height			
Wall	Height	U-Factor*	UA
Base Wall U-factor	9'-4"	0.0655	0.6112
Slab Assembly U-factor	0'-8"	0.0881	0.0587
Total	10'-0"		0.6700

*U-factor values based on ASHRAE 90.1-2019 Appendix A

BUILDING ENVELOPE ASSEMBLIES- THERMAL PERFORMANCE (PRESCRIPTIVE)

R402.1.4
C402.1.3
5.5.3

R-value alternative

- Assemblies that meet or exceed the insulation material R-values in Tables R402.1.3, C402.1.3 or 5.5-4 can be an alternative to the U-factor.
- For simple buildings using common insulation products, compliance is often achieved directly through the R-values in Table C402.1.3 or 5.5-4 in ASHRAE.
- This applies to opaque assemblies; fenestration still needs to meet the U-factor requirements of Table C402.1.2.
- Multiple assemblies within one construction class enclosing the same space conditioning category can demonstrate compliance by meeting the strictest requirement.

R-value computation

- Sum the R-values of cavity insulation layers alone for multiple layers to meet Table R402.1.3/C402.1.3/5.5-4 requirements.
- Sum the R-values of continuous insulation layers for multiple layers to meet continuous insulation requirements in Table R402.1.3/C402.1.3/5.5-4.
- Do not add separate R-values required for cavity and continuous insulation to demonstrate compliance with Table R402.1.3/C402.1.3/5.5-4 .
- For blown insulations, use the manufacturer's settled R-value to demonstrate compliance with Table R402.1.3/C402.1.3/5.5-4 requirements.

R-value alternative supporting documents

Sections of walls, ceilings, and floors forming the building envelope must:

- Display and label all assembly components.
- Illustrate how layered insulation combines to meet the minimum required R-value.
- Perform separate calculations for cavity and continuous insulation.
- For additional documents supporting fenestration compliance, refer to the fenestration section.

NOTE:

- Table C402.1.3 assumes a "default" wall assembly used in developing the prescriptive R-value requirements for Table C402.1.3.
- Values are based on a default framing condition of 16 inches (406 mm) on center, and any greater spacing of framing is permissible.
- Where insulated siding is used, the R-value of the insulated siding must be reduced by subtracting R-0.6 from the manufacturer's labeled R-value. This reduction is required because the R-values for insulation required for wood frame walls in Table R402.1.3 are based on the presence of an assumed noninsulating siding with a nominal R-value of 0.6.

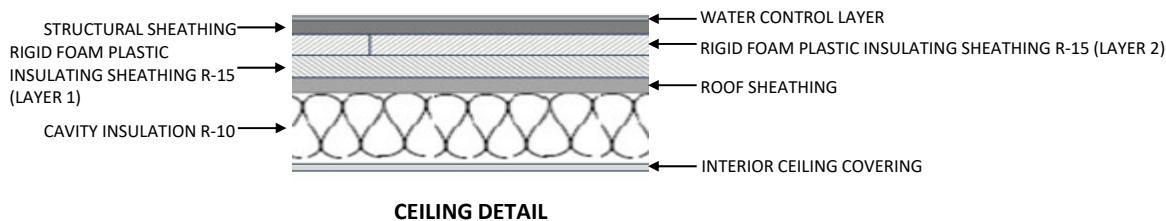


Figure BE-6.
Wall Section and R-value Calculation

INSULATION R-VALUE CALCULATION

INSULATION	CONTINUOUS	CAVITY
RIGID FOAM PLASTIC INSULATING SHEATHING R-15 (LAYER 1)	R-15	
RIGID FOAM PLASTIC INSULATING SHEATHING R-15 (LAYER 2)	R-15	
CAVITY INSULATION R-49		R-10
TOTAL	R-30	R-10

CODE REQUIREMENT (TABLE R402.1.3): R-49 CAVITY INSULATION OR R-30 CONTINUOUS INSULATION. **COMPLIES**

BUILDING ENVELOPE ASSEMBLIES -ENVELOPE TRADEOFFS

R402.1.5
C402.1.4
5.6

ECC Component Performance Method (Commercial and Residential)

- Allows **trade-offs between envelope assemblies** such as walls, roofs, floors, slabs, and fenestration.
- Compliance is achieved when the **total thermal conductance of the proposed envelope is less than or equal to the reference envelope permitted by code.**

Proposed envelope heat transfer ≤ Code reference envelope heat transfer

- The calculation includes:
 - U-factor × Area** of opaque assemblies
 - F-factor × slab perimeter**
 - C-factor × below-grade walls**
 - Thermal bridge effects (ψ and χ factors)** where applicable
- Fenestration may be subject to prescriptive limits

ASHRAE 90.1 Envelope Trade-Off Method

- Envelope Performance Factor (EPF) method
- The proposed design must perform **equal to or better than the base design**

Proposed ≥ Base performance

Demonstrating compliance

Provide either:

- **Envelope trade-off calculation**, or
- A compliance report generated using:
 - COMcheck** (*commercial buildings*)
 - REScheck** (*residential buildings*)

These tools **automatically perform the required envelope trade-off calculations** and generate documentation for submission.

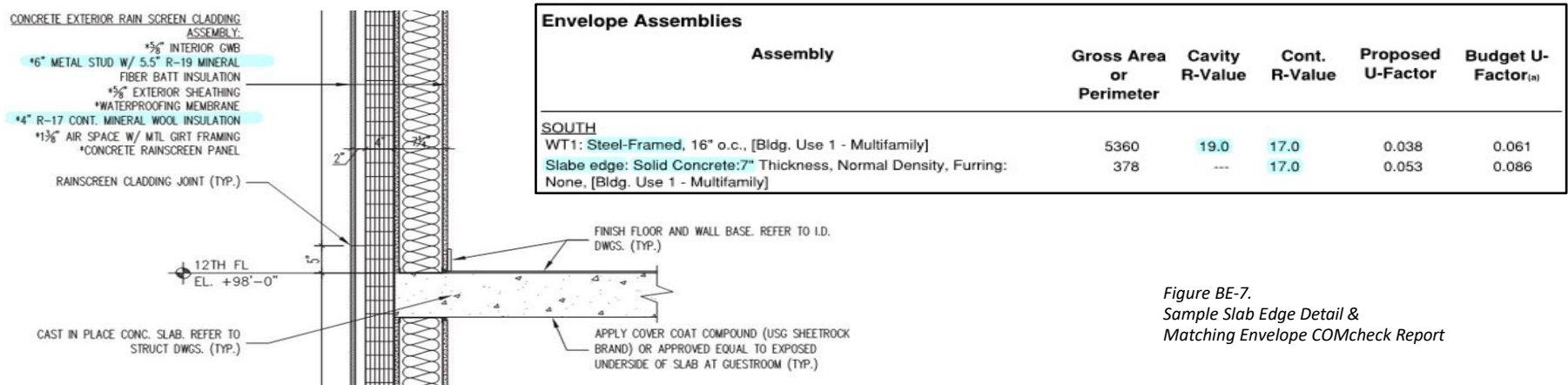


Figure BE-7.
Sample Slab Edge Detail &
Matching Envelope COMcheck Report

WINDOWS & DOORS – FENESTRATION IN THE ENVELOPE

U-factor and SHGC values

- For each fenestration type (e.g., fixed/operable window, skylight, exterior door, storefront, etc.), Assembly U-factor and Solar Heat Gain Coefficient (SHGC) values must be specified in the window/door schedule on drawings, and must not exceed the maximum allowed values. For Commercial building windows, the maximum assembly U-factors depend on the vertical location of the window on the above-grade wall, with more stringent U-factors for windows installed below 95' above-grade. See page [BE-3]. The 95' demarcation line must be indicated on building elevation drawings for Commercial buildings.
- Next to the U-factor and SHGC values specified in the schedule, provide the fenestration assembly manufacturer's information (e.g., 'ABC Windows/xyz 9000 series, or Approved equal') that will satisfy the U-factor and SHGC requirements. U-factors shall be determined by a third-party accredited, independent laboratory, recognized by ANSI, ILAC MRA and labeled and certified by the manufacturer.

R402.4
C402.5
5.5.4.3
5.5.4
1 RCNY §5000-01 (g)(1)(i)
R402.4
C402.6.3/5.8.3.2
R303.1.3
C303.1.3/C402.5
/5.5.4.6

Air Leakage Rate and Visible Transmittance (VT)

- The window/door schedule on drawings must specify the air leakage rate of each proposed fenestration assembly type to demonstrate that the air leakage of fenestration assemblies do not exceed the maximum allowed leakage rate.
- Where required, the window/door schedule must identify Visible Transmittance (VT) of the proposed glazed fenestration products to meet the provisions in the applicable Code sections.

WINDOW & DOOR SCHEDULE								
TAG	TYPE	FRAME MATERIAL	NOMINAL DIM. (W X H)	MANUFACTURER - MODEL NO.	ASSEMBLY U-FACTOR	SHGC	VT	AIR LEAKAGE RATE (CFM/SF)
W1	FIXED	METAL	7'-0" X 7'-0"	ABC WINDOWS - D999 SERIES OR APPROVED EQUAL	0.28	0.34	0.50	0.16
W2	CASEMENT - OPERABLE	METAL	4'-6" X 2'-3"	ABC WINDOWS - EF00 SERIES OR APPROVED EQUAL	0.38	0.34	0.50	0.18
SW1	SKYLIGHT	METAL	2'-10" X 5'-2"	SKL CORP. - GHT000 SERIES OR APPROVED EQUAL	0.46	0.38	0.54	0.18
W5	STOREFRONT - FIXED GLAZING	METAL	VARIES; SEE A-301 ~305 FOR LOCATIONS & DIM.	GLD CO. - STR #Z111 OR APPROVED EQUAL	0.30	0.34	0.50	0.05
D1	STOREFRONT - ENTRANCE GLASS DOOR	METAL	3'-0" X 7'-6"	GLD CO. - STR #Z111 OR APPROVED EQUAL	0.70	0.36	0.52	0.80
D2	OPAQUE SWINGING DOOR	METAL	3'-0" X 7'-0"	OPQ COMPANY RST-#22-33 OR APPROVED EQUAL	0.48	N/A	N/A	0.80

Figure BE-8. Sample Window & Door Schedule

- Fenestration U-factor values must be the 'whole assembly' U-factor, instead of 'center-of-glass' U-factor, and must be furnished by the manufacturer.
- Differentiate Fixed and Operable windows' U-factor values in the window schedule where required, as the Code-prescribed maximum U-factors for Fixed and Operable windows may vary depending on the referenced Code.

SPANDREL PANEL EFFECTIVE U-FACTORS

C303.1.5
5.5.3

**TABLE C303.1.5
DEFAULT EFFECTIVE U-FACTORS FOR SPANDREL PANELS^a**

RATED R-VALUE OF INSULATION BETWEEN FRAMING MEMBERS		None	R-4	R-7	R-10	R-15	R-20	R-25	R-30
Frame Type	Spandrel Panel	Default U-factor							
Aluminum without thermal break ^b	Single glass pane, stone, or metal panel	U-0.445	U-0.285	U-0.259	U-0.247	U-0.236	U-0.230	U-0.226	U-0.224
	Double glazing with no low-e coatings	U-0.356	U-0.273	U-0.254	U-0.244	U-0.234	U-0.229	U-0.226	U-0.223
	Triple glazing or double glazing with low-e glass	U-0.313	U-0.263	U-0.249	U-0.241	U-0.233	U-0.228	U-0.225	U-0.223
Aluminum with thermal break ^c	Single glass pane, stone, or metal panel	U-0.429	U-0.243	U-0.212	U-0.197	U-0.184	U-0.176	U-0.172	U-0.169
	Double glazing with no low-e coatings	U-0.328	U-0.228	U-0.205	U-0.193	U-0.182	U-0.175	U-0.171	U-0.168
	Triple glazing or double glazing with low-e glass	U-0.277	U-0.217	U-0.199	U-0.189	U-0.180	U-0.174	U-0.170	U-0.167
Structural glazing ^d	Single glass pane, stone, or metal panel	U-0.428	U-0.217	U-0.180	U-0.161	U-0.145	U-0.136	U-0.130	U-0.126
	Double glazing with no low-e coatings	U-0.316	U-0.199	U-0.172	U-0.157	U-0.143	U-0.135	U-0.129	U-0.126
	Triple glazing or double glazing with low-e glass	U-0.257	U-0.186	U-0.165	U-0.152	U-0.140	U-0.133	U-0.128	U-0.125
No framing or insulation is continuous ^e	Single glass pane, stone, or metal panel	U-0.445	U-0.160	U-0.108	U-0.082	U-0.058	U-0.045	U-0.037	U-0.031
	Double glazing with no low-e coatings	U-0.356	U-0.147	U-0.102	U-0.078	U-0.056	U-0.044	U-0.036	U-0.030
	Triple glazing or double glazing with low-e glass	U-0.313	U-0.139	U-0.098	U-0.076	U-0.055	U-0.043	U-0.035	U-0.030

- a. Extrapolation outside of the table and interpolation between values in the table shall not be permitted. Assemblies with distance between framing less than 30 inches (762 mm), or not included in the default table, shall have a U-factor determined by testing in compliance with ASTM C1363 or modeling in compliance with ANSI/NFRC 100. Spandrel panel assemblies in the table do not include metal backpans. For designs with metal backpans, multiply the U-factor by 1.20. U-factors for spandrel panels include a 3/4 in. air gap and 5/8 in. gypsum board with R-value of 0.56 for the interior finish. The gypsum board is assumed to span between the window sill and a channel at the floor.
- b. This frame type shall be used for systems that do not contain a non-metallic element that separates the metal exposed to the exterior from the metal that is exposed to the interior condition.
- c. This frame type shall be used for systems where a urethane or other non-metallic element separates the metal exposed to the exterior from the metal that is exposed to the interior condition.
- d. This frame type shall be used for systems that have no exposed mullion on the exterior.
- e. This frame type shall be used for systems where there is no framing, or the insulation is continuous across and uninterrupted by the framing (also known as mullion wrap).

- NOTE 1: To demonstrate compliance, provide COMcheck envelope analysis by:
 - entering the Proposed Spandrel panel U-factor value identified from the Table C303.1.5; and
 - choosing the Baseline U-factor of metal-framed walls (U-0.061).
- NOTE 2: If the Proposed Spandrel panel type is not found in the Table – e.g., Assembly with backpans, Assembly with no insulation – THERM Analysis must be performed and documented on drawings.

Info for THERM is found in the link below.
<https://windows.lbl.gov/software/therm>

COMMERCIAL BUILDING FENESTRATION MAXIMUM U-FACTORS

**TABLE C402.5
BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR
AND SHGC REQUIREMENTS^c**

C402.5
5.5.4.3

CLIMATE ZONE	4		5	6
	Vertical fenestration			
	U-factor ^a			
	Below 95' ^d	Above 95' ^d		
Metal framing, Fixed fenestration	U-0.30	U-0.34	U-0.34	U-0.34
Metal framing, Operable fenestration	U-0.40	U-0.42	U-0.43	U-0.41
Nonmetal framing, all fenestration	U-0.28	U-0.28	U-0.27	U-0.27
Entrance doors	U-0.63		U-0.63	U-0.63
SHGC ^b				
PF < 0.2	0.33		0.33	0.34
0.2 ≤ PF < 0.5	0.40		0.40	0.41
PF ≥ 0.5	0.53		0.53	0.54
Skylights				
U-factor	U-0.48		U-0.48	U-0.48
SHGC ^b	0.38		0.38	0.38

- U-factor shall be rated in accordance with NFRC 100. U-factor shall reflect project-specific sizes, and include framing components plus glazing. SHGC shall be rated in accordance with NFRC 200.
- SHGC shall reflect project-specific sizes, and include framing components plus glazing. SHGC of the center-of-glass shall be an acceptable alternative for determining compliance with the SHGC requirements for the overall fenestration area.
- Fixed fenestration shall include glazed curtain walls, pre-fabricated storefronts and factory assembled fixed window units.
- Where a portion of the fenestration frame is installed at or above 95 feet above grade, the unit may meet the requirements for 95 feet and above.

- NOTE: Where any portion of the window unit is installed above 95' above-grade, U-factor requirement of 95' and above may apply.

FENESTRATION AREA

The *Window-to-Wall Ratio (WWR)* -- the ratio (%) of vertical fenestration area to gross above-grade wall area (or gross wall area for 2025 NYC ASHRAE 90.1 applications) -- must be noted on an EN- labeled drawing in conjunction with building envelope diagrams and the envelope energy analysis. The building envelope diagrams must list all opaque wall areas and vertical fenestration areas per each building orientation. The area values of each opaque wall type and fenestration type listed in the envelope diagrams must match the values entered in the envelope energy analysis (e.g., 'Gross Area' values in COMcheck).

■ Maximum Vertical Fenestration Area (*when following ECC*)

- *Maximum WWR:* 30%
- *Maximum WWR:* 40% *permitted with certain requirements including daylight responsive controls*
- *When WWR > 40%:* ASHRAE must be chosen as Code Compliance Path, as ECC does not allow WWR > 40%.

C402.5.1

■ Maximum Vertical Fenestration Area (*when following ASHRAE*)

- *Maximum WWR:* 40%
- *When WWR > 40%:* Energy Code compliance may be demonstrated through either
 - a) COMcheck (with envelope tradeoff) envelope analysis, or
 - b) Energy Modeling (total building performance) energy analysis.

NOTE:

ASHRAE allows an exception for ground-level street-facing fenestration that has:

- Height limit: 20 ft.
- Overhang : PF > 0.5.
- Fenestration area < 75% of wall area.

Separate calculations needed, no averaging for compliance. No credit for underutilization.

5.5.4.2.1
5.6

■ Maximum Skylight Fenestration Area

- *Maximum skylight fenestration area:* 3% of the gross roof area
- *Maximum skylight fenestration area:* 6% of the gross roof area *permitted with daylight responsive controls*

C402.5.1
5.5.4.2.2

■ Minimum Skylight Fenestration Area

- For an enclosed space $\geq 2,500$ sf, and directly under a roof with ceiling height > 15' and
 - of space types including office, lobby, atrium, concourse, corridor, warehouse storage, among others

C402.5.2
5.5.4.2.3

Minimum skylight fenestration area requirement: Minimum 3% of the gross roof area, or
Minimum 1% 'Skylight Effective Aperture'

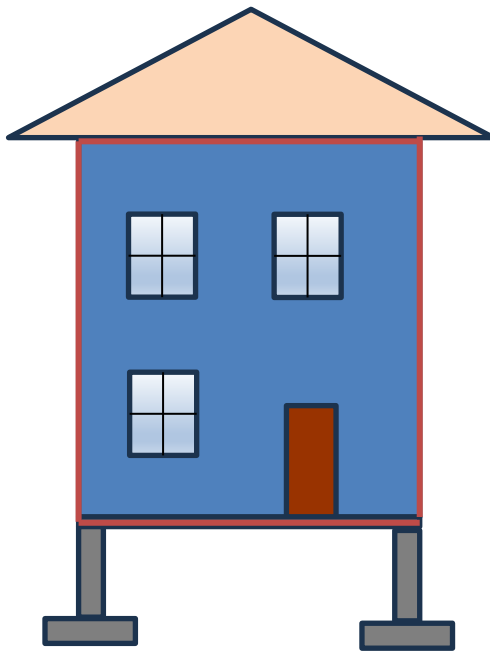
- See Section C402.5.2 and 5.5.4.2.3 for complete applicable space types, minimum total daylight area requirement, and definition of 'Skylight Effective Aperture.'

AIR BARRIER

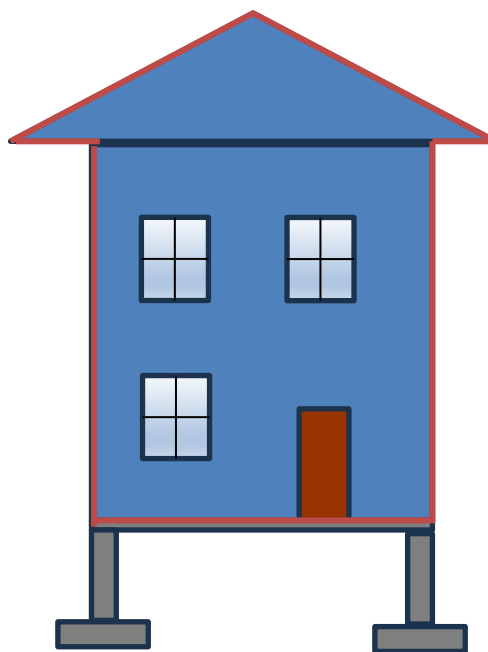
- **Continuous Air Barrier (Drawings must show):**

- Air barrier components and location within the building thermal envelope
- A continuous air barrier plane across all assemblies
- Boundaries between:
 - Conditioned and unconditioned space

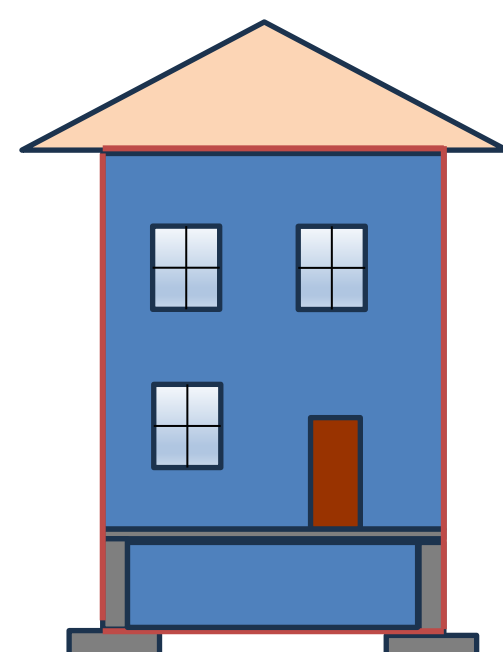
————— Air Barrier



Unconditioned: Attic & Crawl Space
Conditioned: Main living area



Unconditioned: Crawl Space
Conditioned: Main living area & Attic



Unconditioned: Attic
Conditioned: Main living area & Crawl Space

Figure BE-12. Air Barrier around building

AIR BARRIER

- **Drawings must clearly identify:**

- Location of the air barrier within each assembly
- A continuous air barrier plane across:
 - Walls
 - Roofs
 - Floors

- **Continuity must be demonstrated at:**

- Wall-to-roof (including parapets and copings)
- Wall-to-floor and foundation
- Corners and transitions between assemblies
- Fenestration and door interfaces
- Penetrations (MEP, Structural, attachments)

- **Typical representation methods:**

- Wall-to-roof (including parapets and copings)
- Continuous line (often highlighted in details)
- Notes identifying air barrier materials
- Keyed details showing transitions and sealing methods

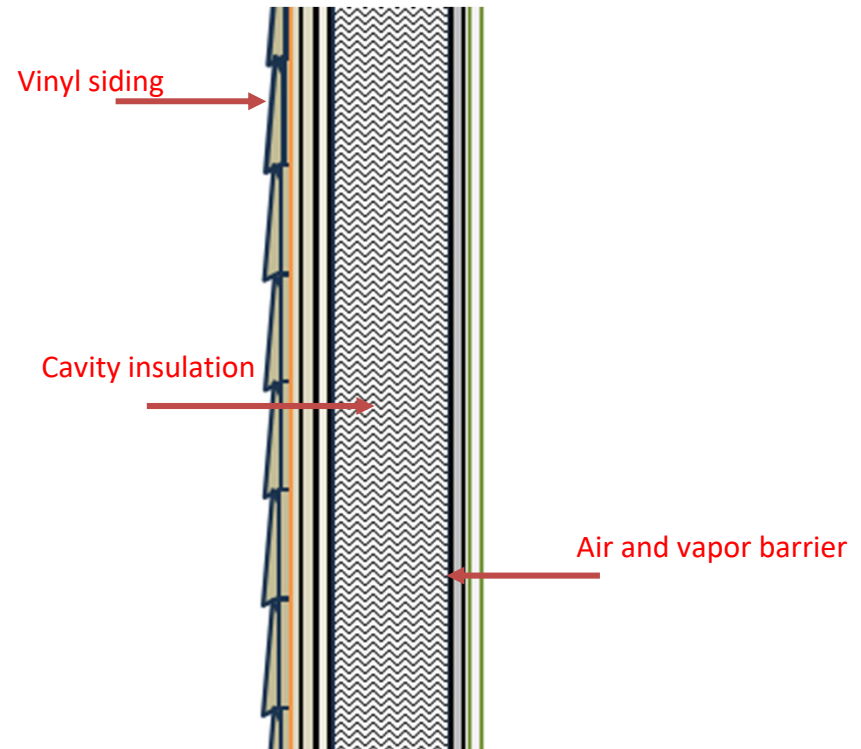


Figure BE-13. Air Barrier- Wall Section

AIR BARRIER

Openings in the Building Envelope

Drawings must identify specific construction measures, configuration, devices and/or performance standards to limit air leakage in particular envelope areas including, but not limited to, the following:

- 1) Fenestration and doors: Maximum allowed air leakage.
- 2) Outdoor air intakes and exhaust openings: Motorized Shutoff dampers are required unless gravity dampers are allowed.
- 3) Doors/Access Openings to shafts, chutes, vents, stairways and elevator lobbies: Gasketing, weatherstripping, and sealing.
- 4) Loading dock: Weatherseals to restrict infiltration.
- 5) Vestibules*: Plan configuration and self-closing devices on doors.
- 6) Recessed lighting: Luminaires installed in building envelope must be:
 - a) IC-rated,
 - b) Labeled with the Code-prescribed maximum air leakage rate, and
 - c) Sealed with gasket or caulk.

C402.6/5.4.3

C402.6.3/5.8.3.2

C402.6.5/6.4.3.4

C402.6.4/5.4.3.2

C402.6.7/5.4.3.3

C402.6.6/5.4.3.4

C402.6.1.2.1/5.4.3.1.1

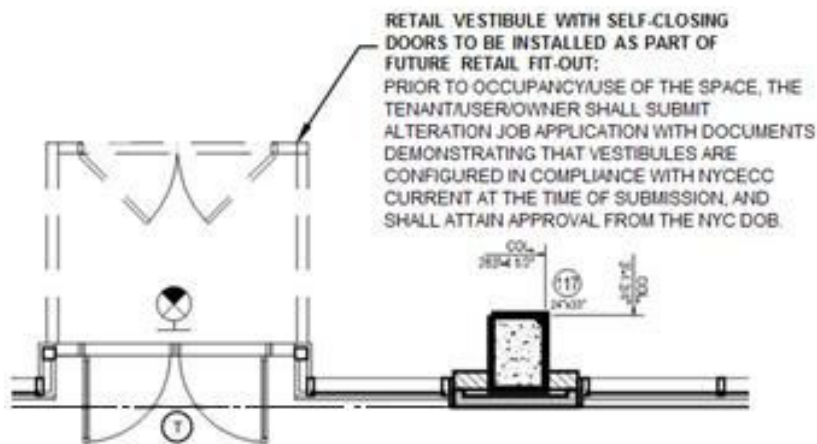


Figure BE-14-1
A Sample Acceptable Plan with Specific Notes Requiring Future Compliance

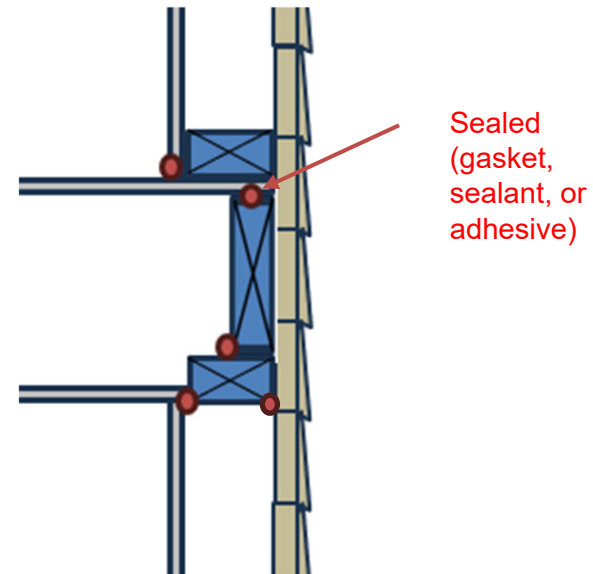


Figure BE-14-2
Wall section illustrating key air barrier transition points requiring continuous sealing (e.g., gasket, sealant, or adhesive) to maintain air barrier continuity.

AIR BARRIER

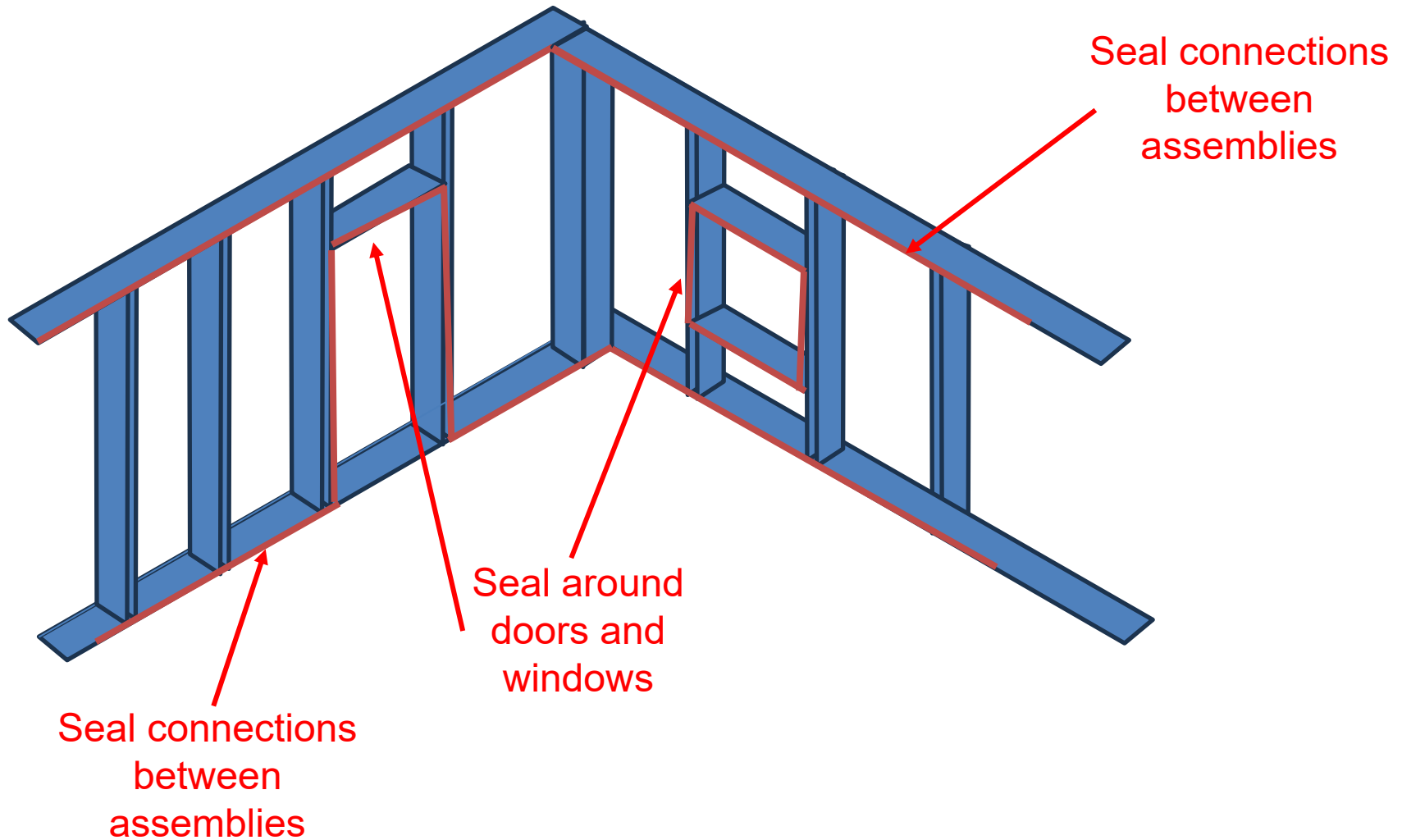


Figure BE-15.
Where sealants (represented by the red lines) should be applied to all assemblies

AIR LEAKAGE TESTING

C402.6.2/5.4.3
R402.5.1.2/R402.5.1.3/
R402.5.1.4

■ General Requirements

All buildings must undergo air leakage testing by an approved third party.

• Maximum Air Leakage limits:

- Commercial: 0.35 cfm/ft² at 75 Pa (0.3 in. w.g.)
- Residential: 3.0 ACH at 50 Pa

• Testing Protocol:

- Third party testing required
- ASTM E779, ASTM E1827, ASTM E3158, or an approved equivalent method.
- Pressurization and depressurization
- Multi-point regression method.

• Required Documentation

- Envelope test area
- Building volume
- Number of stories
- Measured leakage rate

■ Large Buildings (> 50,000 ft²)



Testing is still required — no exemption

Guarded testing (ASTM E3158) is permitted as an alternative method

- Must include critical areas:
 - Roofs
 - Entrances / loading docks
 - Floors over unconditioned space
- ≥25% of above-grade wall area tested
- Area-weighted average must comply with whole-building limit

EQUIPMENT PENETRATIONS IN BUILDING ENVELOPE

■ Calculation of Equipment Penetration Areas

When mechanical equipment listed in Table C403.3.2(4) or Table 6.8.1-4 are proposed:

- Drawings must identify the calculated total area of the equipment penetrations in the opaque above-grade walls by the supporting diagrammatic building elevations.
- Drawings must also identify the percentage of the total equipment penetration area out of the total opaque above-grade wall area.

C402.1.2.1.8
5.5.3

■ U-factor 0.5 for Penetration Areas > 1% of Opaque Walls

- If the total area of penetrations from mechanical equipment specified above *exceeds 1%* of the total opaque above-grade wall area, the equipment penetration area must be identified as a separate wall assembly with a *default U-factor of 0.5 or published and approved U-factor for that equipment*.
- Accordingly, in the envelope energy analysis (e.g., Component performance alternative calculation, COMcheck, or Energy Modeling) the total equipment penetration area must be entered as a separate exterior wall type of proposed U-factor 0.5 and budget U-factor identical to the surrounding wall.

C402.1.2.1.8
5.6.1.1.1



Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U- Factor _(a)
SOUTH					
Exterior Wall - Type 1A: Concrete Block:8", Partially Grouted, Cells Empty, Normal Density, Furring: None, [Bldg. Use 1 - Multifamily]	4350	---	10.0	0.082	0.086
Window - WF1: Metal Frame:Fixed, >= 95' above-grade, Perf. Specs.: Product ID WF1, SHGC 0.36, >= 95' above-grade, [Bldg. Use 1 - Multifamily] (c)	78	---	---	0.350	0.360
Window - WO1: Metal Frame:Fixed, 95' above-grade, Perf. Specs.: Product ID WO1, SHGC 0.36, < 95' above-grade, [Bldg. Use 1 - Multifamily] (c)	1568	---	---	0.420	0.300
Mech PTAC Units Through-Wall: Other Mass Wall, Heat capacity 5.0, [Bldg. Use 1 - Multifamily] (b)	462	---	---	0.500	0.086

Figure BE-17.
Sample Envelope COMcheck report with
Equipment Penetration Area entered as a separate opaque wall type

FUEL-BURNING APPLIANCES

Thermally Isolated and Insulated Rooms

When open combustion air ducts provide combustion air to open combustion fuel-burning appliances (e.g., natural draft boilers or furnaces) in a room, the room must be thermally isolated from the building it serves, and sealed and insulated to meet the requirements of Table R402.1.2, Table C402.1.3 or C402.1.4.

R402.1.6
C402.1.5

Direct Vent Appliances

If the fuel-burning appliances are to be located in a room within the building thermal envelope, the appliances must be identified as direct vent appliances with both intake and exhaust pipes installed continuous to the outside.

R402.1.6
C402.1.5

Fireplaces with Tight-fitting Doors or Dampers

Fireplaces or fireplace units that are designed to allow an open burn must be specified with tight-fitting flue dampers or tight-fitting doors labeled with applicable Code-required UL listings.

R402.5.2
C402.2.8

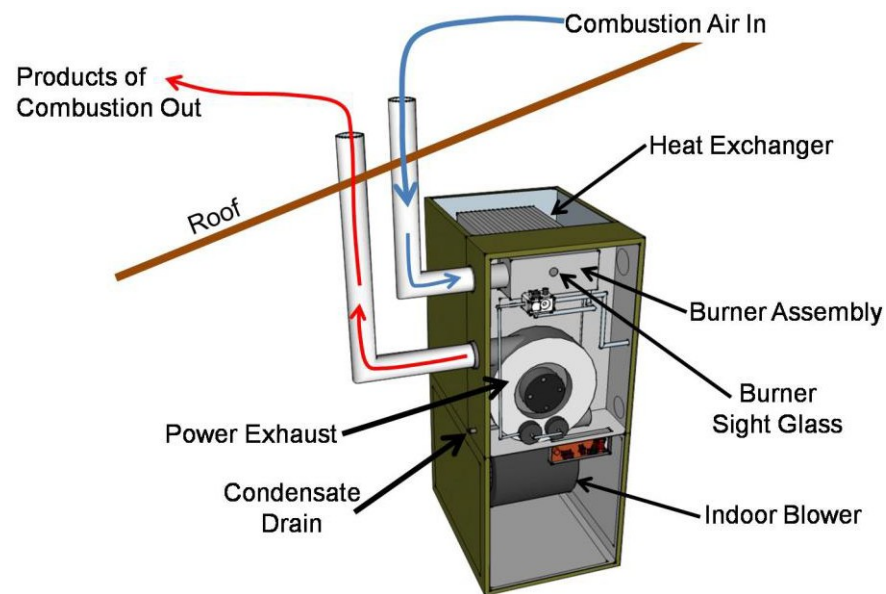


Figure BE-18. A direct-vent sealed-combustion furnace with dedicated pipes for combustion air and exhaust installed continuous to the outside
Source: basc.pnnl.gov/images

FENESTRATION ORIENTATION – ASHRAE-ONLY, PRESCRIPTIVE¹ REQUIREMENTS

■ The Vertical Fenestration on the West- and East-Oriented Walls

(must comply with either A or B below)

A) Limiting Fenestration Area

5.5.4.5

West-oriented vertical fenestration area must be $\leq 1/4$ of the Total vertical fenestration area,
and

East-oriented vertical fenestration area must be $\leq 1/4$ of the Total vertical fenestration area.

B) Limiting SHGC Values

5.5.4.5

West-oriented vertical fenestration area x SHGC for West-oriented fenestration must be $\leq$
 $1/4$ of the Total vertical fenestration area x Code-prescribed maximum SHGC for Climate Zone 4a (from Table 5.5-4),
and

East-oriented vertical fenestration area x SHGC for East-oriented fenestration must be $\leq$
 $1/4$ of the Total vertical fenestration area x Code-prescribed maximum SHGC for Climate Zone 4a (from Table 5.5-4).

1. Prescriptive requirements **MUST** be met when Prescriptive energy analysis method (e.g., Tabular analysis) is chosen to demonstrate Energy Code compliance. If COMcheck or Energy Modeling is used for the energy analysis, the software program automatically takes into account the vertical fenestration areas and SHGC values on the west and east-oriented wall in its computation.

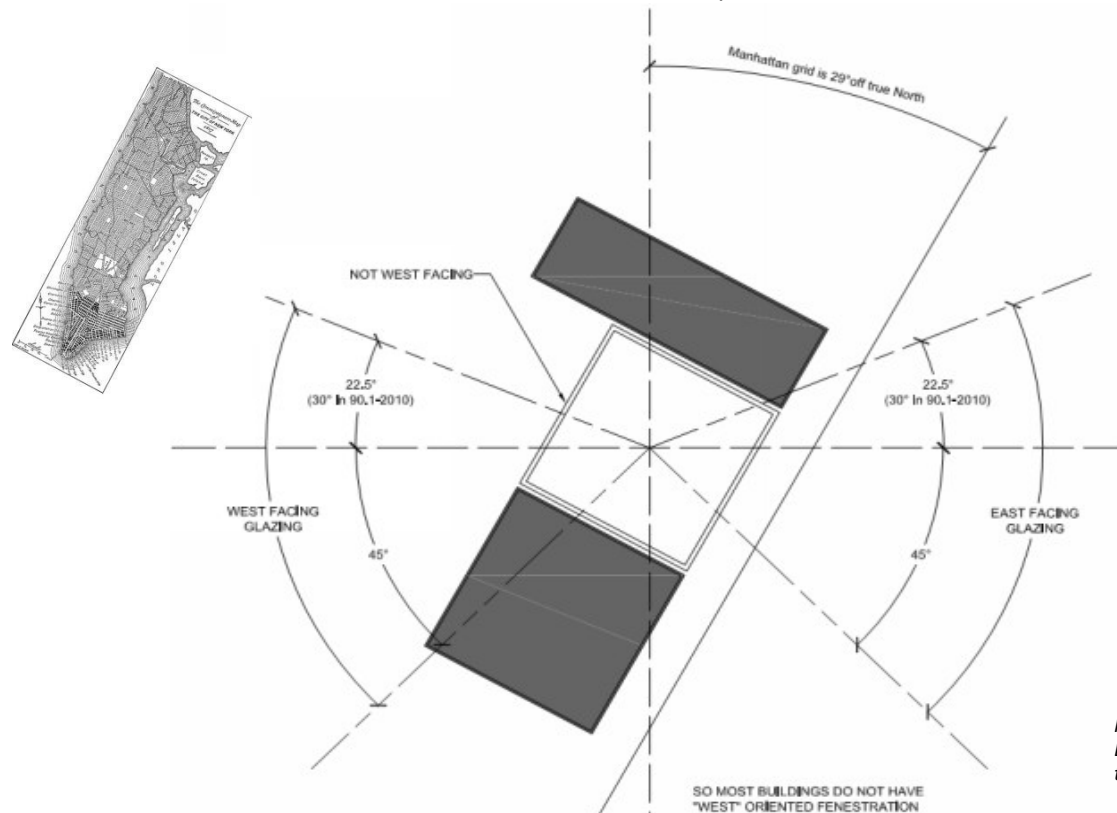


Figure BE-19.
Buildings on Manhattan's grid $\pm 29^\circ$ off of true north are likely to have no West-oriented vertical fenestration

RESIDENTIAL BUILDING ENVELOPE

Blown or Sprayed Roof/Ceiling Insulation

- The thickness of blown-in or sprayed roof/ceiling insulation (fiberglass or cellulose) in the attic must be indicated on markers for every 300 sf.
- The markers must indicate minimum initial installed thickness with numbers of a minimum of 1 inch in height.

R303.1.1.1

Protection of Exposed Foundation Insulation

Rigid, opaque and weather-resistant protective coverings must be applied to protect the insulation over the exterior of basement walls, crawl space walls and the perimeter of slab-on-grade floors.

R303.2.1

Slab-on-Grade Floor Insulation at the Perimeter

- Slab-on-grade floors with a floor surface < 12" below-grade must be insulated at the slab perimeter with minimum R-10. For Heated slab floors on-grade, R-10 insulation must be provided under the full heated slab area in addition to the required slab perimeter insulation of minimum R-10.
- The insulation must be extended downward or horizontally (as shown in the Figures below) a minimum of 4' for Climate Zone 4A.
- Insulation extending away from the building must be protected by pavement or by minimum 10" of soil.

R402.2.10

Insulation at Tenant Separation Walls

Fire-separated walls between dwelling units in two-family houses or townhouses must be insulated at a minimum R-value of R-10.

R402.5.6

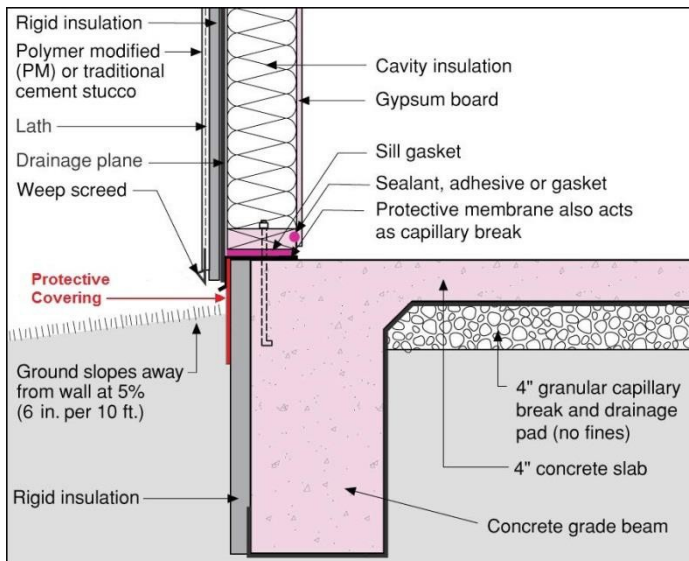
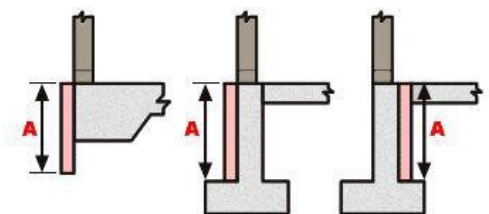
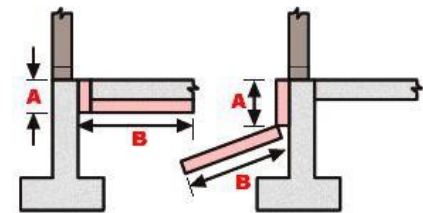


Figure BE-20.a.
Protection of Insulation Over the Grade Beam
Source: basc.pnnl.gov/images



Vertical Insulation (A = Insulation Depth)



Horizontal Insulation (A + B = Insulation Depth)

Figure BE-20.b.
Slab Insulation Methods
Source: basc.pnnl.gov/images

RESIDENTIAL BUILDING ENVELOPE

■ Insulation in Ceilings

- Ceiling with Attic Spaces: Minimum R-49; or *Uncompressed* R-38 covering 100% of ceiling and extended over the wall top plate at the eaves (See Figures below).
- Ceiling without Attic Spaces: When installation of required minimum R-49 insulation in 100% of the ceiling is unachievable, R-30 insulation is allowed for a maximum 500 sf or maximum 20% of the total insulated ceiling area, whichever is less. If partial R-30 insulation is proposed, provide roof area calculations with roof plan diagrams.

R402.2.1

R402.2.2

■ Access Hatches and Doors

Access doors to unconditioned spaces such as attics and crawl spaces must be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces (e.g., adjacent ceiling surface).

R402.2.5

■ Sunroom Insulation and Fenestration

- Sunrooms enclosing conditioned space must meet the Residential building envelope insulation and fenestration requirements.
- Sunrooms *with thermal isolation* and enclosing conditioned space must meet the following insulation and fenestration requirements:
 - Ceiling Insulation: Min. R-19
 - Wall Insulation: Min. R-13
 - Vertical Fenestration: Max. U-0.45
 - Skylight: Max. U-0.70
- Conditioned space *with thermal isolation* must be controlled as a separate zone for heating and cooling, or conditioned by separate equipment.

R402.2.13

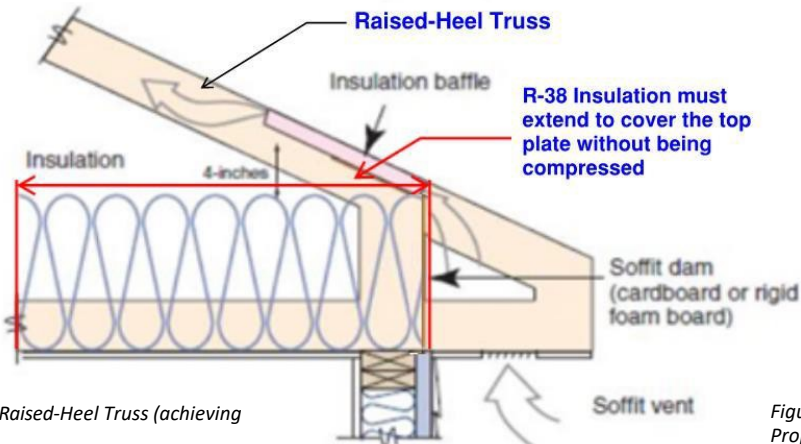


Figure BE-21-a Raised-Heel Truss (achieving Energy Truss)

Source: basc.pnnl.gov/images



Figure BE-21-b Access Hatch Properly Insulated

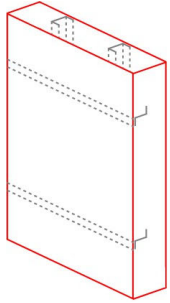
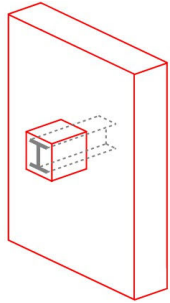
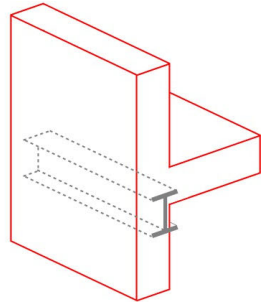
Source: basc.pnnl.gov/images

THERMAL BRIDGES IN RESIDENTIAL BUILDING ENVELOPE

1 RCNY §5000-01
R402.7

Documentation of Thermal Bridges

- Architectural plan set drawings must report all thermal bridges in the building thermal envelope in *three categories* below.
- Documentation requirements apply to Residential and Commercial buildings for all New buildings, Additions, and Alterations to the building envelope work scope.

Category	CLEAR FIELD Thermal Bridge	POINT Thermal Bridge	LINEAR Thermal Bridge
Definition	Area-based thermal transmittance associated with elements of a building envelope assembly which repeat at regular intervals. Most clear field thermal bridges are taken into account in the assembly types found in 2025 NYC ASHRAE 90.1 Appendix A.	Element-based thermal transmittance associated with a discrete element that penetrates the building envelope. Point thermal transmittance is heat flow divided by the temperature difference between the interior and exterior sides of the assembly, represented by a X-value (Chi-Value) in units Btu/hr•°F.	Length-based thermal transmittance associated with horizontal, vertical, or diagonal elements within the building envelope Linear thermal transmittance is heat flow divided by length and by the temperature difference between the interior and exterior sides of the assembly, represented by a Ψ-value (Psi-Value) in units Btu/hr•ft•°F.
Typical Assemblies	Wall assembly with metal studs, or brick ties, or z-girts	A beam penetrating a wall, A column penetrating a roof or floor, An anchor or connection used to attach an element to the building	Balcony, Floor, Fenestration perimeter transition, Parapet, Floor slab edge, Shelf angle
Sample Illustration			
Documentation Requirements on Architectural Plan Set	- List of CLEAR FIELD Thermal Bridges - How they are entered in Envelope energy analysis - Reference section detail locations	- List of POINT Thermal Bridges ≥ 8 in² for Residential buildings, and ≥ 12 in² for Commercial buildings - Size and quantity of each thermal bridge type - Reference section detail locations	- List of LINEAR Thermal Bridges - Ψ-value of each thermal bridge type and its source - Total length of each thermal bridge - How they are entered in Envelope energy analysis - Reference section detail locations

[EXAMPLE] DOCUMENTATION OF THERMAL BRIDGES (REQUIRED IN ARCHITECTURAL PLANS)

CLEAR FIELD Thermal Bridges			
CFTB.no	Assembly/Thermal Bridge Description	Assembly ID in Energy Analysis ¹	Section Detail Location
CFTB.1	Concrete roof deck with R-33ci	RF-1	A-502/4
CFTB.2	Concrete roof deck with R-30ci	RF-2	A-502/5
CFTB.3	CMU wall, EIFS finish	WT-1	A-501/1
CFTB.4	CMU wall, Metal panel cladding	WT-2	A-501/2
CFTB.5	Spandrel wall – Aluminum frame w. thermal break, Single pane glass, Metal panel	WT-3	A-508/4
CFTB.6	Mass floor over parking garage	FL-1	A-503/5
CFTB.7	Mass floor over unconditioned space at courtyard	FL-2	A-503/6

1. Envelope ResCheck report on EN-004

POINT Thermal Bridges				
PTB.no	Assembly/Thermal Bridge Description	Size [sq. inches]	Number of Occurrence	Section Detail Location
PTB.1	Structural beam penetration on walls @ courtyard	14	6	A-502/7
PTB.2	Structural column (pilotis) penetrating 2nd floor slab/soffit @ courtyard	21	4	A-504/1
PTB.3	Main entrance canopy structural member penetration on walls	9	2	A-504/2

LINEAR Thermal Bridges						
LTB.no	Type of Thermal Bridge	Ψ - Value [Btu/hr•ft•°F]	Ψ - Value Source/ Calculation	Total Length [ft]	Assembly ID in Energy Analysis ¹	Section Detail Location
LTB.1	Parapet	0.42	Default value from Table C402.6	284	n/a	A507/1
LTB.2	Balcony	0.45	Ψ - Value of better performing details per BC Hydro Building Envelope Thermal Bridging Guide v.1.2	34	WT-B	A507/7
LTB.3	Floor Slab Edge-1	0.44	Default value from Table C402.6	72	WT-SE1	A507/2
LTB.4	Floor Slab Edge-2	0.40	Ψ - Value of better performing details per BC Hydro Building Envelope Thermal Bridging Guide v.1.2	21	WT-SE2	A507/3
LTB.5	Fenestration Perimeter	0.32	Default value from Table C402.6	617	n/a	A702/1, A702/2, A702/5, A702/6
LTB.6	Shelf Angle	0.41	Default value from Table C402.6	65	n/a	A508/2, A508/3

1. Envelope ResCheck report on EN-004

THERMAL BRIDGES IN COMMERCIAL BUILDING ENVELOPE

Thermal Bridges Must Be Identified

Construction documents must evaluate and detail thermal bridges at key envelope intersections, including:

Structural elements

- Structural framing and members
- Cladding attachment systems

Assembly intersections

- Roof edge / parapet
- Intermediate floor to wall
- Balcony or overhang to wall
- Balcony at vertical fenestration
- Cladding support locations
- Wall to vertical fenestration

Compliance Must Be Documented

Applicants must indicate whether each thermal bridge is:

Mitigated or Unmitigated

and provide the corresponding Ψ (psi) or χ (chi) factors using one of the following:

- Default values from **ECC Table C402.1.4**
- Default values from **2025 NYC ASHRAE 90.1 Table A10.1**
- Calculations in accordance with **ASHRAE 90.1 Section A10**
- Approved **thermal analysis or testing**

Compliance Path Determines the Approach

Component Performance / Trade-Off Path

- Identify all thermal bridges
- Provide ψ or χ factors for each bridge

Prescriptive Path

Thermal bridges must be mitigated in accordance with:

- ECC Section C402.7, or
- ASHRAE 90.1 Sections 5.5.5.1 – 5.5.5.5

1 RCNY §5000-01
C402.7
5.5.5

Thermal Bridge Type	Total Length / Quantity	Detail Location	Mitigated	Ψ -value / χ -value
Intermediate floor slab edge	180 ft	Wall Section A-501	Yes	0.04
Balcony slab connection	24 units	Detail 3/A-602	No	0.18
Window perimeter	1,250 ft	Window Detail A-701	Yes	0.03

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE: THERMAL BRIDGES (PRESCRIPTIVE)

■ Balconies and concrete floor decks (Prescribed mitigation method ECC)

C402.7.2.1

Balconies and floor decks should not interrupt the thermal envelope; however, when they do, they need to comply with one of the following:

- Continuous insulation
- An approved thermal break device rated at least R-10
- If Above-grade wall compliance is determined through area weighted U-factor, areas where balconies or floor decks penetrate the thermal envelope should be factored into the calculation with a default U-factor of 0.8 Btu/h-°F-ft².

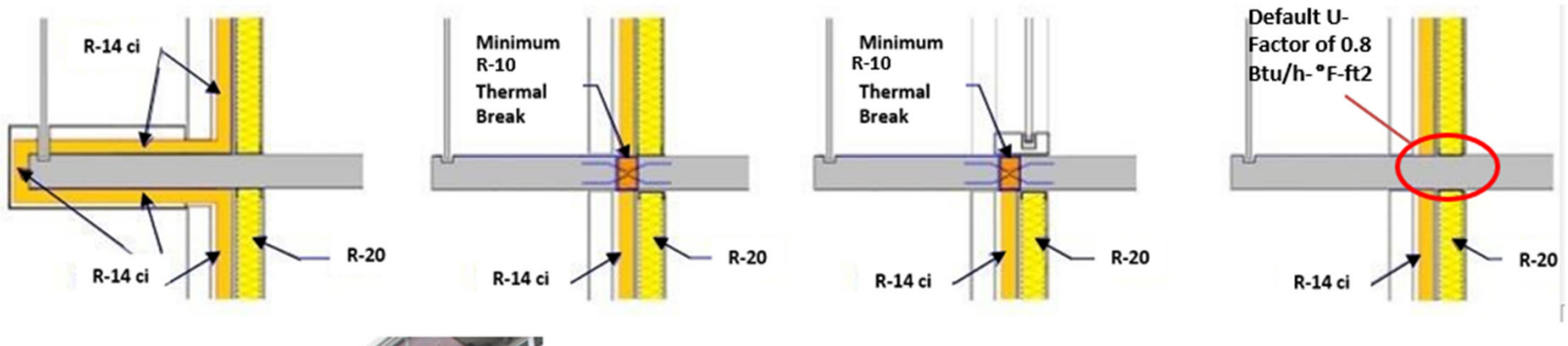


Figure BE-25
Thermal Bridge mitigation for balconies (ECC)

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE: THERMAL BRIDGES (PRESCRIPTIVE)

Walls & Intermediate Floor Intersections (ASHRAE)

At floor-to-external wall intersections, insulation must be continuous across the floor edge based on wall type and insulation location.

- Prescriptive Options (by wall type)
 - **Continuous insulation walls**
 - Exterior continuous insulation extends past the floor edge
 - **Cavity insulation walls (>50% of R-value)**
 - Insulation extends to the underside of the floor deck
 - May be interrupted by framing members
 - **Mass walls (exterior or integral insulation)**
 - Insulation extends past the floor edge, OR
 - Provide R-5 insulation at floor edge
 - **Mass walls (interior insulation)**
 - Interior insulation extends to underside of floor, AND
 - Provide additional R-5 insulation at floor edge, OR
 - Adjust wall performance per Table 5.5.5.2.1

Balconies / Floor Overhangs (ASHRAE)

- Limited to 35% of building perimeter, unless:
 - Thermally broken ($\geq R-12$)

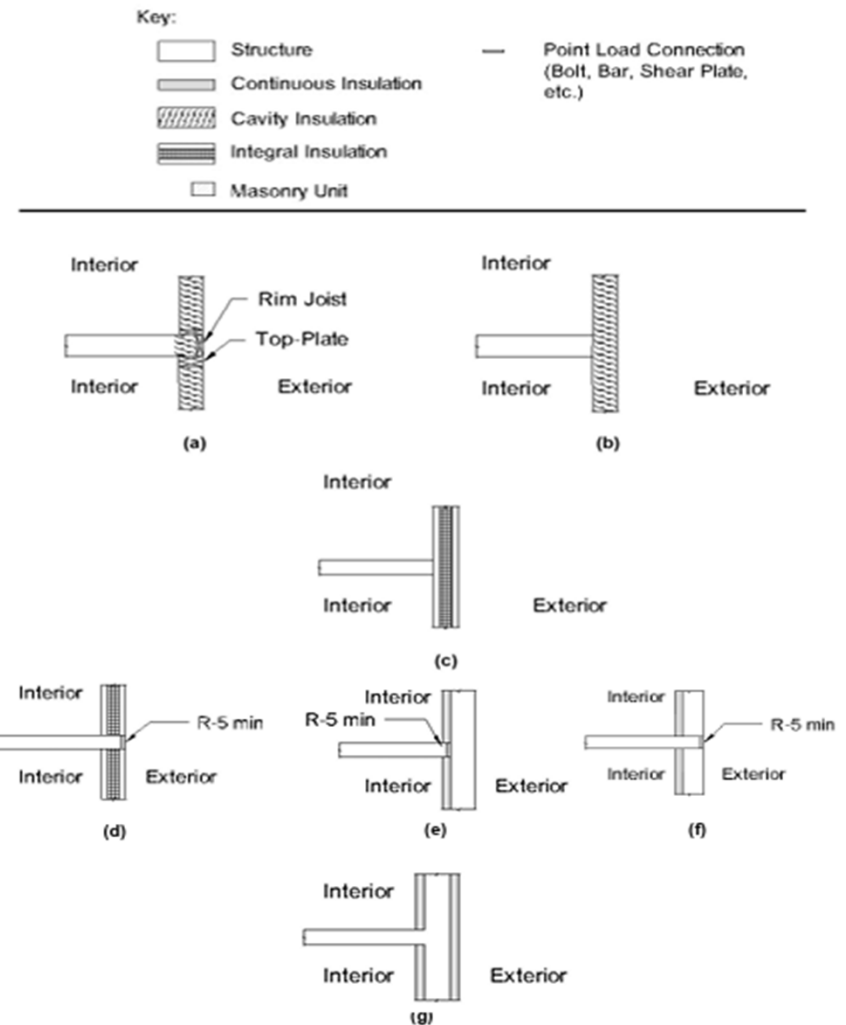


Figure K-4

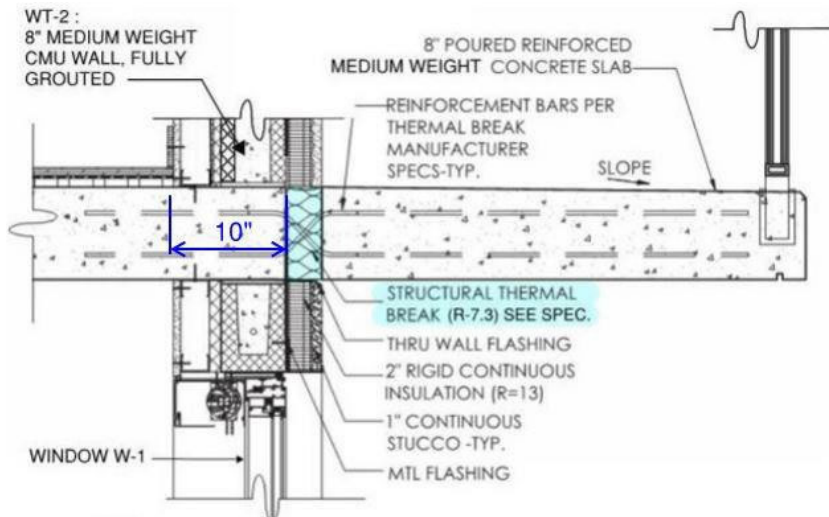
- a. Wall with cavity insulation (Section 5.5.5.2.1[b])
- b. Wall with cavity insulation (Section 5.5.5.2.1[b])
- c. Wall with integral insulation (Section 5.5.5.2.1[c])
- d. Mass wall with exterior integral insulation (Section 5.5.5.2.1[d][1])
- e. Mass wall with interior integral insulation (Section 5.5.5.2.1[d][1])
- f. Mass wall with interior integral insulation (Section 5.5.5.2.1[d][2])
- g. Mass wall with exterior continuous insulation plus interior insulation (Section 5.5.5.2.1[e])

Figure BE-26

Thermal Bridge mitigation for balconies and intermediate floors (ASHRAE)

Source of image: ASHRAE 90.1 Appendix K

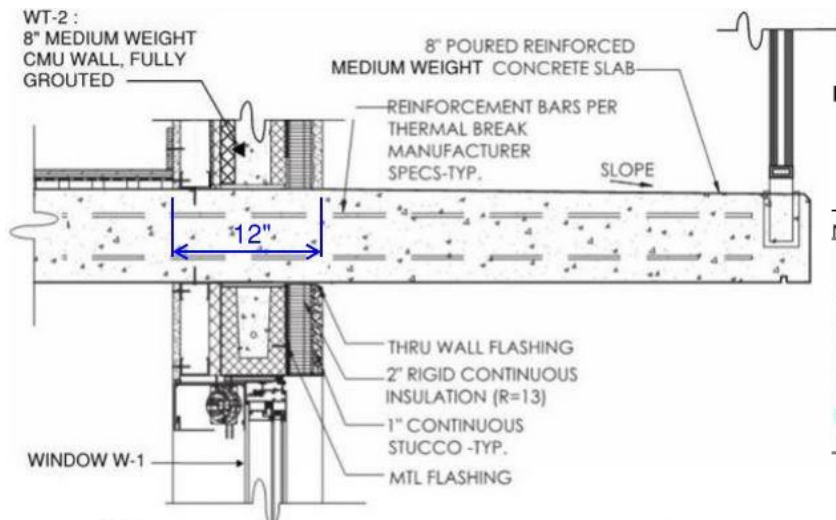
DOCUMENTING THERMAL BRIDGES IN BALCONY SLAB



1 BALCONY CONNECTION WITH THERMAL BREAK

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor _(B)
NORTH					
Exterior Wall 1: Concrete Block:8", Solid Grouted, Medium Density, Furring: None, [Bldg. Use 1 - Multifamily]	3780	---	13.0	0.066	0.086
Window 1: Metal Frame:Fixed, 95' above-grade, Perf. Specs.: Product ID WT1, SHGC 0.36, < 95' above-grade, [Bldg. Use 1 - Multifamily] (b)	580	---	---	0.380	0.300
Window 2: Metal Frame:Fixed, >= 95' above-grade, Perf. Specs.: Product ID WT2, SHGC 0.36, >= 95' above-grade, [Bldg. Use 1 - Multifamily] (b)	720	---	---	0.380	0.360
Slab edge1: Solid Concrete:10" Thickness, Medium Density, Furring: None, [Bldg. Use 1 - Multifamily]	255	---	7.3	0.103	0.086



2 BALCONY CONNECTION WITHOUT THERMAL BREAK

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor _(B)
NORTH					
Exterior Wall 1: Concrete Block:8", Solid Grouted, Medium Density, Furring: None, [Bldg. Use 1 - Multifamily]	3780	---	13.0	0.066	0.086
Window 1: Metal Frame:Fixed, 95' above-grade, Perf. Specs.: Product ID WT1, SHGC 0.36, < 95' above-grade, [Bldg. Use 1 - Multifamily] (b)	580	---	---	0.380	0.300
Window 2: Metal Frame:Fixed, >= 95' above-grade, Perf. Specs.: Product ID WT2, SHGC 0.36, >= 95' above-grade, [Bldg. Use 1 - Multifamily] (b)	720	---	---	0.380	0.360
Slab edge1: Solid Concrete:12" Thickness, Medium Density, Furring: None, [Bldg. Use 1 - Multifamily]	255	---	0.0	0.450	0.086

Figure BE-27.
Sample Balcony Edge Details &
Matching Envelope COMcheck Reports

BUILDING ENVELOPE – THERMAL PERFORMANCE: THERMAL BRIDGES (PRESCRIPTIVE)

C402.7.2.2

■ Cladding supports ECC (Prescriptive)

Cladding supports shall maintain the effectiveness of continuous insulation and minimize thermal bridging:

- Offset supports from structure (clip angles)
- Clip-and-rail systems
- Hat channels

The choice of approach depends on project-specific needs and requires coordination with the structural engineer.

■ Cladding supports (Prescribed mitigation method ASHRAE)

Shelf angles shall be:

- Offset from floor edge, or
- Supported using point connections

Point connection area shall not exceed:

- 1.5 in²/ft (carbon steel)
- 2.3 in²/ft (stainless steel)

Cladding supports penetrating continuous insulation shall:

- Use point connections, and
- Allow full depth of continuous insulation

BUILDING ENVELOPE – THERMAL PERFORMANCE: THERMAL BRIDGES (PRESCRIPTIVE)

C402.7.2.3

■ Structural beams and columns ECC (Prescribed)

When structural elements penetrate the thermal envelope, they shall:

- Be insulated with minimum R-5, extending ≥ 2 ft beyond the insulation plane, OR
- Include an approved thermal break device.

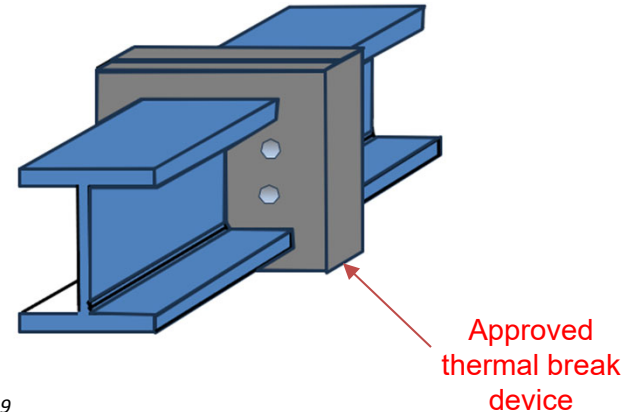
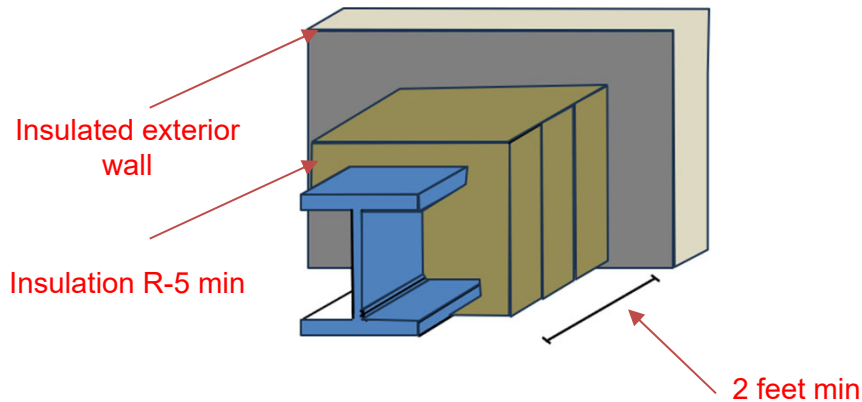


Figure BE-29
Thermal Bridge mitigation for structural beams

👉 ASHRAE does NOT prescribe R-values for this type of thermal Bridge

■ Structural Beams and Columns – ASHRAE 90.1 (Prescriptive)

- Thermal bridges at structural penetrations shall be addressed through continuous insulation and assembly design
- No fixed R-value or thermal break requirement is prescribed
- Compliance is typically achieved by:
 - Maintaining continuous insulation continuity, or
 - Accounting for the thermal bridge through assembly performance (U-factor)

BUILDING ENVELOPE – THERMAL PERFORMANCE: THERMAL BRIDGES (PRESCRIPTIVE)

Vertical fenestration (Prescriptive)

C402.7.2.4

At window-to-wall intersections, thermal bridging shall be mitigated by:

- Aligning glazing or thermal break within 2 in of the insulation plane
 - Insulating rough openings:
 - Minimum R-3, or
 - ≥ 1.5 in wood buck
- Spandrel systems shall be detailed to address thermal bridging (ECC)
- At fenestration–spandrel interfaces provide a thermal break ($\leq 3.6 \text{ Btu}\cdot\text{in}/\text{h}\cdot\text{ft}^2\cdot^\circ\text{F}$) (ASHRAE)

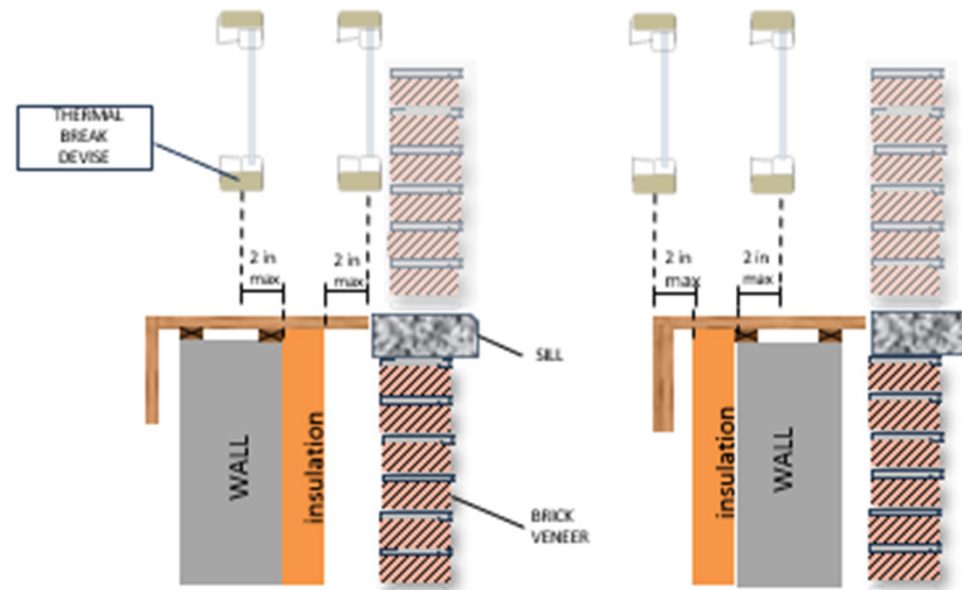


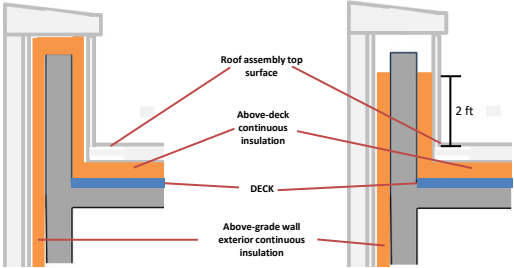
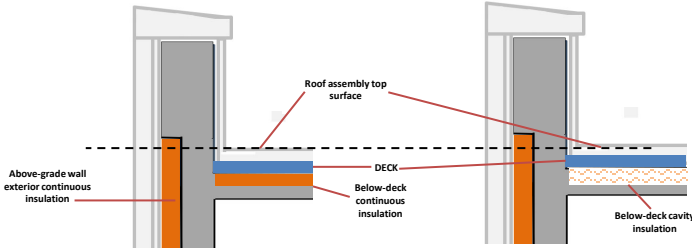
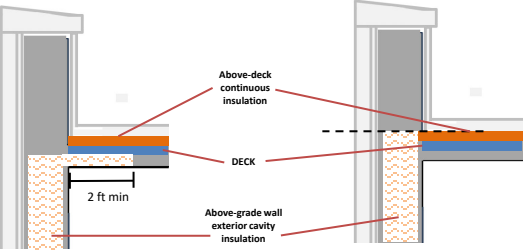
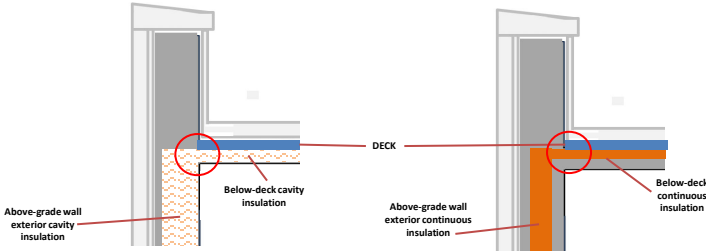
Figure BE-30
Thermal Bridge mitigation fenestration

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE:
THERMAL BRIDGES (PRESCRIPTIVE)

Parapets ECC (Prescriptive)

C402.7.2.5

Insulation when not using a thermal break devise.

INSULATION LOCATION/TYPE	ILLUSTRATION	REQUIREMENT
ABOVE-GRADE WALL: - EXTERIOR/CONTINUOUS ROOF: -ABOVE DECK/CONTINUOUS		CONTINUOUS INSULATION FROM BOTH WALL AND ROOF SHALL EXTEND UP THE PARAPET 2 FEET OR TO THE TOP AND AROUND THE PARAPET (WHICHEVER IS LESS)
ABOVE-GRADE WALL: - EXTERIOR/CONTINUOUS ROOF: -BELOW DECK/CONTINUOUS		CONTINUOUS INSULATION FROM THE WALL SHALL RUN UP THE PARAPET TO AT LEAST THE SAME LEVEL OF THE TOP SURFACE OF THE ROOF ASSEMBLY
ABOVE-GRADE WALL: - INTERIOR/CAVITY OR CONTINUOUS ROOF: -ABOVE DECK/CONTINUOUS		INSULATION FROM THE WALL SHALL RUN UP THE PARAPET TO AT LEAST THE SAME LEVEL OF THE EXTERIOR FACE OF THE ROOF INSULATION OR INSULATION WITH THE EQUIVALENT R-VALUE SHALL BE INSTALLED BELOW THE DECK AND EXTEND NO LESS THAN 2 FT HORIZONATALLY
ABOVE-GRADE WALL: - INTERIOR/CAVITY (OR CONTINUOUS) ROOF: -BELOW DECK/CONTINUOUS OR CAVITY		INSULATION FROM BOTH THE WALL AND ROOF SHALL BE INSTALLED SO THAT THEY ARE ADJACENT TO EACH OTHER IN THE ROOF-CEILING-WALL INTERSECTION

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE: THERMAL BRIDGES (PRESCRIPTIVE)

■ Parapets ASHRAE (Prescriptive)

- Continuous insulation shall:
 - Extend across both sides of parapet, OR
- Where wall insulation >50% of total R-value:
 - Provide one of the following:
 - Extend insulation within parapet cavity
 - Extend insulation to underside of roof deck (≥ 2 ft)
 - Provide R-5 insulation at roof edge
- Insulation values may require adjustment per:
 - Tables 5.5.5.1.1-1 and 1.2

■ Roof Edges Without Parapets ASHRAE (Prescriptive)

Roof insulation shall extend to:

- Exterior wall edge, OR
- Where wall insulation >50%:
 - Provide:
 - Continuous insulation across roof-wall intersection, OR
 - Insulation below roof deck (≥ 2 ft), OR
 - R-5 at roof edge

Figure BE-32
Thermal Bridge mitigation parapets (ASHRAE)
Source: ASHRAE 90.1-Appendix K

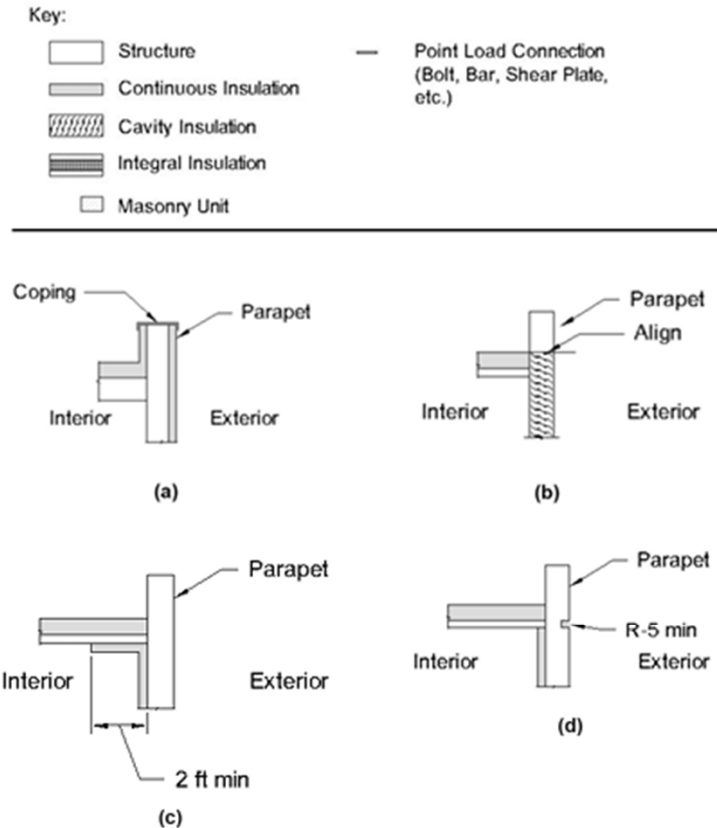


Figure K-2
a. Wall with exterior continuous insulation (Section 5.5.5.1.2[a])
b. Wall with cavity insulation (Section 5.5.5.1.2[b][1])
c. Mass wall with interior insulation (Section 5.5.5.1.2[c][1])
d. Mass wall with interior insulation (Section 5.5.5.1.2[c][2])

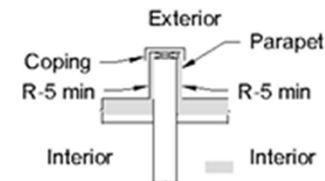


Figure K-3 Parapet within field of roof (Section 5.5.5.1.3).

5.5.5.1.1
5.5.5.1.2

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE: THERMAL BRIDGES (PRESCRIPTIVE)

Other Elements and Building Assembly Intersections (ASHRAE)

- Applies to thermal bridges not addressed in Sections 5.5.1–5.5.4
- Thermal bridges shall satisfy:

$$347 \text{ Btu}\cdot\text{in.}/(\text{ft}^2\cdot\text{h}\cdot^\circ\text{F}) \times 0.003\% \times \text{Above-grade area of the building envelope} \geq (k_1 \times A_1) + (k_2 \times A_2) + (k_3 \times A_3) +$$

k = Thermal conductivity of material (Btu-in/hr-ft²·°F)

A = Total cross-sectional area of thermal bridges (ft²)

The right side is the sum of all point and linear thermal bridges for each material type

NOTE:

Point thermal bridges with areas below what is shown under Table 5.5.5.5 do not need to be included in the calculations

Alternative compliance - ψ and χ factors (Table A10.1)

- Calculated ψ and χ values (per Appendix A) shall be $\leq$ the “Default” values in Table A10.1

Table A10.1 Thermal Bridging Psi-Factors and Chi-Factors for Thermal Bridges

Class of Construction—Wall, above Grade	Thermal Bridge Type	Section	Unmitigated		Default	
			Psi-Factor, Btu/(h·ft ² ·°F)	Chi-Factor, Btu/(h·°F)	Psi-Factor, Btu/(h·ft ² ·°F)	Chi-Factor, Btu/(h·°F)
Steel framed and metal buildings	Roof edge	5.5.5.1.1	0.450	N/A	0.140	N/A
	Parapet	5.5.5.1.2	0.289		0.151	
	Intermediate floor to wall intersection	5.5.5.2.1	0.487		0.177	
	Intermediate floor balcony or overhang to opaque wall intersection	5.5.5.2.2	0.487		0.177	
	Intermediate floor balcony in contact with vertical fenestration	5.5.5.2.2	0.974		0.177	
	Cladding support	5.5.5.3	0.314		0.217	
	Wall to vertical fenestration intersection	5.5.5.4	0.262		0.112	
	Other element and assembly intersections	5.5.5.5	N/A	0.73	N/A	0.91
Mass (exterior or integral)	Roof edge	5.5.5.1.1	0.500	N/A	0.100	N/A
	Parapet	5.5.5.1.2	0.238		0.125	
	Intermediate floor to wall intersection	5.5.5.2	0.476		0.179	
	Intermediate floor balcony or overhang to opaque wall intersection	5.5.5.2.2	0.476		0.179	
	Intermediate floor balcony in contact with vertical fenestration	5.5.5.2	0.974		0.177	
	Cladding support	5.5.5.3	0.270		0.186	
	Wall to vertical fenestration intersection	5.5.5.4	0.188		0.131	
	Other element and assembly intersections	5.5.5.5	N/A	0.91	N/A	0.19

N/A = not applicable

“Default” values in Table A10.1 represent mitigated (compliant) thermal bridge conditions

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE:

■ Thermal Bridges - Component Performance Alternative (ECC)

- Thermal bridges are included in the component performance calculation
- They represent additional heat loss (e.g., balconies, slab edges, penetrations)

$$\text{Equation 4-1 } A_P + B_P + C_P + T_P \leq A_T + B_T + C_T + T_T \quad V_F - V_S$$

T_p = Heat loss from thermal bridges in the proposed design

T_t = Heat loss from thermal bridges in the code reference design

Based on:

- Linear thermal bridges ($\psi \times \text{length}$)
- Point thermal bridges ($\chi \times \text{quantity}$)

👉 Higher T_p = more heat loss = harder to comply

TABLE C402.1.4
PSI- and CHI-FACTORS TO DETERMINE THERMAL BRIDGES FOR THE COMPONENT PERFORMANCE METHOD

THERMAL BRIDGE PER SECTION C402.7	THERMAL BRIDGE COMPLIANT WITH SECTION C402.7		THERMAL BRIDGE NONCOMPLIANT WITH SECTION C402.7	
	Psi-Factor (Btu/h × ft × °F)	Chi-Factor (Btu/h × °F)	Psi-Factor (Btu/h × ft × °F)	Chi-Factor (Btu/h × °F)
C402.7.1 Balconies and floor decks	0.2	N/A	0.5	N/A
C402.7.2 Cladding supports	0.2	N/A	0.3	N/A
C402.7.3 Structural beams and columns	N/A	1.0 carbon steel 0.3 concrete	N/A	2.0 carbon steel 1.0 concrete
C402.7.4 Vertical fenestration	0.15	N/A	0.3	N/A
C402.7.5 Parapets	0.2	N/A	0.4	N/A

For SI: 1 W/m × K = 0.578 Btu/h × ft × °F, 1 W/K = 1.9 Btu/h × °F. N/A = Not Applicable.

Use when thermal bridge details:

- Do not comply with Section C402.7

Code reference
(baseline) values
(used for T_t)

Proposed design values (used for T_p)
• Use when complying with C402.7

👉 **Alternative ψ and χ values may be used for T_p when supported by approved analysis or testing.**

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE:

Thermal Bridges -Envelope Trade-off (ASHRAE)

Thermal bridges shall be included in the overall envelope heat transfer (U_t)

• U_t accounts for:

- Linear thermal bridges ($\psi \times \text{length}$)
- Point thermal bridges ($\chi \times \text{quantity}$)

Use when
thermal bridge
does NOT meet
prescriptive
requirements

Use when thermal
bridge meets
prescriptive
requirements

$$U_t = \Sigma(U_o \times A) + \Sigma(\psi \times L) + \Sigma(\chi \times n)$$

Determining ψ and χ Values

ψ and χ shall be determined per Appendix A (A10.1):

- Simulation (ISO 10211)
- Testing (ASTM C1363)
- Approved calculation method
- Table A10.1

Table A10.1 Thermal Bridging Psi-Factors and Chi-Factors for Thermal Bridges

Class of Construction— Wall, above Grade	Thermal Bridge Type	Section	Unmitigated		Default	
			Psi-Factor, Btu/(h·ft·°F)	Chi-Factor, Btu/(h·°F)	Psi-Factor, Btu/(h·ft·°F)	Chi-Factor, Btu/(h·°F)
Steel framed and metal buildings	Roof edge	5.5.5.1.1	0.450	N/A	0.140	N/A
	Parapet	5.5.5.1.2	0.289		0.151	
	Intermediate floor to wall intersection	5.5.5.2.1	0.487		0.177	
	Intermediate floor balcony or overhang to opaque wall intersection	5.5.5.2.2	0.487		0.177	
	Intermediate floor balcony in contact with vertical fenestration	5.5.5.2.2	0.974		0.177	
	Cladding support	5.5.5.3	0.314		0.217	
	Wall to vertical fenestration intersection	5.5.5.4	0.262		0.112	
	Other element and assembly intersections	5.5.5.5	N/A	1.73	N/A	0.91
Mass (exterior or integral)	Roof edge	5.5.5.1.1	0.500	N/A	0.100	N/A
	Parapet	5.5.5.1.2	0.238		0.125	
	Intermediate floor to wall intersection	5.5.5.2	0.476		0.179	
	Intermediate floor balcony or overhang to opaque wall intersection	5.5.5.2.2	0.476		0.179	
	Intermediate floor balcony in contact with vertical fenestration	5.5.5.2	0.974		0.177	
	Cladding support	5.5.5.3	0.270		0.186	
	Wall to vertical fenestration intersection	5.5.5.4	0.188		0.131	
	Other element and assembly intersections	5.5.5.5	N/A	0.91	N/A	0.19

N/A = not applicable

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE:

■ Thermal Bridges in Practice (ECC & ASHRAE)

- Thermal bridge effects are accounted for within approved compliance tools, such as COMcheck, when using performance-based methods
- These tools incorporate thermal bridge impacts using standardized assumptions and default values

■ What This Means for Designers

ψ and χ shall be determined per Appendix A (A10.1):

- Manual ψ and χ calculations are typically not required for standard compliance workflows
- Compliance can generally be demonstrated using approved software tools without explicitly modeling each thermal bridge
- Detailed thermal bridge analysis is typically only needed for:
 - Custom or non-standard details
 - High-performance buildings
 - Projects pursuing optimized envelope performance

The screenshot shows the 'Edit Exterior Wall' dialog box. On the left, under 'Assembly description:', there is a text box containing 'Ext Wall'. Below this is a list of radio button options for wall types: 'Wood-Framed, 16in. o.c.', 'Wood-Framed, 24in. o.c.', 'Steel-Framed, 16in. o.c.' (which is selected), 'Steel-Framed, 24in. o.c.', 'Metal Building Wall', 'Solid Concrete Wall', 'Concrete Block', and 'Other (U-Factor option)'. On the right, under 'Properties', there are input fields for 'Gross Area (ft2)' (1000), 'Orientation' (Unspecified), 'Cavity R-Value' (13), and 'Continuous R-Value' (10). At the bottom, there is a button labeled 'THERMAL BRIDGE SETTINGS' which is circled in red. Below this button are 'CANCEL' and 'APPLY CHANGES' buttons. A red arrow points from a text box on the right to the 'THERMAL BRIDGE SETTINGS' button.

When editing an exterior wall, click on “Thermal Bridge Settings” to add thermal bridge information.

COMMERCIAL BUILDING ENVELOPE – THERMAL PERFORMANCE:

Thermal Bridge				
Thermal Bridge	Thermal Bridge Type	Compliance Type	Thermal Bridge Factors	Length (linear feet) or Numbers of Points
☒ Parapet	Linear	Non-prescriptive compliance Prescriptive compliance As-Designed	Psi-Factor	
☐ Balconies and floor decks	Linear		Psi-Factor	
☐ Vertical Fenestration	Linear		Psi-Factor	
☐ Cladding support	Linear		Psi-Factor	
☐ Structural beams and columns - carbon steel	Point		Chi-Factor	
☐ Structural beams and columns - concrete	Point		Chi-Factor	

Clear Field U-Factor - calculated U-factor based on wall type and insulation: 0.055
Adjusted Field U-Factor - calculated based on thermal bridge specifications: 0.055

Note: The Adjusted Field U-Factor calculation is based on the ASHRAE 90.1-2022 Appendix A equation A10.2. Please note that this factor serves as a reference only and is not used in the UA calculation

CANCEL SAVE

Non-prescriptive compliance: “Thermal Bridge non-compliant with Section C402.7” from Table C402.1.4 or “Unmitigated” from Table A10.1

Prescriptive compliance: “Thermal Bridge compliant with Section C402.7” from Table C402.1.4 or “Default” from Table A10.1

As-Designed: Applicant inputs Psi-or Chi Factor based on testing or approved sources.

👉 Key Takeaway

For most projects, thermal bridge impacts are incorporated within compliance tools (e.g., COMcheck), and do not require separate manual calculations



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)			MCA (A)	M
						@ 47 F	@ 17 F			
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 @
IND PRESSURE TEL	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

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



Generated by COMcheck-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

- 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

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				MANUFACTURER AND MODEL No.	IEER/EER	CODE REQUIRED EFFICIENCY EER	COP	CODE REQUIRED EFFICIENCY COP	WEIGHT LBS	REMARKS
					MCA	MFS	VOLTS	PH							
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				WEIGHT (LBS)	MANUFACTURER AND MODEL	REMARKS	AIR COOLED CONDENSING UNIT SERVED
									MCA AMPS	MFA AMPS	VOLTS	PH				
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 COMcheck-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**

- **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.

R403.3.1

R403.7

[illegible]

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

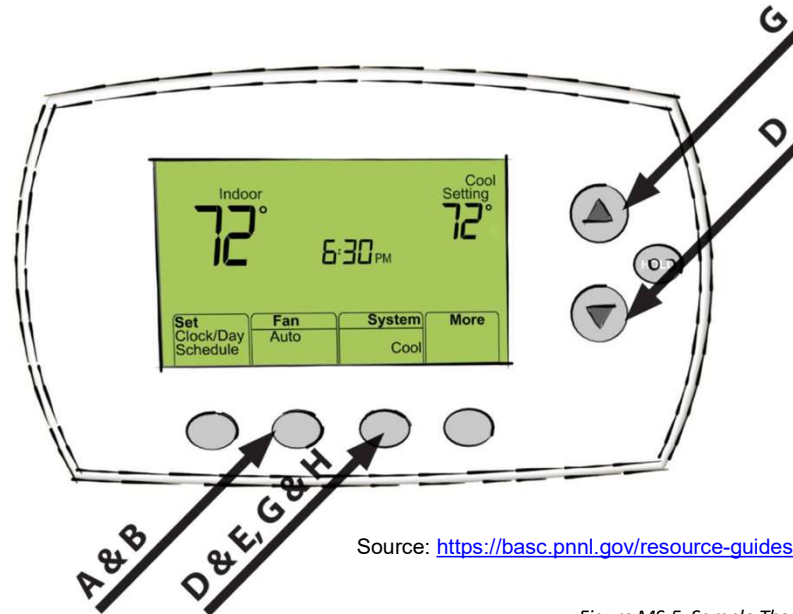
■ Controls

- **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.
- **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.

R403.1.1

R403.1.2

R403.2



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

Figure MS-5. Sample Thermostat

RESIDENTIAL - BUILDING-SPECIFIC REQUIREMENTS

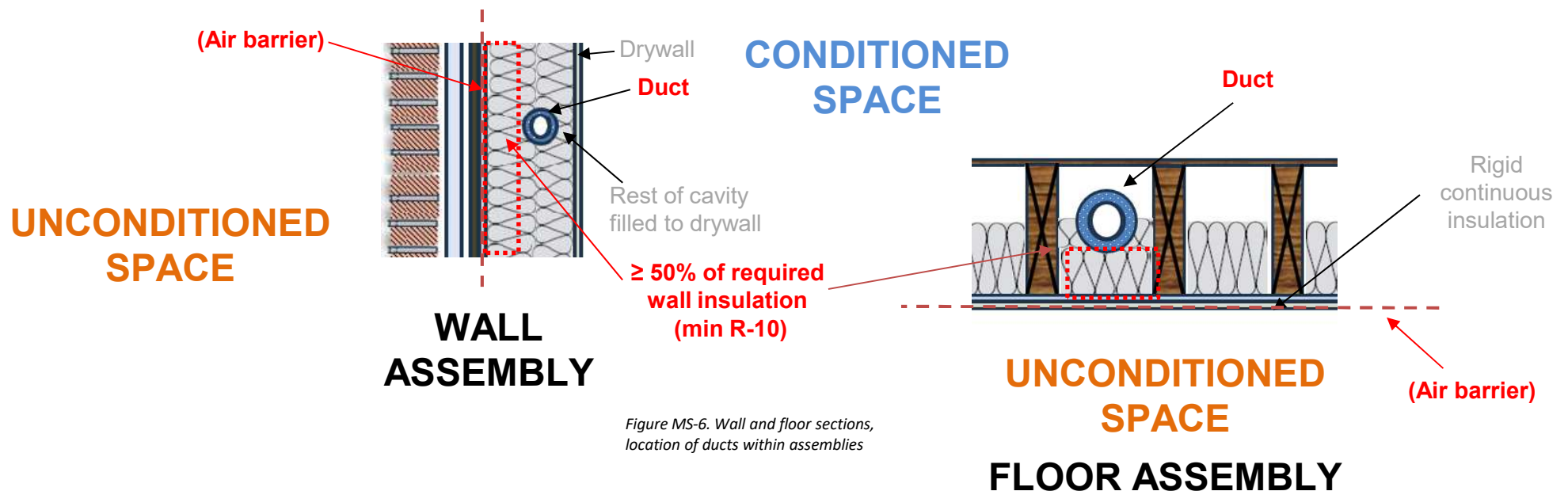
The relevant construction drawings (e.g., M-, P-labeled drawings) must clearly document — through equipment schedules, notes, narratives, drawings, and/or diagrams, etc. — how the proposed system will comply with the applicable Code requirements, and where the proposed means and measures will be located.

■ Duct & Piping Insulation

- 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 $> 105^{\circ}\text{F}$, or $< 60^{\circ}\text{F}$, 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 ($\geq \text{R-10}$ or $\geq 50\%$).
 - 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.

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

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



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

- **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.

R403.3.7
R403.3.8
R403.3.9

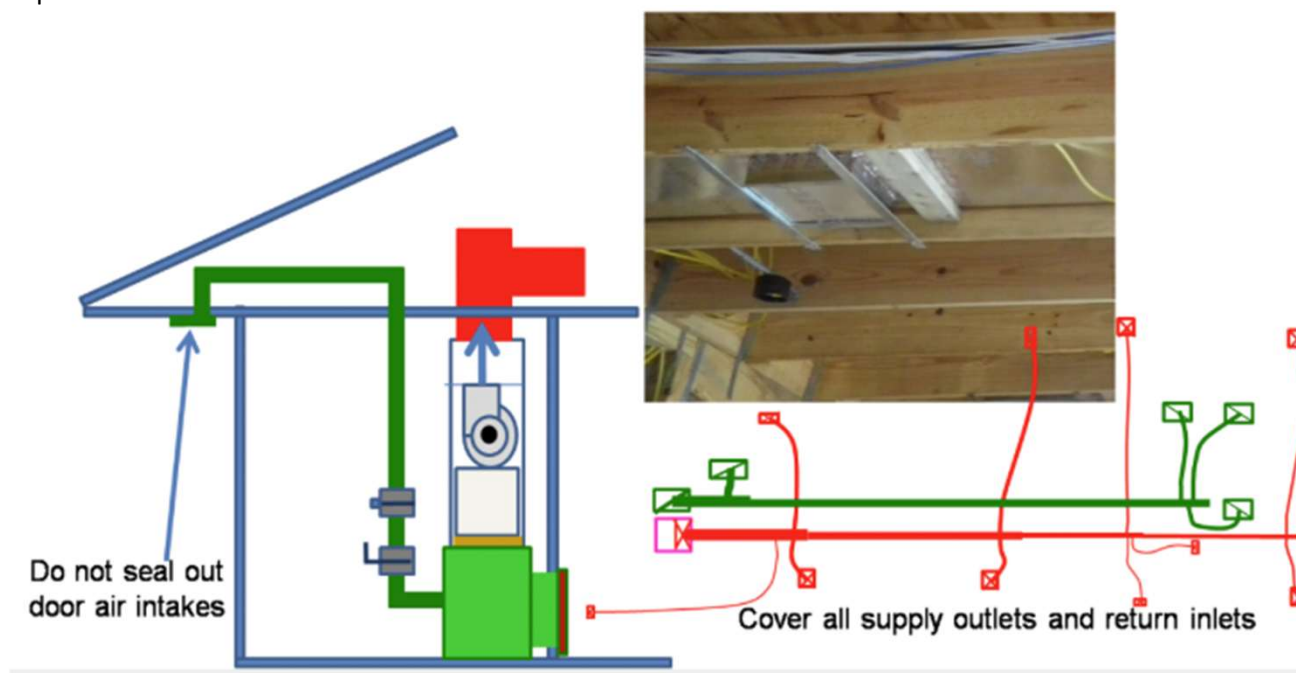


Figure MS-7. To prepare for a total duct test at rough-in, cover all of the supply outlets and return inlets.

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

RESIDENTIAL - BUILDING-SPECIFIC REQUIREMENTS

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

- **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

- **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:** 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.

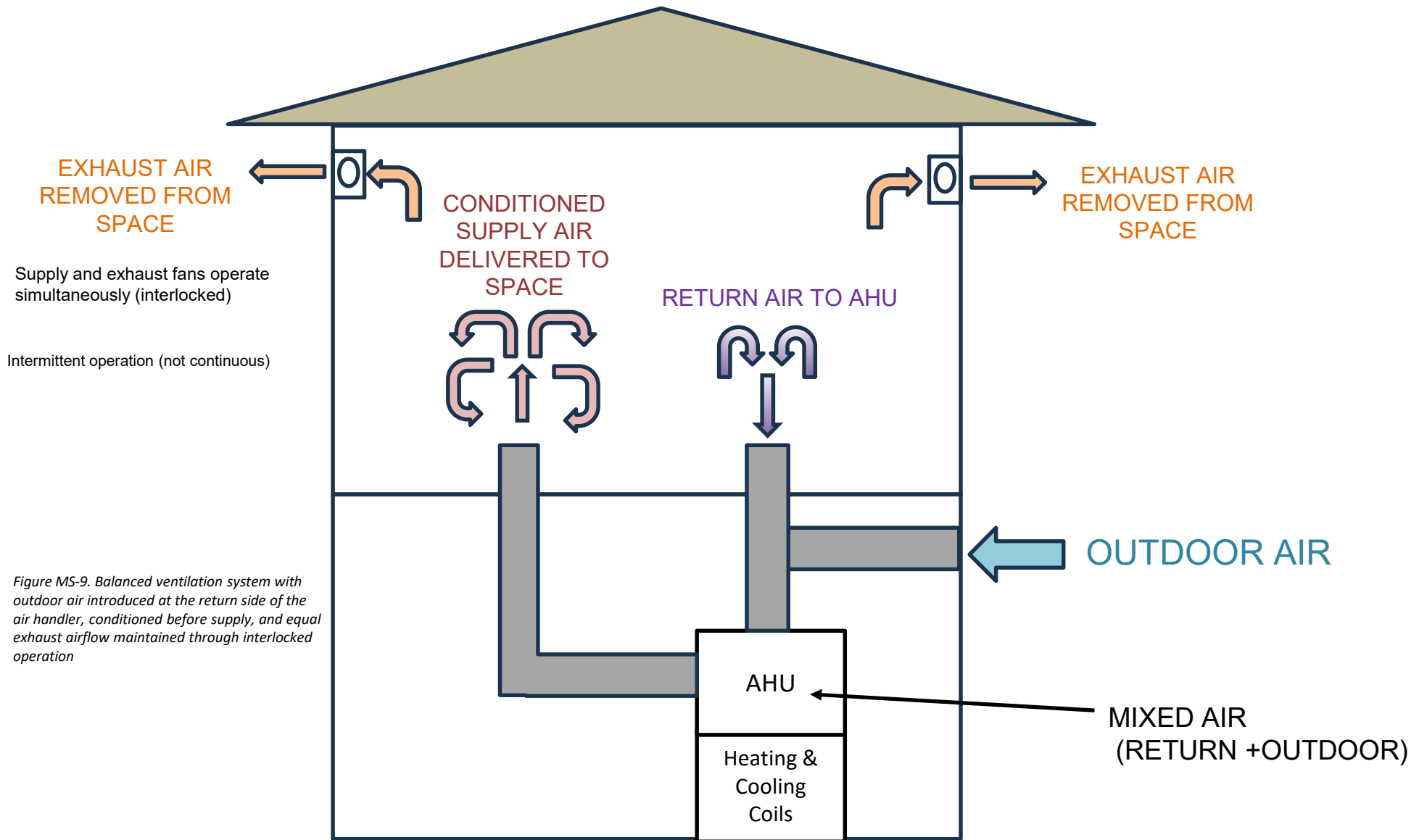


Figure MS-9. Balanced ventilation system with outdoor air introduced at the return side of the air handler, conditioned before supply, and equal exhaust airflow maintained through interlocked operation

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

■ 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)

- *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*

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

- **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 $\leq 5\%$ of building heating capacity/area (whichever is less), with specific exceptions.

C403.1.1
C403.3.1
C403.1.3
6.4.2.1
6.10

Item	Complies?	Comments/Assumptions
1	☒ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	
2	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.
3	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.
4	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.
5	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.
6	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.
7	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.
8	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.
9	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.
10	☐ Complies ☐ Does Not ☐ Not Observable ☒ Not Applicable	See the Mechanical Systems set for values.

CALCULATION OF HEATING AND COOLING LOADS

DESIGN LOADS HAS BEEN DETERMINED IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN ANSI/ASHRAE/ACCA STANDARD 183.

MECHANICAL CONTRACTOR SHALL PROVIDE OPERATING AND MAINTENANCE MANUALS TO THE BUILDING OWNER.

ALL SUPPLY AND RETURN AIR DUCTS AND PLENUMS SHALL BE INSULATED A MINIMUM OF R-5 INSULATION WHEN LOCATED IN THE UNCONDITIONED SPACES AND WITH A MINIMUM OF R-8 INSULATION WHEN LOCATED OUTSIDE THE BUILDING. WHEN LOCATED WITHIN A BUILDING ENVELOPE ASSEMBLY, THE DUCT OR PLENUM SHALL BE SEPARATED FROM THE BUILDING EXTERIOR OR UNCONDITIONED OR EXEMPT SPACES BY MINIMUM OF R-8 INSULATION.

THERE IS NO REFRIGERANT PIPING UTILIZED FOR THIS PROJECT.

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

- 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

C403.2

6.4.3.3.4

6.5.3.8

■ Ventilation

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

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

■ Fault Detection & Diagnostics (ECC only)

- Required for buildings $\geq 100,000$ 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)

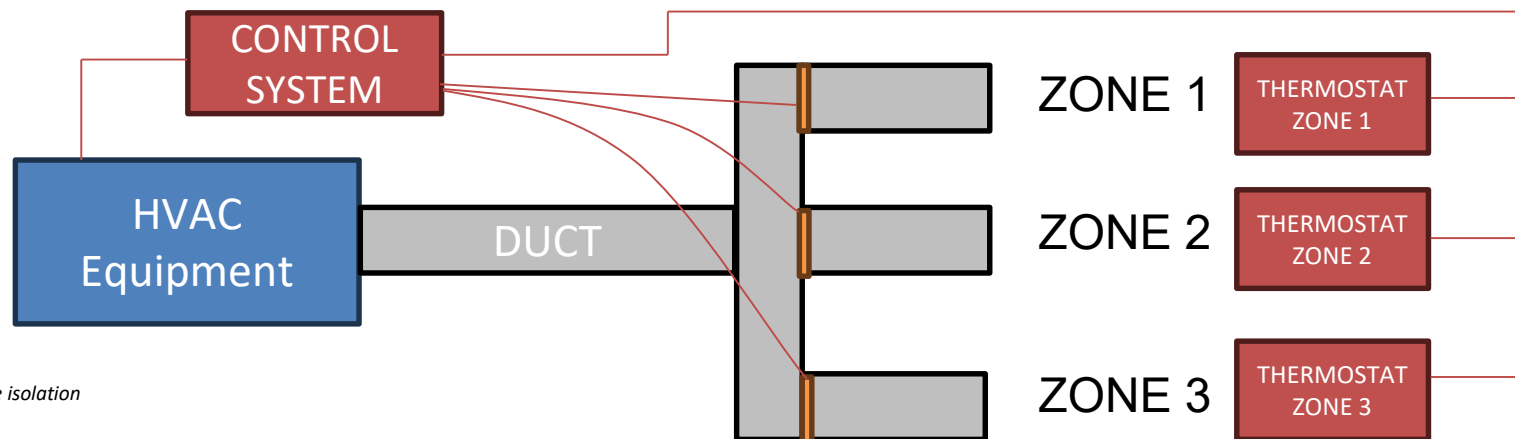


Figure MS-12. Zone isolation

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 $\leq 25\%$ 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

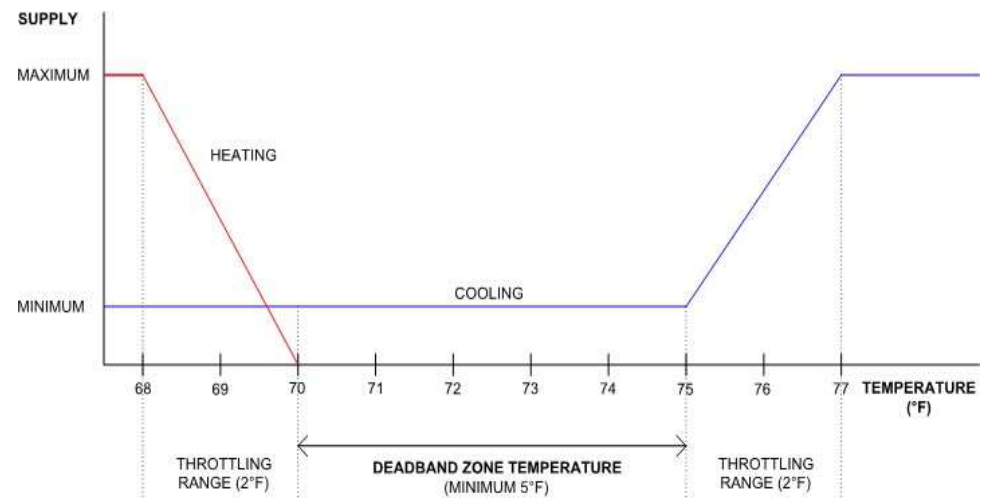


Figure MS-13.
Sample Deadband Control Setup

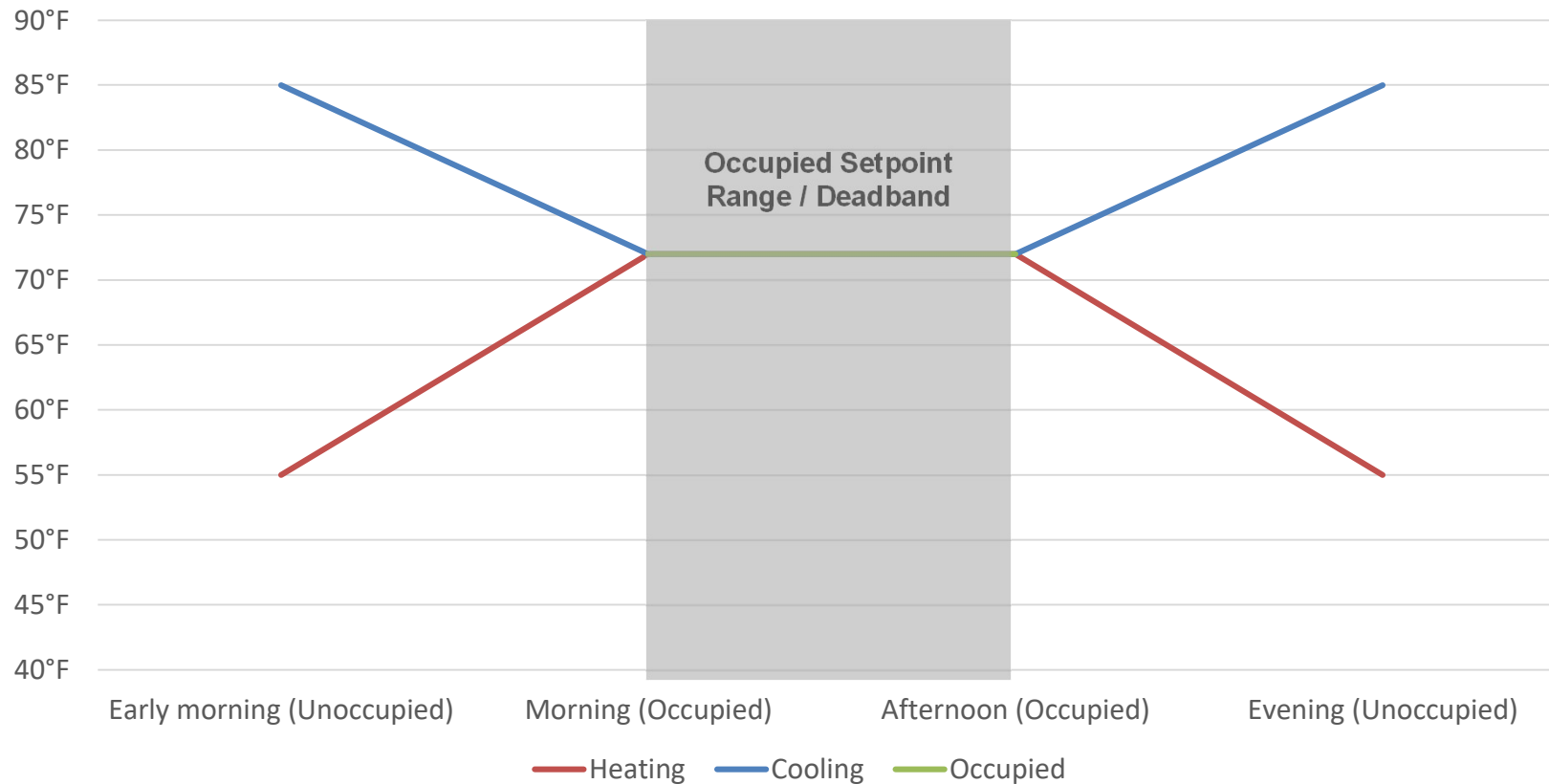
COMMERCIAL - HVAC SYSTEM CONTROLS

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.
- 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.

C403.4.2
6.4.3.3



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 $\leq 55^{\circ}\text{F}$.
 - Disable cooling or reset cooling setpoint to $\geq 90^{\circ}\text{F}$: 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

- 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.

C403.5
6.5.1

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

■ High-Efficiency Exemption

- 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.

Table C403.5(2)
Table 6.5.1-2

■ 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.

C403.5.1

■ 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.

C403.5.3.3
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.

C403.5.5
6.4.3.12

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.
- **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.

C403.7.1
6.4.3.8

TABLE 403.3.1.1
MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY #/1000 FT ^{2a}	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R _p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE R _a CFM/FT ^{2a}	EXHAUST AIRFLOW RATE CFM/FT ^{2a}
Correctional facilities				
Booking/waiting	50	7.5	0.06	—
Cells				
without plumbing fixtures	25	5	0.12	—
with plumbing fixtures ^b	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 ^c	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 ($\pm 1^{\circ}\text{F}$)
 - 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

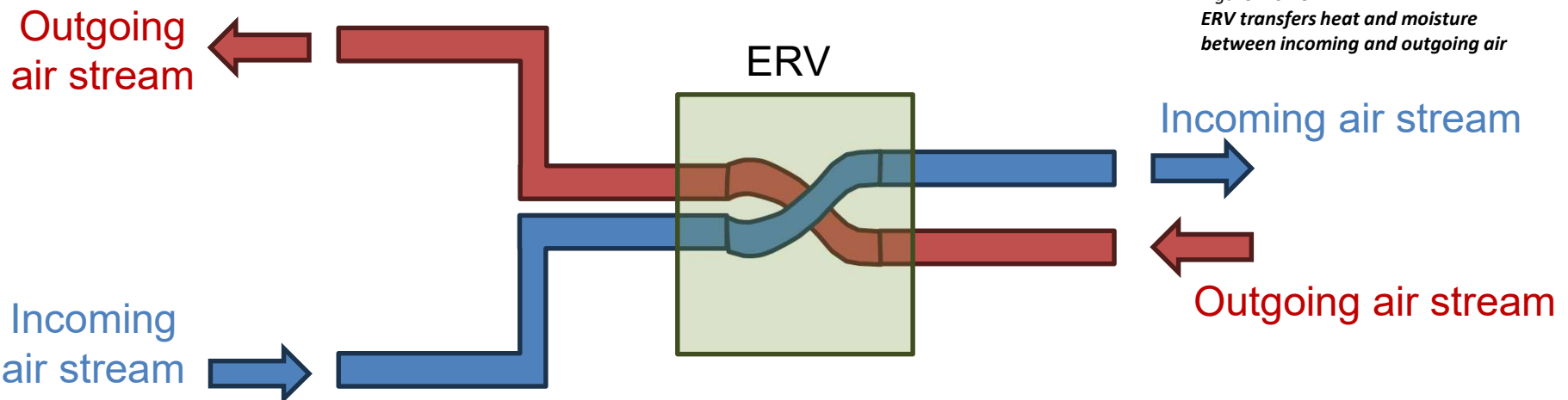


Figure MS-18.
ERV transfers heat and moisture
between incoming and outgoing air

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.
- Chilled-water and evaporative cooling systems with fan motor power $\geq 1/4$ 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.

C403.8.6
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 $\leq$ the first available motor size greater than the hp value calculated per Section C403.8.2.

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

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 $\sim 40\%$ 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 $\geq 2,500,000$ Btu/h must include combustion air positive shutoff
- Applies where boilers operate with nonpositive vent static pressure or are connected to common vents

C403.3.4

■ Fan Motor Controls

Boilers with combustion air fan motors ≥ 10 hp must include:

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

C403.3.4

■ Boiler Oxygen Concentration Controls (ECC only)

Boilers $\geq 5,000,000$ 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

- A single boiler or boiler systems $\geq 1,000$ 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.

C403.3.4.2
6.5.4.1

Condensing Boilers

For space heating gas-fired condensing boilers with rated thermal efficiency (E_t) of $\geq 90\%$, the distribution system must be designed so that the hot water return temperature (entering water temperature) is $\leq 120^\circ\text{F}$, when the boiler is firing.

C403.3.5
6.4.1.6

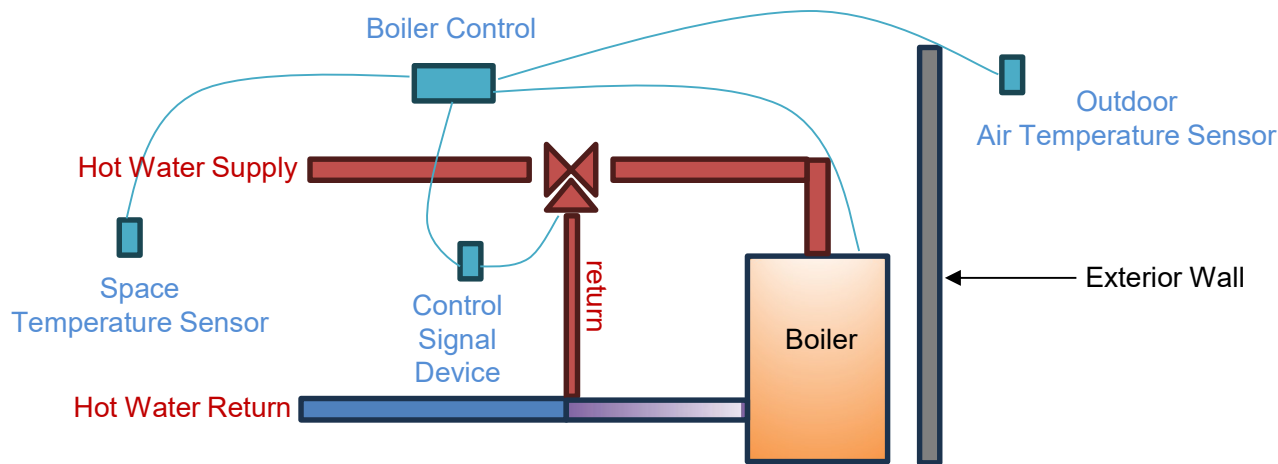


Figure MS-22-a
Boiler control system



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

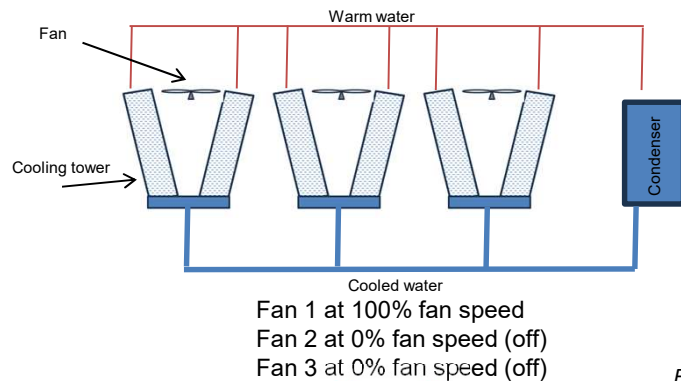
Heat rejection systems operating with water-cooled chillers and configured with VFD condenser water pumps must be designed so that all open-circuit cooling tower cells are capable of running in parallel with sequencing as provided by the Code.

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.
- 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.

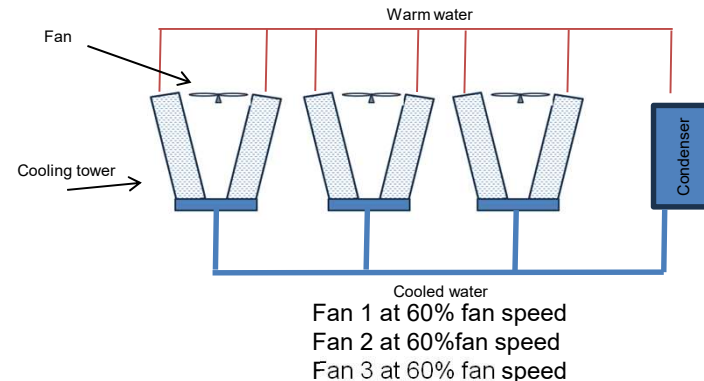
C403.11.6



INCORRECT

One fan at full speed, others off (staged operation)

Figure MS-23
Multiple cooling tower with VFD



CORRECT

All operating fans run at the same reduced speed (VFD control)

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

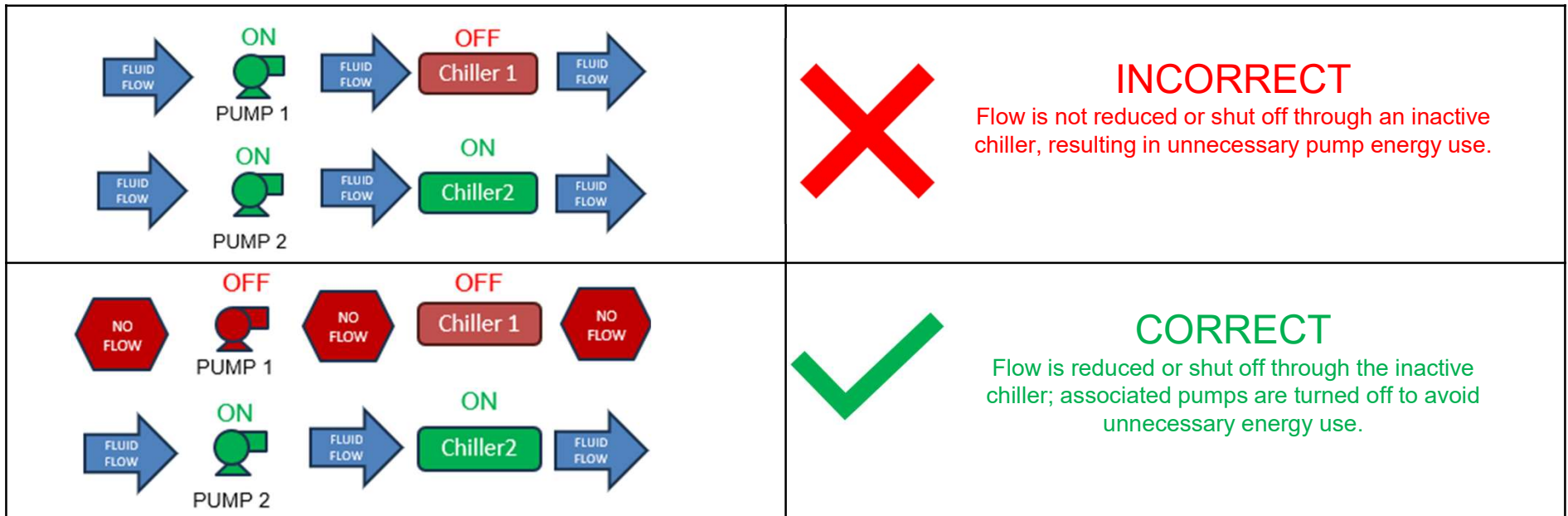
Hydronic systems of heating fluids that have been previously mechanically cooled, and hydronic systems of cooling fluids that have been previously mechanically heated, must be provided with supply temperature reset controls and/or a supply temperature deadband between changeovers based on the system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

C403.4.5
6.5.4.3



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/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.
- 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.

C403.7.7
6.4.3.4.2

■ Enclosed Parking Garage Ventilation

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

C403.7.2
6.4.3.4.5



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
- Setpoint control (3 modes):
 - Rented & unoccupied: $\pm 4^{\circ}\text{F}$ setback/setup (ECC: 30 min | ASHRAE: 20 min)
 - Unrented & unoccupied: reset to $\geq 80^{\circ}\text{F}$ cooling / $\leq 60^{\circ}\text{F}$ 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)

C403.7.6
6.4.3.3.5

■ 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 $\leq 10\%$ of exhaust airflow
 - 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 $\geq 50\%$ airflow reduction
 - ASHRAE: Allows compliance via transfer air ($\geq 50\text{--}75\%$), DCKV, or energy recovery ($\geq 40\%$)
- System performance & design:
 - ECC: Requires listed hoods and max exhaust rates by hood type
 - ASHRAE: Emphasizes performance testing and capture/containment verification

C403.7.5
6.5.7.2

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 $\leq 25\%$ of design (or minimum required by equipment).
- Pumps ≥ 5 hp must include variable speed controls to limit pump power to $\leq 30\%$ 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.
- Systems must include controls for mode changeover, temperature deadband, and loop operation (e.g., $\geq 20^\circ\text{F}$ 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.

C403.4.3

■ 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.
- 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.

C403.3.3

6.5.9

■ Vestibule Heating/ Cooling

C403.4.1.5

- The heating system must be provided with controls to shut off the source when the outdoor temperature is $> 45^\circ\text{F}$.
- The heating and cooling systems must have a thermostat in the vestibule to limit heating to $\leq 60^\circ\text{F}$ and cooling to $\geq 85^\circ\text{F}$.

6.4.3.9

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

- 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.

C403.13.2
6.4.4.2.1

■ Piping Insulation

- 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.

C403.13.3
C404.4
6.4.4.1.3

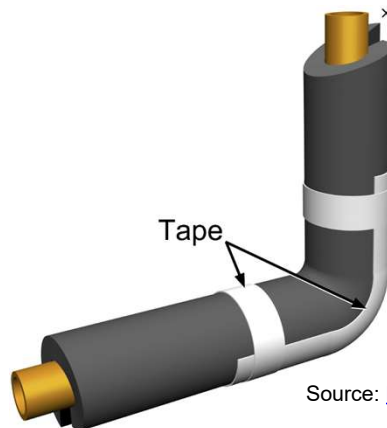


Figure MS-28-a
Tubular pipe insulation sleeves

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



Figure MS-28-b
Finished raised ceiling duct chase

Source: [basc.pnnl.gov](https://www.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

- 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.

C403.14.1
6.5.8.1

▪ Roof and Gutter Deicing Controls

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).

C403.14.3
6.4.3.7

▪ 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.

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.

C403.14.2
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.

C403.14.4
6.4.3.7

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 ($\geq 75\%$), 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 ($PEI \leq 1.0$ 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:
 - 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.

6.4.3.11

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

R303.3
C408.1.1
C408.2.5.2
4.2.2.3

■ 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.
- 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.

C408.2.2
C408.2.5.3
6.7.3.5.5.3
6.7.3.4

■ 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
- 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* $\geq 500,000$ *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.

C408.2.5.4
6.7.3.5.5.4

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.
- 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

■ 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.

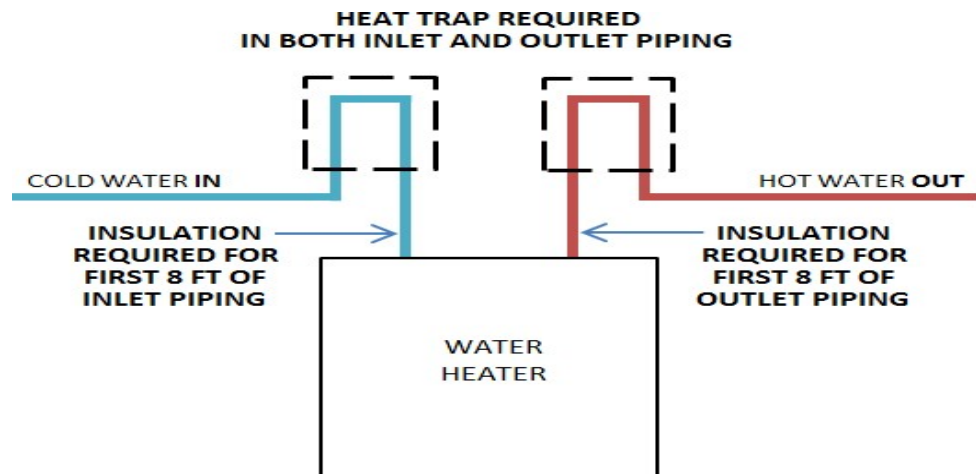


Figure MS-33.

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

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

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

- 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

- 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)

C403.1
C409
6.6.2
Appendix L

■ 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 $\geq$ 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 $\neq$ submission

👉 Screenshot of results $\neq$ 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

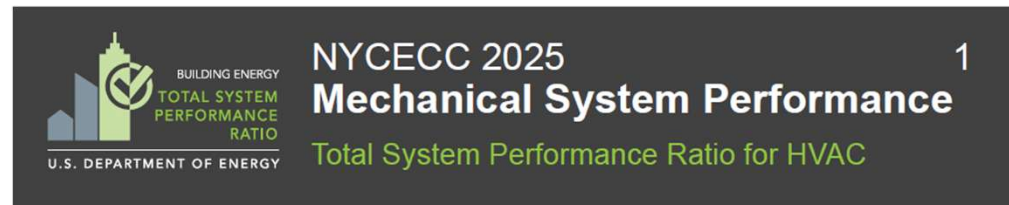
- Project info matches filing (area, systems, etc.)
- TSPR passes required target
- Correct code and climate zone

■ 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.



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.



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.

RESIDENTIAL BUILDINGS - INTERIOR LIGHTING POWER

High-Efficacy Lamps or Luminaires

- For Residential buildings, also for Dwelling units within Commercial buildings, 100% of the permanently installed lighting fixtures must have:
 - Lamp efficacy ≥ 65 lumens/watt, or
 - Luminaire efficacy ≥ 45 lumens/watt
- To validate the above, light fixture schedules must clearly identify lamp/luminaire efficacy of each light fixture, and lamp/luminaire counts of all lighting fixtures
- Exceptions:**
 - Lighting integral to other appliances
 - Antimicrobial lighting
 - Luminaires with rating < 3 watts
 - General service lamps complying with DOE 10 CFR, Part 430.32
- Dwelling units within commercial buildings** have the same requirement as residential buildings

R404.1
C405.3.3



Figure LE-1-b. High-Efficacy Lamp examples
Source: basc.pnnl.gov

To Show Compliance:

- Provide a lighting schedule, add note indicating "All permanently installed lighting fixtures are high efficacy lamps or luminaires"

Refer to LE-3

LIGHTING FIXTURE SCHEDULE*								
Fixture ID	LOCATION	MANUFACTURER/ MODEL	LAMP TYPE	# OF LAMPS/ FIXTURE	LAMP EFFICACY (Lumens/Watt)	FIXTURE EFFICACY (Lumens/Watt)	Control	NOTES
A1	Apt Foyer	QWERT/ Model-number-LE-1234-5678	LED	1	98	---	Automatic shutoff	
A2	Apt Bathroom	WERTY/ Model-number-LE-2345-6789	LED	1	92	---	Dimmer	
A3	Living Room	ERTYU/ Model-number-LE-3456-7890	LED	2	---	83	Dimmer	
A4	Kitchen	RTYUI/ Model-number-LE-4567-8901	LED	2	---	87	Dimmer	
A5	Bedroom	TYUIO/ Model-number-CFL-5678-9012	Compact FL	2	91	---	Dimmer	

* All permanently installed lighting fixtures are high efficacy lamps or luminaires

Figure LE-1-a. Sample Lighting Fixture Schedule for Residential Building

RESIDENTIAL BUILDINGS - EXTERIOR LIGHTING POWER

Exterior Lighting Power

- Exterior lighting must comply with power allowances in Table R404.1 (where applicable)
- The following building types **do not** have exterior lighting power allowance requirements:
 - One-and-two family dwellings
 - Townhouses
- This requirement **does not** apply to the following:
 - Approved safety or emergency lighting
 - Lamps or luminaires that comply with interior lighting power requirements
 - Solar powered lamps
 - Other specialized lighting fixtures

R404.1.1
R404.1.2
R404.1.3

To Show Compliance:

- Provide a lighting schedule, include fixture wattage and area and show to total wattage allowance as per the following:

Total Allowable Exterior Lighting Power = Base Site Allowance (280 W) + Σ (Area/Length $\times$ Allowance from Table R404.1)

Refer to LE-3

EXTERIOR LIGHTING FIXTURE SCHEDULE										
Fixture ID	LOCATION	AREA/LENGTH	ALLOWANCE	ALLOWED WATTAGE SUBTOTAL	MANUFACTURER/ MODEL	# OF LAMPS/ FIXTURE	W/FIXTURE	INSTALLED W	CONTROL	NOTES
P1	Uncovered Parking	5000 ft ²	0.026 W/ft ²	130	OLWX1 LED 40W 50K	1	37	37	Daylight controls	
P2	Pedestrian entrance	20 ft	9.8/ft	196	Rab VXBRLD13	2	13	26	Daylight controls	
L1	Landscaping	1,500 ft ²	0.025/ft ²	37.5	Kichler 15384AZT	4	35	140	Daylight controls	
Total Allowable Exterior Lighting Power (280 W) + Σ (Area/Length $\times$ Allowance)				643.5	Total Exterior Lighting power to be installed			203		Complies

Figure LE-2. Sample Exterior Lighting Fixture Schedule for Residential Building

RESIDENTIAL BUILDINGS - LIGHTING POWER CONTROLS, DWELLING ELECTRICAL METER AND REC

■ Interior Lighting Controls

R404.2

- **Habitable spaces must have:**
 - Dimmer or
 - Automatic shutoff controls (turn lights off after 15 min) incorporated with manual controls
- **Garages, unfinished basements, laundry and utility rooms must have:**
 - Automatic shutoff controls (turn lights off after 15 min) incorporated with manual controls

■ Exterior Lighting Controls

R404.3

- Required when total exterior lighting power is > 30 watts
- Must provide manual controls with automatic shutdown actions that shut off when daylight is present
- Controls that override automatic shutoff actions are not allowed

■ Dwelling Electrical Meter

R404.5

- Each dwelling unit must have its own electric meter.

■ Renewable Energy Certificate (REC)

R404.4

- When renewable energy is used for compliance, documentation must show that associated RECs/EACs are secured through a valid agreement.
- RECs/EACs must be retained or retired on behalf of the building owner to count toward code compliance.

COMMERCIAL BUILDINGS - INTERIOR LIGHTING POWER

■ Maximum Allowed Interior Lighting Power

- Light fixture layout plans and light fixture schedules must demonstrate that the proposed interior lighting power density (watts/sf) is not greater than the maximum allowed interior lighting power density.
- Light fixture schedules must be complete with the fixture identification key, lamp/fixture type, number of lamps per fixture, fixture wattage, lamp/fixture efficacy (in lumens/watt), and quantities that match the light fixture layout plans.
- Light fixture schedules must support the lighting energy analysis report: e.g., *Lamps/Fixture*, *# of Fixtures*, and *Fixture Wattage* listed in Lighting COMcheck report on EN- drawings and must match those values in light fixture schedules on RCP drawings. If not using COMcheck provide a manual calculation showing fixture schedule, total connected lighting power (TCLP), applicable LPD allowance, and confirmation that proposed lighting power does not exceed the allowed limit.
- Fixture efficacy values (lumens/watt), and/or fixtures' low-voltage information, when pertaining to exemption of certain lighting power/controls requirements, must also be listed in the light fixture schedules.

C405.3

9.2.2.1

1 RCNY §5000-01(g)(3)

C405.1

9.1.1

■ Total Connected Lighting Power (TCLP)

- Total interior lighting power must include all input power to lighting systems, including:
 - Lamps, drivers/ballasts, transformers, and associated control devices
- Additional lighting not covered above must be included using manufacturer-rated wattage
- The following lighting is not included in TCLP calculations:
 - Emergency and safety lighting
 - Lighting for specialized applications (e.g., medical, theatrical, display, signage)
 - Lighting integral to equipment or used for specific processes

C405.3.1

9.1.3

9.1.4

■ Allowance Calculation Method

- The maximum allowed interior Lighting Power Density (LPD) must be determined by *either* the Building Area Method, *or* the Space-by-Space Method. These may not be used in combination.
- The selection of one method between the two, by which the allowed LPD of the job application is determined, must be justified by the building/space programs and work scope of the job application.

C405.3.2

9.2.1

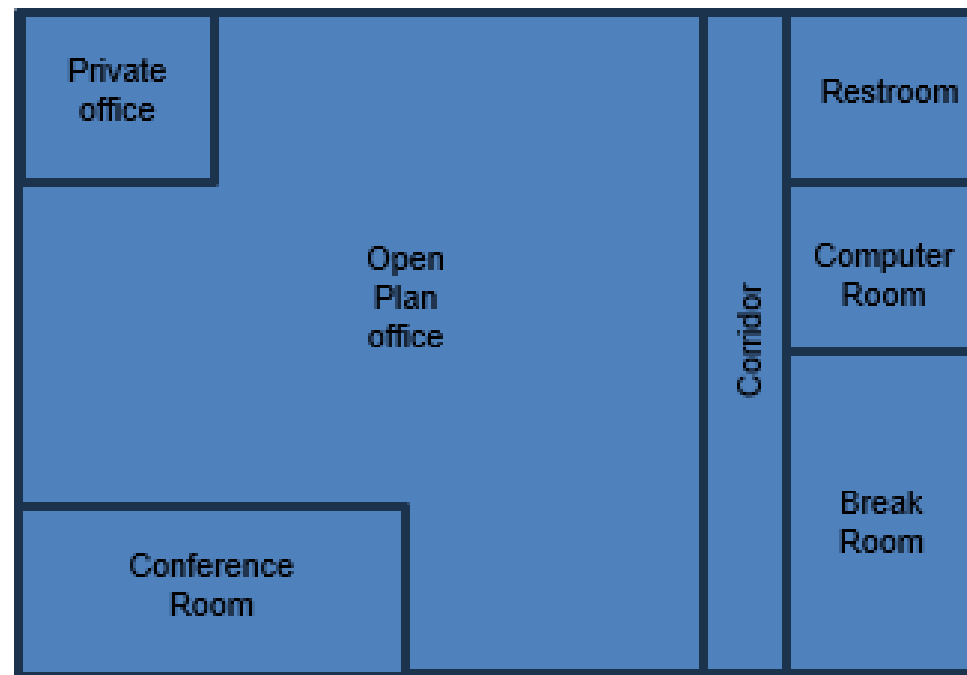
COMMERCIAL BUILDINGS - INTERIOR LIGHTING POWER

■ Building Area Method

C405.3.2.1
9.5.1

Interior Lighting Power Allowance = Total floor area by building use × LPD from Table C405.3.2(1) / Table 9.5.1

- Applies a single LPD value to large building areas grouped by primary use
- Simpler method, but less precise (limited ability to reflect space differences)
- Does not allow trade-off between areas



Value from Table C405.3.2 (1)

$$\text{Interior Lighting Power Allowance} = (\text{Total Area} \times 0.62)$$

Figure LE-5. Building Area Method

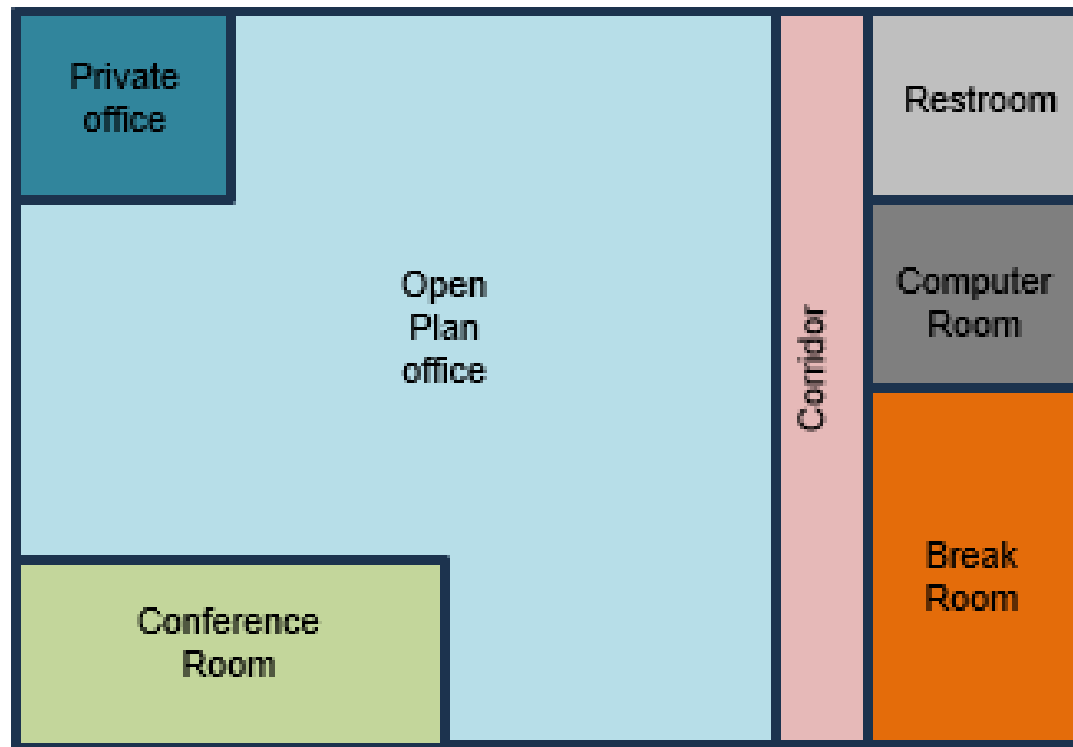
COMMERCIAL BUILDINGS - INTERIOR LIGHTING POWER

■ Space-by-Space Method

C405.3.2.2
9.5.2

Interior Lighting Power Allowance = Sum of (floor area of each space × LPD from Table C405.3.2(2) / Table 9.5.2.1

- Applies specific LPD values to individual space types (e.g., office, corridor, storage)
- More detailed and flexible, allowing trade-offs between spaces



Values from Table C405.3.2 (2)

Interior Lighting Power Allowance = (Private office X 0.73) + (Open Plan office X 0.56) + (Conference Room X 0.88) + (Corridor X 0.44) + (Restroom X 0.74) + (Computer Room X 0.75) + (Break room X 0.44)

Figure LE-6. Space-by-Space Method

COMMERCIAL BUILDINGS - INTERIOR LIGHTING POWER

C405.3.2.2
9.5.2

■ To Show Compliance:

- Provide a COMcheck report or a manual calculation that matches lighting schedules and RCPs



Project Information

Energy Code: 2025 New York City Energy Conservation Code
Project Title: PROPOSED NEW BUILDING (2025 NYC EEC)
Location: New York, New York
Climate Zone: 4a
Project Type: New Construction

Construction Site: Owner/Agent: Designer/Contractor:

Allowed Interior Lighting Power

A	B	C	D
Area Category	Floor Area (ft ²)	Allowed Watts / ft ²	Allowed Watts
1-Residential (Common Space Types/Lobby)	15491	0.8	12393
Total Allowed Watts:			

Proposed Interior Lighting Power

A	B	C	D
Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	# of Fixture	Fixture Watt.	(B X C)
1-Residential (Common Space Types/Lobby)			
L1 - CEILING FLUSH MOUNT LIGHT: L1 - CEILING FLUSH MOUNT LIGHT: LED	132	6	792
L2 - RECESSED LED LIGHT: L2 - RECESSED LED LIGHT: LED	39	10	390
Mechanical: Mechanical: Linear Fluorescent -<	111	40	4440
Stair Light: Stair Light: Linear Fluorescent -<	10	17	170
Exit: Exit: LED	26	4	104
Total Proposed Watts:			

Proposed Interior Lighting Controls

Fixture	Lighting Control
1-Residential (Common Space Types/Lobby)	
L1 - CEILING FLUSH MOUNT LIGHT: L1 - CEILING FLUSH MOUNT LIGHT: LED	
L2 - RECESSED LED LIGHT: L2 - RECESSED LED LIGHT: LED	
Mechanical: Mechanical: Linear Fluorescent -<	
Stair Light: Stair Light: Linear Fluorescent -<	

Interior Lighting PASSES: Design 52% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2025 New York City Energy Conservation Code requirements in COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title Signature Date

Must match lighting schedule and RCP

Interior lighting schedule

Fixture ID	Location	Manufacturer / Model	Description	Lamp Type	Qty	W/Fixture	Installed Watts	Control	Notes
L1	Lobby	Lithonia FMML 7 840 M4	Ceiling flush mount	LED	132	6 W	792 W	Occupancy sensor	General lighting
L2	Lobby	Lithonia LDN4 10LM MVOLT GZ10	Recessed downlight	LED	39	10 W	390 W	Occupancy sensor	Accent / general
L3	Lobby	Lithonia ZL1N L48 4000LM F-MVOLT	Linear strip fixture	Fluorescent/L ED equiv.	111	40 W	4,440 W	Time switch	Continuous rows
L4	Lobby	Lithonia IBG 17L MVOLT	Stair lighting	LED	10	17 W	170 W	Occupancy sensor	Stair illumination
L5	Lobby	Lithonia EXR LED EL N	Exit sign	LED	26	4 W	104 W	Always on	Emergency / egress

Figure LE-7. COMcheck report

COMMERCIAL BUILDINGS - OCCUPANT SENSOR CONTROLS*

■ Where Required

- Occupant sensor controls are required in spaces including classrooms, conference rooms, copy rooms, lounges/ break rooms, enclosed offices, open plan offices, restrooms, storage rooms, locker rooms, warehouse storage areas, janitor closets, corridors/transition areas, cafeteria/fast food dining areas, egress illumination (stairways, exit access), and other spaces ≤ 300 sf.
- Light fixture layout plans, fixture schedules, and the controls narrative must clearly identify the location of occupant-sensor-controlled light fixtures and the connected sensor/control devices.

C405.2.1
Table 9.5.2.1-1

■ Occupant Sensor (OS) Control Function Typical Spaces (See separate requirements for large/open areas)

- Automatic-Off: Drawings must specify that occupant sensor-controlled luminaires are automatically turned off within 15 minutes of all occupants leaving the space.
- Manual-On or Maximum 50% Automatic-On: Lights turned off by occupant sensor controls must be either manually on or controlled to be automatically on maximum 50% of the lighting power in the space.
- Manual-On ONLY: Lights turned off by occupant sensor controls must be only manually on – i.e., max. 50% automatic-on is not allowed – in the following spaces: classrooms, conference/meeting rooms, employee break rooms, and offices < 200 sf. The sensors and controls in these spaces must not have an override switch that converts from manual-on to automatic-on functionality.
- Full Automatic-On: Only in the following spaces, occupant sensors with full automatic-on are allowed: open plan offices, public corridors, stairways, restrooms, primary building entrance areas and lobbies, and areas where manual-on operation would endanger the safety or security of the building occupants.
- Manual Control to Turn Off: Occupant-sensor-controlled luminaires must also be equipped with manual controls that allow occupants to turn lights off.
- **ASHRAE 90.1 Approach:**
 - Lighting control requirements are determined by space type using Table 9.5.2.1-1
 - Each space must implement:
 - All “REQ” (required) control functions
 - At least one “ADD1/ADD2” option, where applicable
 - For occupant sensors:
 - Typically requires automatic OFF
 - Allows either: Manual-ON, or Partial Auto-ON ($\leq 50\%$), depending on space type

C405.2.1.1
9.4.1.1

COMMERCIAL BUILDINGS - OCCUPANT SENSOR CONTROLS

■ OS Controls in Open Plan Offices, Cafeteria, and Fast-Food Dining Areas ≥ 300 sf

- The maximum control zone area controlled by one (1) occupant sensing device is 600 sf.
- Controls must turn off all lighting within 15 minutes when all occupants leave all zones
- Controls must either turn off lighting or uniformly reduce lighting to $\leq 20\%$ of full power in unoccupied zones within 15 minutes after occupants leave those zones.
- Controls that automatically turn on lighting within an occupied zone are allowed; lighting in other unoccupied zones within the same open space may be automatically turned on up to 20% of full power.
- Daylight responsive control shall not activate general lighting controls when no occupancy is detected in these spaces.

C405.2.1.2
C405.2.1.3
9.4.1.1

NOTE: Warehouse storage areas: lighting must be controlled by aisle, with automatic reduction to $\leq 30\%$ power within 15 minutes of vacancy (time-switch control required if lights do not turn off)

■ OS Controls for Egress Illumination

- Luminaires servicing exit access and providing means of egress illumination must have controls that automatically reduce the lighting power by 50 % when unoccupied for more than 15 minutes.
- OS with Full Automatic-On of the lighting are allowed
- Means of egress illumination of < 0.02 watt/sf and the Building-Code-designated emergency lighting are exempt from this requirement

C405.2.1.5
9.4.1.1

OPEN SPACE OFFICE > 300 SF

Scenario 1:

Zone 1: unoccupied

Zone 2: occupied

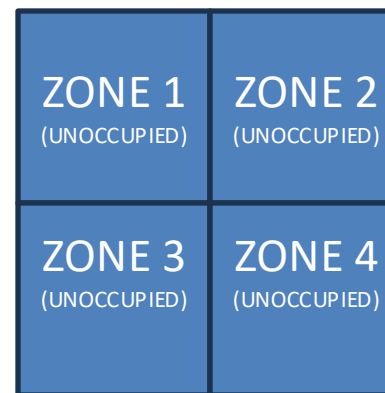
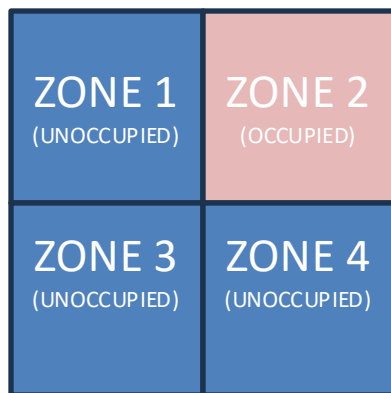
Zone 3: unoccupied

Zone 4: unoccupied

Zone 2: ON (occupied zone)

Zone 1, 3 and 4:

OFF or $\leq 20\%$ power within 15 minutes of vacancy



Scenario 2:

Zone 1: unoccupied

Zone 2: unoccupied

Zone 3: unoccupied

Zone 4: unoccupied

All zones: OFF within 15 minutes of vacancy

Figure LE-9. Occupancy Sensor Control Scenarios

COMMERCIAL BUILDINGS - TIME-SWITCH CONTROLS

■ Where Required

- Spaces where “Occupant Sensor Control Function” in page [LE-3] are not provided, and
- Open Plan Offices, Cafeteria, and Fast-Food Dining Areas ≥ 300 sf

C405.2.2

Both Time-switch controls *and* Dimming controls must be provided. The controls’ function and locations must be clearly specified on drawings.

■ Time-Switch Controls (Programmed)

C405.2.2.1

Time-switch controls must be designed to:

- 1) Have a minimum 7-day clock,
 - 2) Allow to program 7-different day types/week,
 - 3) Have an automatic holiday ‘shutoff’ feature,
 - 4) Have program backup capabilities in case of power interruption, *and*
 - 5) Include a manually-controlled override switch that, when initiated, permits the controlled lighting to remain on for a maximum of 2 hours, and that individually controls a maximum area of 5,000 sf.
 - 6) Be programmed to automatically turn off lights when space is scheduled to be unoccupied, and where schedules are not defined, they shall be programmed by default to turn off lights no less than 12 hours per day.
- **ASHRAE 90.1 Approach:**
 - Lighting must be controlled by scheduled shutoff using time-switch controls or an equivalent automatic control system
 - Controls must:
 - Automatically turn lighting OFF when the space is scheduled to be unoccupied
 - Allow a manual override of ≤ 2 hours
 - Be capable of independent control zones (limited area and typically one floor)
 - Time-switch control may be integrated with:
 - Building automation systems, or
 - Occupant sensor systems

COMMERCIAL BUILDINGS - DIMMING CONTROLS*

C405.2.3

■ Where Required

- Dimming controls are required for general lighting in the following space types:
 - Classrooms, meeting rooms, dining areas, fitness spaces, healthcare spaces, laboratories, libraries, lobbies, break rooms, and offices
 - See Section C405.2.3 for full list
 - Dwelling units: dimming controls are required for permanently installed lighting
- Dimming controls are also required in spaces not provided with occupant sensor controls complying with Section C405.2.1.1
- Exception: luminaires controlled by special application controls complying with Section C405.2.5

■ Dimming Controls

- Dimming controls must be designed to:
 - 1) Provide manual control in each space
 - 2) Allow lighting to be reduced from full output to: $\leq 10\%$ of full power, or lowest achievable continuous dimming level
 - 3) Allow full ON and OFF control
- **ASHRAE 90.1 Approach:**
 - Dimming requirements are determined by space type using Table 9.5.2.1
 - For applicable spaces:
 - Must provide multilevel lighting control
 - May be achieved through:
 - Continuous dimming, or
 - Stepped control (e.g., intermediate light levels)
 - Control requirements vary by space type:
 - All “REQ” control functions must be implemented
 - At least one “ADD1”/“ADD2” function must be selected where applicable
 - Dimming may be integrated with:
 - Occupant sensor controls, and/or
 - Daylight-responsive controls

*For complete controls requirements on ASHRAE 90.1 per space type, refer to Section 9.4.1 and Table 9.5.2.1-1.

COMMERCIAL BUILDINGS - DAYLIGHT-RESPONSIVE CONTROLS*

■ Where Required

- Primary sidelit daylight zones: total general lighting > 75 W
- Combined sidelit daylight zones (primary + secondary): total general lighting > 150 W
- Toplit daylight zones: total general lighting > 75 W

C405.2.4
9.4.1.1.e & f
9.7.3.3

■ Control Function

- Lighting plans must clearly *delineate the boundary of each daylight zone and* indicate separate circuiting and switch control for each zone boundary.

C405.2.4.2
3.2

Daylight-responsive controls must:

- Control daylight zones independently
- Provide continuous dimming to $\leq 15\%$ of full power and full OFF
- Be calibratable by authorized personnel, with controls located for ready access
- Continue to respond to daylight after occupancy-based reduction, without exceeding the unoccupied setpoint
- Up to 100 W per daylight zone may be controlled together with another daylight zone of the same type but different orientation
- Identify daylight-responsive control type and sequence of operation on drawings or schedule

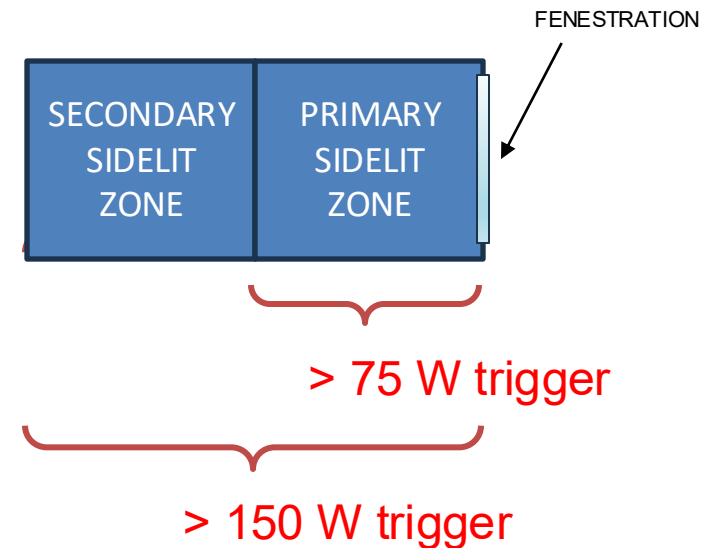


Figure LE-12. Primary and Secondary sidelit zone triggers

COMMERCIAL BUILDINGS - DAYLIGHT-RESPONSIVE CONTROLS*

■ Sidelit Zone - What is it? (ECC)

- Floor area adjacent to vertical fenestration (windows) that receives usable daylight
- Two zones must be identified:
 - Primary sidelit zone (closest to window)
 - Secondary sidelit zone (extends beyond primary zone)

C405.2.4
9.4.1.1.e & f
9.7.3.3

■ Zone Extents (Typical - Wall Condition)

For windows located in a wall:

C405.2.4.2
3.2

- Primary zone extends:
 - Depth: up to $1.0 \times$ window head height (H)
 - Width: up to $0.5 \times H$ from each side of the window
- Secondary zone extends:
 - From edge of primary zone
 - Additional depth up to $2.0 \times H$ total from floor to window head

■ What Must Be Shown on Drawings

Construction documents must clearly indicate:

- Primary and secondary sidelit daylight zone boundaries
- Window height (H) used to define zones
- Adjacent obstructions or walls affecting zone limits
- Lighting fixtures located within each daylight zone
- Separate control zones corresponding to daylight zones

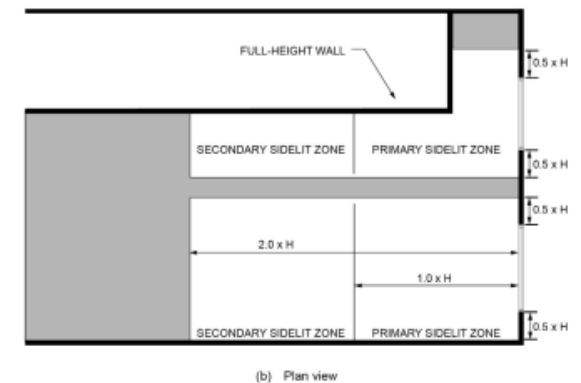
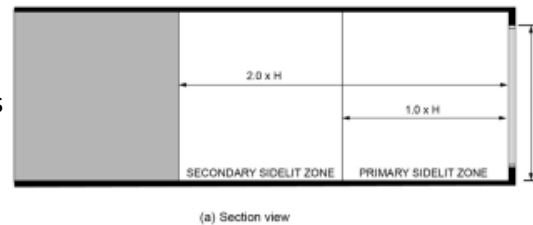


Figure LE-13. Sidelit Zones

COMMERCIAL BUILDINGS - DAYLIGHT-RESPONSIVE CONTROLS*

■ Toplit Zone - What is it? (ECC)

- Floor area directly below roof fenestration (skylights, monitors, etc.) that receives daylight
- Applies where roof openings provide sufficient daylight contribution

■ Zone Extents (Typical - Wall Condition)

For windows located in a wall:

- Toplit daylight zone extends:
 - Laterally and longitudinally from the skylight
 - Up to the nearest obstruction taller than $0.7 \times$ ceiling height, or
 - Up to $0.7 \times$ ceiling height, whichever is less

■ What Must Be Shown on Drawings

Construction documents must clearly indicate:

- Toplit daylight zone boundaries
- Location and size of skylights/roof fenestration
- Ceiling height used to define zone limits
- Obstructions affecting daylight distribution
- Lighting fixtures located within toplit zones
- Control zones aligned with toplit daylight zones

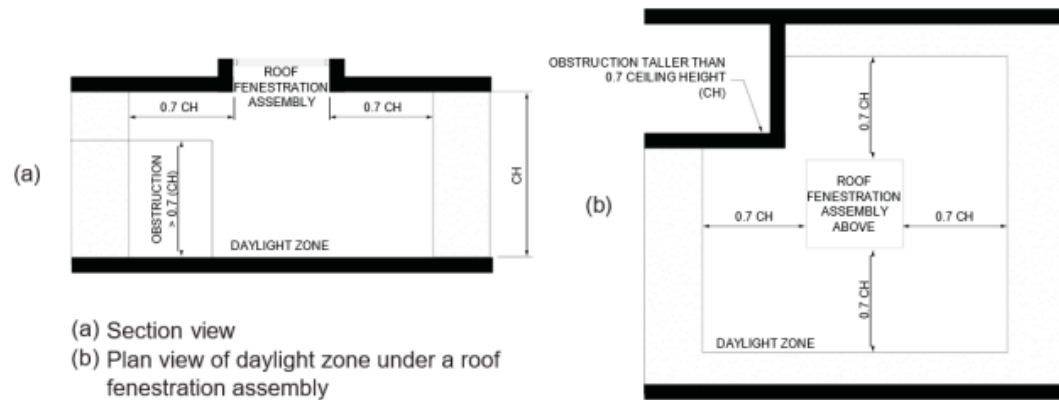


**FIGURE C405.2.4.3
TOPLIT DAYLIGHT ZONE**

Figure LE-14. Toplit zones

C405.2.4.3
3.2

COMMERCIAL BUILDINGS - EXTERIOR LIGHTING POWER

■ Maximum Allowed Exterior Lighting Power

C405.5
9.4.2

- Light fixture layout plans and light fixture schedules must demonstrate:
 - Proposed exterior lighting power density (watts/sf) $\leq$ Maximum allowed exterior lighting power density
- Light fixture schedules must be complete with fixture identification keys, fixture/lamp type, number of lamps per fixture, and fixture wattages and quantities that match the light fixture layout plans.

■ Calculation of Maximum Allowance

C405.5.2
1 RCNY §5000-01
(g)(3)(ii)
9.4.2

- The maximum allowed building exterior lighting power must be computed based on Table C405.5.2(2) or Table 9.4.2-2 for the applicable Exterior Lighting Zone per 1 RCNY §5000-01(g)(3)(ii).

$$\begin{array}{lclcl} \text{Maximum Allowed Exterior} & = & \text{Base Site Allowance} & + & \text{Individual Allowance per Area Type} \\ \text{Lighting Power} & & \text{(per Lighting Zone)} & & \text{(Tradable/Non-Tradable Surfaces)} \end{array}$$

- Trade-offs are allowed only among exterior lighting applications in the Tradable Surfaces of Table C405.5.2(2), or Table 9.4.2-2.

Lighting Zone 1: Park land

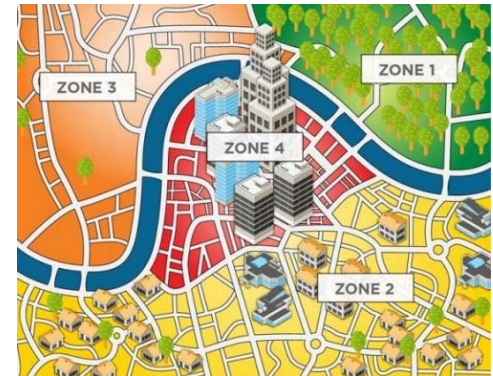
Lighting Zone 2: All R districts, R districts with C overlays and MX districts

Lighting Zone 3: M districts, except MX; C districts, except C5, C6 and C overlays on R districts

Lighting Zone 4: C5 and C6 districts

Exterior Lighting Zone

Figure LE-15. **Exterior Lighting Zone** per 1 RCNY §5000-01 (g)(3)(ii)



Source: energycodes.gov

COMMERCIAL BUILDINGS - EXTERIOR LIGHTING POWER

■ Exterior Lighting Controls

C405.2.7

9.4.1.2

9.4.1.4

- (a) Daylight shutoff: Lights automatically turned off when daylight satisfies the lighting needs
- (b) Decorative lighting shutoff: Building façade and landscape lighting automatically shut off within 1 hour of business closing and until 1 hour or less prior to business opening
- (c) Lighting setback: For lighting not controlled per the (b) above, controls to automatically reduce the lighting by minimum 50% during 12am - 6am, or from 1-hr after the business closing to 1-hr before opening, or when no activity detected for 15 minutes
- (d) Exterior time-switch control function: Controls with 7-different-day-type-programmable clock and automatic holiday setback
- (e) Outdoor parking area lighting control: Luminaires of wattage > 78 W and mounted at 24' or less above the ground controlled to automatically reduce the power by minimum 50% when no activity detected for 15 minutes

■ Narrative on Lighting System and Controls

On drawings where light fixture layout plans and schedules are documented; a narrative must be provided to describe the function and operation of mandatory lighting and power controls.

1 RCNY §5000-01

(g)(3)

■ Lighting System Functional Testing

Drawings must specify the requirements that:

C408.2.3

9.7.3.1

- The approved agency must certify that the installed lighting control systems including occupant sensor controls, time-switch controls, and daylight-responsive controls have been tested and perform as intended.
- Documents certifying the installed lighting controls meet documented performance criteria of Section C405 must be provided to the building owner within 90 days of the receipt of the certificate of occupancy.

COMMERCIAL BUILDINGS - OTHER LIGHTING REQUIREMENTS

■ Hotel Guestrooms

For hotel and motel guestrooms (sleeping units or guest suites), drawings must specify a master control device that is capable of automatically switching off all installed luminaires and switched receptacles *within 15 minutes* of all occupants leaving the guestroom.

C405.2.10.1
9.4.1.3

■ Display and Accent Lighting

Display lights, accent lights, and lighting in display cases must be controlled by a dedicated control that is independent of the controls for other lighting within the room or space. Controls' locations must be clearly noted on the light fixture layout plans.

C405.2.5
9.4.1.3

■ Parking Garage

Parking garage lighting must be designed so that:

- 1) Lighting must be controlled by occupant sensors and time-switch controls that automatically shut off lighting during scheduled unoccupied periods.
- 2) Luminaire lighting power is automatically reduced by minimum 30% within 15 minutes of no activity detected in each lighting zone of maximum 3,600 sf. (ECC only)
- 3) Luminaire lighting power is automatically reduced by minimum 50% within 10 minutes of no activity detected in each lighting zone of maximum 3,600 sf. (ASHRAE only)
- 4) Luminaires for covered garage entrances and exits are separately controlled, so the lighting power is automatically reduced by minimum 50% from sunset to sunrise.
- 5) Lighting within 20 ft of perimeter wall openings or skylights must automatically reduce by at least 50% in response to daylight, unless exempt due to limited daylight access or obstructions.

C405.2.9
9.4.1.2

COMMERCIAL BUILDINGS - ELECTRICAL POWER REQUIREMENTS

■ Voltage Drop

C405.11

8.4.1

The total voltage drop across the feeder conductors and branch circuits combined must not exceed 5%, unless the feeder conductors and branch circuits are dedicated to emergency services.

■ Inverters

C405.16

Inverters serving on-site renewable energy systems or ESS must comply with IEEE 1547 and UL 1741

■ Automatic Receptacle Control

8.4.2

Drawings must specify that:

- Minimum 50% of receptacles in spaces including private offices, conference rooms, and classrooms, etc., *and*
- Minimum 25% of branch circuit feeders in modular furniture are automatically controlled:
 - a) On a scheduled basis, *or*
 - b) By occupant sensors, *or*
 - c) By an automated signal from another control or alarm system.

■ Separate Metering for Dwelling Units and Large Tenant Spaces

R404.5

C405.6

8.4.5

8.4.6

Drawings must indicate that:

- *Each dwelling unit* in a Group R-2 building must be provided with *a separate electrical meter*.
- *Each covered tenant space* in a new building must be provided with *a separate meter or sub-meter* to measure the electrical consumption of each space. Refer to Section 28-311.2 of the Administrative Code of the City of New York for definitions.
- Locations of electrical meters must be shown on plan drawings.

COMMERCIAL BUILDINGS - ENERGY MONITORING

C405.14

8.4.1

■ Energy Monitoring

New buildings with a gross conditioned floor area $\geq 10,000$ sf must include systems to:

- Measure energy consumption
- Monitor end-use categories
- Record and store data
- Provide graphical energy reporting

■ Electrical & Non-Electrical End-Use Monitoring

Construction documents must identify meters/submeters for the following end-use categories, as applicable:

- **Electrical end uses**
 - Total HVAC systems
 - Interior lighting
 - Exterior lighting
 - Plug loads
 - Process loads
 - Building operations & miscellaneous loads
 - Electric service water heating
 - Electric vehicle charging
- **Non-electrical end uses**
 - HVAC thermal energy
 - Process loads
 - Service water heating
 - Other fuel-fired systems

COMMERCIAL BUILDINGS - ENERGY MONITORING

■ Data Acquisition & Reporting Requirements

C405.14
8.4.1

The energy monitoring system must:

- Automatically communicate meter/submeter data to a data acquisition system
- Store a minimum of 36 months of data
- Provide:
 - Real-time energy consumption
 - Hourly, daily, monthly, and yearly data
 - Peak demand and time-of-peak information
- Include a permanent graphical reporting interface accessible to building operators

■ What Must Be Shown on Drawings

Construction documents must clearly indicate:

- Meter and submeter locations
- Associated end-use category
- Metering diagrams/risers
- Data acquisition system architecture
- Communication method between meters and DAS
- Renewable energy metering (where applicable)
- Graphical reporting/dashboard interface or narrative
- Sequence of operation for energy monitoring systems

Renewable Energy Monitoring
On-site renewable energy systems must be separately metered
Renewable generation data must be integrated into the reporting system with the same reporting frequency as other monitored energy sources

COMMERCIAL BUILDINGS - ELECTRICAL POWER REQUIREMENTS

■ Elevator Cabs

Drawings must specify that:

- Lighting efficacy: For each elevator cab's interior lighting, total lumens divided by total watts must be ≥ 35 lumens/watt.
- Ventilation fan power: Ventilation fans in elevator cabs without their own air-conditioning system must not consume power > 0.33 watts/cfm.
- Controls to de-energize: When stopped and unoccupied with doors closed for over 15 minutes, cab interior lighting and ventilation systems must be automatically controlled to be de-energized.

C405.10.1
10.4.3

■ Traction Elevator Power Conversion System

New traction elevators with a rise $\geq 75'$ in new buildings must have a power conversion system with the following:

- Induction Motors with a Class IE2 efficiency rating or approved alternative technologies.
- Transmissions not reducing the efficiency of the combined motor/transmission below that shown for the Class IE2 motor for elevators with capacities below 4,000 lbs.
- Regenerative Drive recovering potential energy released during motion and supplying it to the building electrical system.

C405.10.1.1
10.4.3.5

■ Escalators and Moving Walks

- Automatic speed reduction: Drawings must specify that *escalators and moving walks* have controls to *automatically reduce speed* when not conveying passengers.
- Regenerative drive: An *escalator* designed either for *one-way down operation only* or for *reversible operation* must have a *variable frequency regenerative drive* that supplies electrical energy to the building electrical system when the escalator is loaded with passengers whose combined weight > 750 lbs. See Figure below.

C405.10.2
10.4.4

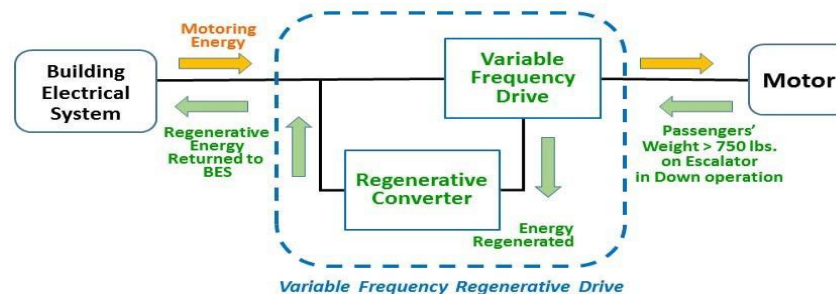


Figure LE-21.
Escalator Variable Frequency Regenerative Drive

COMMERCIAL BUILDINGS - RENEWABLE ENERGY SYSTEMS

■ **Applicability**

New buildings must comply with renewable energy requirements through either:

C405.15
10.5.1

- On-site renewable energy systems, or
- Qualified off-site renewable energy procurement

👉 Requirements generally apply to buildings $\geq 5,000$ sf gross conditioned floor area.

■ **On-Site Renewable Energy Systems (ECC)**

Buildings must provide on-site renewable electricity generation systems with a minimum rated capacity based on:

C405.15.1
10.5.1.1

- $0.75 \text{ W/ft}^2 \times \text{gross conditioned floor area}$

Typical systems include:

- Photovoltaic (PV) systems
- Building-mounted renewable energy systems

■ **Off-Site Renewable Energy Compliance (ECC)**

C405.15.2

Where on-site systems cannot fully comply, buildings may use qualified off-site renewable energy procurement.

Acceptable procurement methods include:

- Physical renewable energy purchase agreements (PPAs)
- Financial renewable energy purchase agreements
- Community renewable energy facilities
- Off-site renewable energy systems
- Renewable energy investment funds
- Green retail tariffs

👉 Off-site renewable energy contracts must have a duration of at least 15 years.

COMMERCIAL BUILDINGS - RENEWABLE ENERGY SYSTEMS

■ Renewable Energy Certificate (REC/EAC) Documentation

Construction documents and supporting submissions must demonstrate:

C405.15.1
10.5.1

- RECs/EACs are associated with the required renewable energy generation
- Certificates are retained or retired on behalf of the building owner or tenant
- RECs/EACs are:
 - Created within 12 months of use
 - From systems placed in service within the previous 5 years

👉 Signed attestations and supporting agreements must be provided

■ What Must Be Shown on Drawings / Submissions

Construction documents must clearly indicate::

- Proposed renewable energy system type and capacity
- Roof plans showing renewable energy layout and available roof area
- Shading or obstruction analysis (if claiming exemption)
- Electrical interconnection and inverter information
- Renewable energy procurement method (if off-site)
- REC/EAC documentation and agreements
- Renewable energy calculations demonstrating compliance

👉 Narratives and calculations should clearly explain whether compliance is achieved through on-site systems, off-site procurement, or REC purchases.



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.

ADDITIONAL ENERGY EFFICIENCY CREDITS

■ Key Principles

Projects required to comply with Additional Energy Efficiency Credits (ECC Sections R408, C406, or Section 11) must include a credit summary table in the main filing or submit a summary of credits generated by COMcheck or REScheck.

The table must:

- List each proposed credit and **corresponding code section**
- Identify **base/required credits** and **credits achieved**
- Include **supporting calculations and drawings**, where applicable
- Show the **total credits achieved compared to the credits required**

Important notes:

- The credit table must appear **only once in the main filing**
- Credits may be counted **only if the measure is not already required by the Energy Code or other laws**
- For **mixed-occupancy buildings**, required credits must be **weighted by gross conditioned floor area**
- For multiple occupancies, credits must be area weighted per occupancy
- Credits must always be rounded to a whole number

Example Additional Efficiency Credit Table

Credit ID	Code Section	Credit Title	Base Energy Credit	Credit Achieved	Supporting Documentation
E02	C406.2.1.2	UA reduction (15%)	13	6	
E03	C406.2.1.3	Reduced air leakage	8	17	EN-003
Total Additional Efficiency Credits Achieved:					23
Total Credits Required					

PERMANENT AND THERMAL ENVELOPE CERTIFICATE

For new buildings, a permanent certificate must be installed indoors and in accordance with Sections ECC R401.3 or C401.3, except that it may be posted near the electrical distribution panel at eye level and in plain sight. The Builder or Other Approved Party must complete and post the Certificate.

1 RCNY §5000-01(g)(4)
R401.3
C401.3

Required Data Contents in the Certificate

- **R-values in opaque assemblies and other components** - insulation in ceiling/roofs, walls, floor/foundation components, and ducts outside the conditioned spaces
- **U-factors and SHGC values of fenestration** - windows and doors
- **Air leakage testing results**
- **Mechanical equipment types and efficiencies** - HVAC and Service water heating equipment

Location of Certificate

- Drawings must specify that the Certificate shall be posted on a wall in the space where the furnace is located, a utility room, or an approved location inside the building prior to final inspections of the application.
- When specifying to post the Certificate near or on the electrical distribution panel, drawings must also instruct that the Certificate must be readily visible (at eye level and in plain sight) and yet must not obstruct the visibility of the other Code-required labels (e.g., circuit directory label, service disconnect label, etc.).

Additions & Alterations Job Applications

For Additions and Alterations applications affecting information on the *existing Permanent Certificate*, drawings must specify that the existing Certificate shall be updated and re-installed.

Permanent Energy Efficiency Certificate					
Insulation Rating					
Ceiling/Roof	Attic	R-50 cavity			
	Vaulted	R-50 cavity			
Walls	Framed wall (wood frame)	R-6 continuous + R-21 cavity			
	Mass wall	n/a			
	Basement	R-15 continuous			
	Crawl Space	n/a			
Floors	Over unconditioned space	R-30 cavity			
	Slab Edge	R-12 continuous 4 ft deep			
Ducts outside					
Conditioned space	Attic	R-10			
	Other	R-8			
Fenestration Rating					
Window	U-Factor (NFRC)	U-0.25		SHGC (NFRC)	0.36

Figure OR-2.a. Sample Permanent Energy Efficiency Certificate (partial view)
[Click [here](#) for the full view of a Sample certificate and a Sample suggested form]

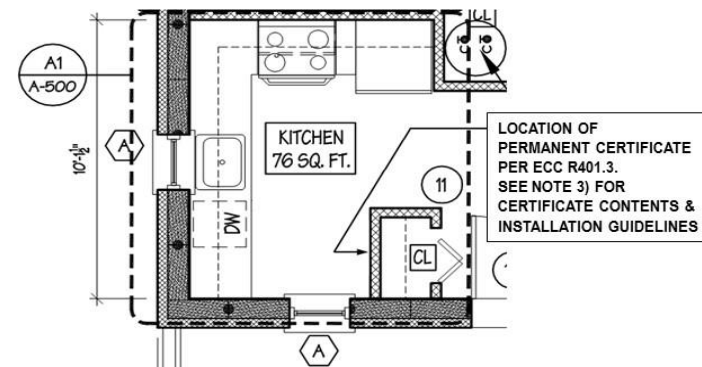


Figure OR-2.b. Sample Plan Drawing indicating Certificate Requirement

ELECTRICAL VEHICLE SERVICE READY

R404.6

- **This Requirement Applies to**
 - One or two-family dwellings with parking area
 - Low-rise multi-family buildings with parking area
 - Townhouses with parking area
- **For Each Dwelling Unit, Provide:**
 - 208/240V 40-amp outlet, or
 - Panel capacity and conduit for the future installation of such an outlet adjacent to the parking area.
- **For Residential occupancies with Common Parking Area, Provide:**
 - Panel capacity and conduit for the future installation of 208/240V 40-amp outlets for 5 percent of the total parking spaces, but not less than one outlet, or
 - 208/240V 40-amp outlets for 5 percent of the total parking spaces, but not less than one outlet.



Figure OR-3.
Electrical Outlet Ready for
Electrical Vehicle Service
Source:
basc.pnnl.gov/images

DEMAND RESPONSIVE CONTROLS

Applies where **demand response signals and infrastructure are available**, exceptions include small systems, certain occupancies, and specialized applications

- **HVAC Systems:**

Must respond to demand signals by adjusting setpoints (e.g., $\pm 1\text{--}4^{\circ}\text{F}$) while maintaining occupant comfort and normal operation when no signal is present

C403.4.6
C404.8
C405.2.8.1

- **Water Heating:**

Electric storage water heaters (40–120 gal, ≤ 12 kW) must include demand response capability to initiate heating in response to a signal (per AHRI 1430/CTA-2045)

- **Lighting Systems:**

Interior lighting ($\geq 75\%$ of floor area in applicable occupancies) must automatically reduce output to $\leq 80\%$ and gradually dim during demand response events

ENERGY RATING INDEX (ERI) - COMPLIANCE ALTERNATIVE FOR RESIDENTIAL BUILDINGS

ERI is a score-based rating system which alternatively determines Energy Code compliance of a new residential building based on its energy performance. It allows applicants to approach the Energy Code with the same flexibility of the Simulated Building Performance (Section R405), yet it uses energy modeling and in-field inspection to confirm that results are achieved.

■ ERI 'Reference Design' vs. 'Rated Design'

- The ERI Reference Design is a standardized baseline home defined by ANSI/RESNET/ICC 301 and used to calculate the Energy Rating Index (ERI).
- The Rated Design is the proposed residential building design being evaluated for compliance.
- Compliance is achieved when the Rated Design has an ERI less than or equal to the value in Table R406.5 for the applicable climate zone.
- Different ERI targets apply depending on whether the building includes qualifying on-site renewable energy systems (OPP).

R406.4
R406.5

■ For Compliance Through ERI Approach, Drawings Must Indicate:

- 1) Mandatory provisions for Residential buildings listed in Table R406.2 are met.
- 2) The building thermal envelope thermal conductance must be less than or equal than the prescriptive thermal conductance multiplied by 1.15
- 3) Verification of compliance is required to be completed by an approved third party.
- 4) Documentation is required regarding a) Compliance software tools, b) Compliance report, and c) Other additional documentation that may be required to submit to the Department.
- 5) Calculation software tools, where used, meet the requirements on a) Minimum capabilities, b) Specific approval, and c) Input values.

R406.2
R406.3
R406.5
R406.6
R406.7

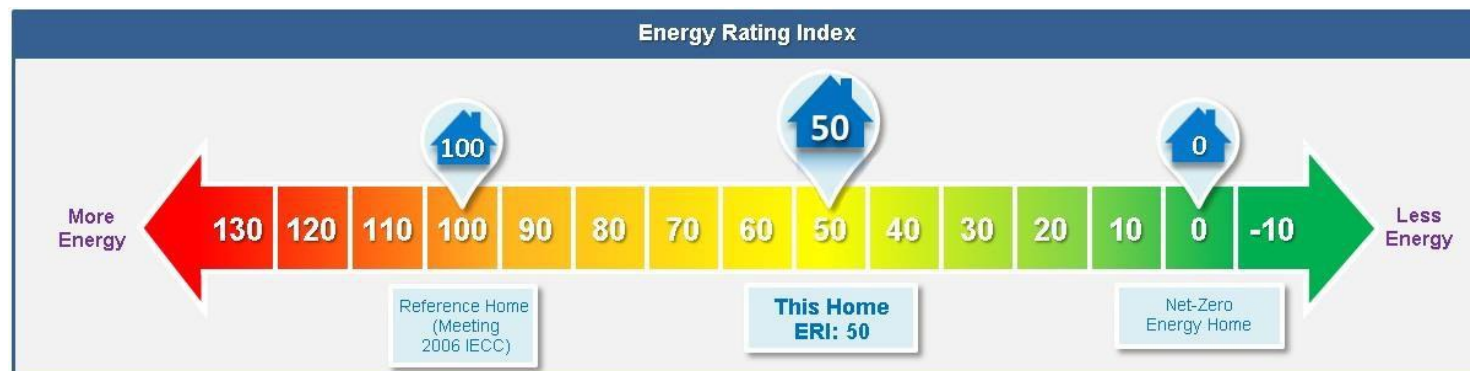


Figure OR-5. Sample Energy Rating Index Label

SYSTEM COMMISSIONING

■ Specify Total Proposed Heating and Cooling Capacity

1 RCNY §5000-01(g)

C408.2

6.7.3.3

C408.3

9.7.3

- For ALL Commercial building job applications including New buildings, Additions, and Alterations Total Heating Equipment Capacity (in Btu/h) being Installed, or

Total Heating Equipment Capacity (in Btu/h) Serving the Alteration space
and

Total Cooling Equipment Capacity (in Btu/h) being Installed, or

Total Cooling Equipment Capacity (in Btu/h) Serving the Alteration space

Must be clearly calculated and documented on an EN- labeled sheet.

■ Specify Whether System Commissioning is Required

- Drawings must clearly state *whether* System Commissioning is required.
- System Commissioning is *not required* for:
 - Buildings with less than 10,000 square feet (929 m²) gross conditioned floor area and combined heating, cooling and service water heating capacity of less than 960,000 Btu/h (281 kW) (Both ECC and ASHRAE)
 - Mechanical systems of Total Heating capacity Installed, or Serving the Alteration Space < 600 kBtu/h (ASHRAE only)
 - Mechanical systems of Total Cooling capacity Installed, or Serving the Alteration Space < 480 kBtu/h (ASHRAE only)
 - Renewable Energy systems of Total generating capacity < 25 kW

■ Areas Where Commissioning is Required

- For systems for which Commissioning is required, drawings should clearly identify specifications of each Commissioning-required system with detailed information on the equipment/fixture schedules and complete narratives including controls notes.

- Commissioning-required systems, at a minimum, include the following:

Mechanical systems

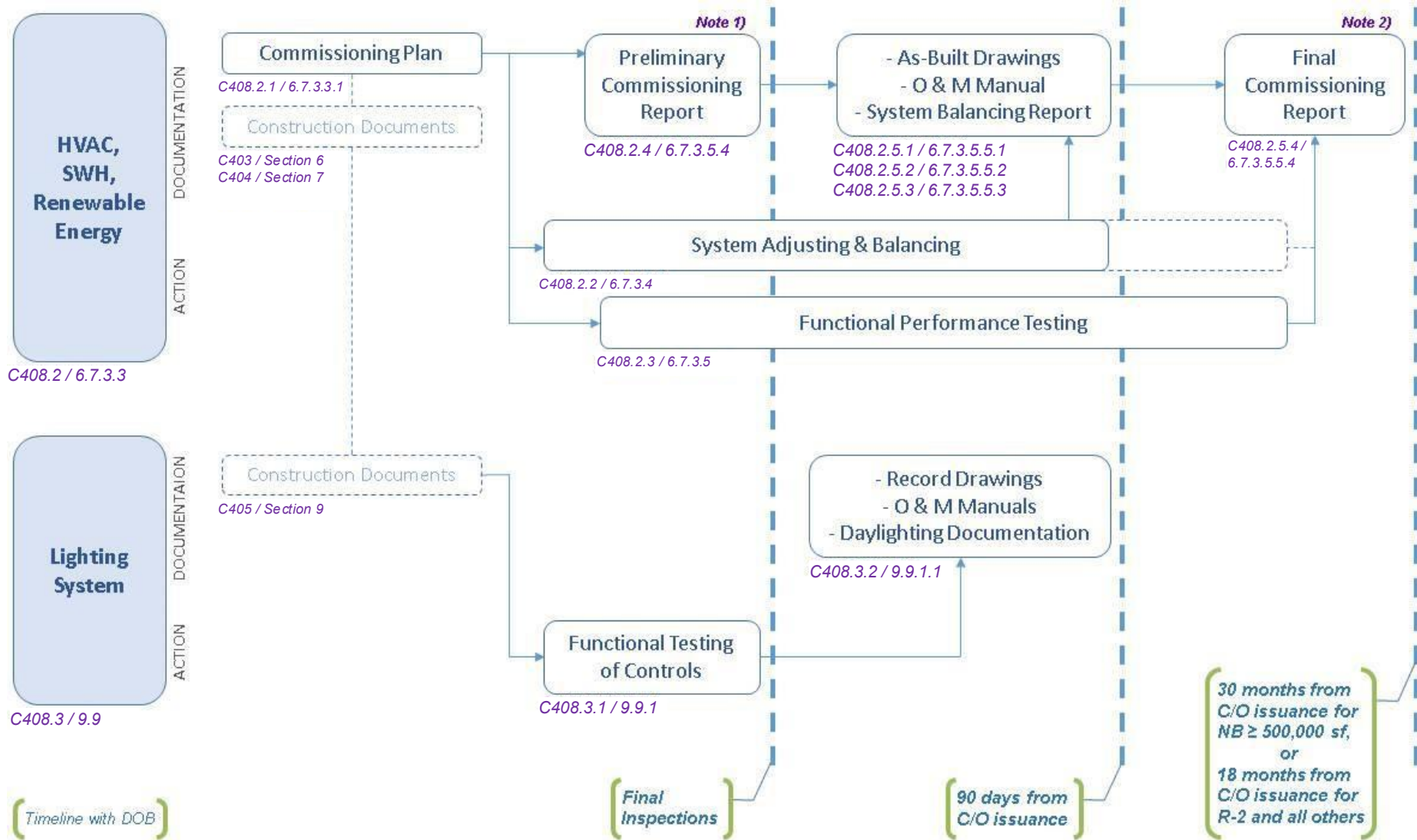
- 1) Heating, cooling, air handling and distribution, ventilation and exhaust systems;
- 2) Energy recovery systems;
- 3) Manual or automatic controls;
- 4) Plumbing systems;
- 5) Service water heating systems;
- 6) Refrigeration systems;
- 7) Renewable energy and energy storage systems; and
- 8) Other systems/equipment/components supporting HVAC and affecting energy use.

Lighting control systems

- 1) Occupant sensor controls;
- 2) Time-switch controls; and
- 3) Daylight responsive controls.

■ *Total Heating Equipment Capacity' calculations must include the 'Service Water Heating' equipment capacity.*

SYSTEM COMMISSIONING



Note 1) Upon the owner's receipt of the Preliminary Commissioning Report, the owner (owner's authorized agent) shall send a letter acknowledging the receipt to DOB at cx@buildings.nyc.gov.

Note 2) Upon completion of the final commissioning procedures, the owner (owner's authorized agent) shall send the Final Commissioning Report to DOB at cx@buildings.nyc.gov. Click [here](#) for more information in the FAQ under DOB Energy Code website.

Figure OR-7. System Commissioning Work Flow

CHANGES TO EXISTING BUILDINGS

■ Compliance

- Job applications of additions, alterations, repairs or relocation of existing buildings/structures, or changes of occupancy to existing buildings must demonstrate compliance with the NYCECC and other governing NYC Codes that are effective as of the job application filing date.
- Job applications following ECC must comply with:
 - 1) Section R502/Section C502 for Additions
 - 2) Section R503/Section C503 for Alterations
 - 3) Section R504/Section C504 for Repairs
 - 4) Section R505/Section C505 for Changes of Occupancy or Use
- Job applications following ASHRAE must comply with:
 - 1) Provisions of Sections 5, 6, 7, 8, 9 and 10 *or* Section 11 *or* Appendix G for Additions
 - 2) Provisions of Sections 5, 6, 7, 8, 9 and 10 *or* Section 11 *or* Appendix G for Alterations
 - 3) Provisions of Sections 5, 6, 7, 8, 9 and 10 for Repairs and Changes of Occupancy or Use

R501.2
C501.2

4.2.1.2
4.2.1.3

■ Clear Scope of Work

- Construction drawings must clearly define the proposed scope of work in the existing buildings by:
 - 1) Written descriptions of all proposed changes to the existing buildings, and
 - 2) Graphical delineations of the proposed work on drawings to separate the areas affected by ‘additions, alterations, repairs, relocations, or changes of C/O’ from the areas of ‘existing-to-remain.’

1 RCNY §5000-01(g)

CHANGES TO EXISTING BUILDINGS

A. Additions

- In general, *altered* portions that resulted from the proposed 'addition' in the existing building or building system are subject to the ECC requirements for *new* buildings.
- Specifically, *Residential* buildings must demonstrate compliance by Prescriptive compliance option per Section R502.2
- Specifically, *Commercial* buildings must demonstrate compliance by 1) Prescriptive compliance option per Section C502.3, *or* 2) satisfying 2025 NYC ASHRAE 90.1 applicable sections.
- Compliance of the 'addition' must be demonstrated by showing that:
 - 1) The 'addition' portion alone complies with the ECC prescriptively; *or*
 - 2) The existing building and the 'addition' combined, as a single building, comply with the ECC through the performance path; *or*
 - 3) For Residential buildings, the existing building with the 'addition' uses no more energy than the existing building prior to the 'addition.'
- A change from unconditioned space to conditioned space is considered an addition.
- Additions of more than 25% of the existing conditioned area are also required to comply with 50% Additional Efficiency Credits for new Commercial buildings or 5 credits for Residential Buildings.

R502
C502

B. Alterations

- In general, *altered* portions that resulted from the proposed 'alteration' in the existing building or building system are subject to the ECC requirements for *new* buildings.
- Alterations that are substantial improvements (as defined in the ECC) must also comply with 100% of the required Additional Efficiency Credits.
- The following alterations, provided that the energy use of the building after the 'alteration' is not increased, need *not* comply with the requirements for *new* buildings:
 - 1) Storm windows installed over existing fenestration
 - 2) Surface-applied window film installed on existing single-pane fenestration assemblies reducing solar heat gain
 - 3) Existing ceiling, wall or floor cavities exposed during construction, provided that cavities are completely filled with insulation
 - 4) Construction where the existing roof, wall or floor cavity is not exposed
 - 5) Roof recover
 - 6) Re-roofing of roofs without insulation in the cavity, providing new insulation either above or below the exposed sheathing (Residential buildings only)
 - 7) Alterations that replace less than 10 % of the luminaires in a space (*commercial buildings only*)
 - 8) Air barriers are not required for roof recover and roof replacement unless the entire existing building envelope is in the work scope of alterations, renovations or repairs (*commercial buildings only*)
- Compliance requirements for 'alterations' in *Residential* buildings
 - 1) Building Envelope: Section R503.1.1
 - 2) Heating and cooling systems: Section R503.1.2
 - 3) Service hot water systems: Section R503.1.3
 - 4) Lighting: Section R503.1.4

R503
C503

CHANGES TO EXISTING BUILDINGS

B. Alterations *(continued from the previous page)*

R503
C503

- Compliance requirements for 'alterations' in *Commercial* buildings
 - 1) Building Envelope: Section C503.2
 - 2) Heating and cooling systems: Section C503.3
 - 3) Service hot water systems: Section C503.4
 - 4) Lighting systems: Section C503.5
- Alterations in Commercial buildings complying with 2025 NYC ASHRAE 90.1 need *not* comply with Section C503.

C. Repairs

R504
C504

- While building maintenance and repairs must be conducted in compliance with relevant New York City Codes, work on damaged/non-damaged building components justified by the required repair/maintenance in the existing building are considered as 'repairs' work and are *not* subject to the requirements for Alterations in Section R503/Section C503.
- The following are considered 'repairs':
 - 1) Glass-only replacements in fenestration
 - 2) Roof repairs
 - 3) Replacement of the bulb and/or ballast within the existing luminaires in a space, without increasing the installed interior lighting power
 - 4) Replacement of existing doors that separate conditioned space from the exterior, without removing the existing vestibule (Commercial buildings only)
 - 5) Air barriers are not required for roof repair unless the entire existing building envelope is in the work scope of alterations, renovations or repairs (Commercial buildings only)
- Repairs in Commercial buildings complying with 2025 NYC ASHRAE 90.1 need *not* comply with Section C504.

D. Change of Occupancy or Use

R505
C505

- Residential building: A space converted from a different use to a dwelling unit, shall comply with the Addition requirements of R502
- *Commercial buildings: When a change of use happens in a space, the Energy Use Intensity* for each system shall be checked under tables C505.2.2, C505.2.3 and C505.2.4, *where the EUI is increased the system must comply as if it was a New Building.*
- Alterations in conjunction with the change of use or occupancy must also comply with the requirements of R503 and C503.