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Int. No. 1816-A

By Council Member Cornegy (by request of the Mayor)

A Local Law to amend the administrative code of the city of New York, in relation to conforming the New York city energy conservation code to the New York state energy code with amendments unique to construction in the city and incorporate therein provisions of the NYStretch energy code-2020, and to repeal section 28-1001.2 of such administrative code relating to such conforming amendments

Be it enacted by the Council as follows:Section 1. Statement of findings and purpose. The New York State Energy Conservation Construction Code (the "New York State Energy Code") is promulgated by the State Fire Prevention and Building Code Council pursuant to Article 11 of the New York State Energy Law. In accordance with Article 11, the New York City Energy Conservation Code is stricter than the New York State Energy Code. The purpose of this local law is to conform the New York City Energy Conservation Code to recent changes in the New York State Energy Code with local law amendments unique to construction in the city and local law amendments in accordance with Section 28-1001.3.3 of the administrative code relating to the NYStretch Energy Code-2020.

§ 2. The definition of "New York state energy code" in Section 28-1001.1.1 of the administrative code of the city of New York, as amended by local law number 32 for the year 2018, is amended to read as follows:

NEW YORK STATE ENERGY CODE. The term "New York State Energy Code" means the New York State Energy Conservation Construction Code, constituting part 1240 of title 19 of the New York codes, rules and regulations (19 NYCRR Part 1240), and the publications incorporated by reference in such part, promulgated on [~~September 21, 2016~~] February 12, 2020, by the State Fire Prevention and Building Code Council pursuant to Article 11 of the New York State Energy Law.

§ 3. Section 28-1001.2 of the administrative code of the city of New York is REPEALED and a new Section 28-1001.2 is added to read as follows:

§ 28-1001.2 New York city amendments to the New York state energy code. The following New York city amendments to the New York state energy code are hereby adopted as set forth in Sections 28-1001.2.1, 28-1001.2.2 and 28-1001.2.3.

§ 28-1001.2.1 New York city amendments to 19 NYCRR Part 1240.

1240.6 Exceptions.

1240.6 - Delete Exception (b) in its entirety.

§ 28-1001.2.2 New York city amendments to commercial and residential chapters of the New York state energy code.

Chapter 1 [CE] and Chapter 1 [RE]

Delete Chapter R1 and Chapter C1 in their entirety and replace with a new Chapter 1 to read as follows:

CHAPTER 1

ADMINISTRATION

INTRODUCTORY STATEMENT

The New York City Energy Conservation Code ("NYCECC") is comprised of the New York State Energy Conservation Construction Code with amendments as enacted into law by the city. Reflecting these amendments to the New York State Energy Conservation Construction Code, the NYCECC is divided into provisions relevant to commercial buildings and provisions relevant to residential buildings as follows:

1. The provisions of the NYCECC for commercial buildings are reflected in the state publications incorporated by reference in 19 NYCRR Sections 1240.3 and 1240.4, as amended by Sections 28-1001.2.1, 28-1001.2.2 and 28-1001.2.3 of the Administrative Code. Such state publications include (i) Chapters 1 [CE], 2 [CE], 3 [CE], 4 [CE], 5 [CE] and 6 [CE] of the publication entitled the 2020 Energy Conservation Construction Code of New York State ("ECCCNYS"); (ii) the October 2016 edition of Energy Standard for Buildings Except Low-Rise Residential Buildings ("ASHRAE 90.1-2016"), as amended by 19 NYCRR Section 1240.3; and (iii) reference standards incorporated by reference in subdivision (c) of 19 NYCRR Section 1240.4.

2. The provisions of the NYCECC for residential buildings are reflected in the state publications incorporated by reference in 19 NYCRR Section 1240.5, as amended by Sections 28-1001.2.1, 28-1001.2.2 and 28-1001.2.3 of the Administrative Code. Such state publications include (i) Chapters 1 [RE], 2 [RE], 3 [RE], 4 [RE], 5 [RE] and 6 [RE] of the publication entitled the 2020 Energy

Conservation Construction Code of New York State ("ECCCNYS"); and (ii) the referenced standards incorporated by reference in subdivision (b) of 19 NYCRR Section 1240.5.

SECTION ECC 101

SCOPE AND GENERAL REQUIREMENTS

101.1 General. These provisions shall be known and cited as the "New York City Energy Conservation Code," "NYCECC" or "ECC," and are referred to herein as "this code." All section numbers in this code shall be deemed to be preceded by the designation "ECC." Administration and enforcement of this code shall be in accordance with Title 28 of the Administrative Code.

101.1.1 Titles.

The publication entitled 2020 Energy Conservation Construction Code of New York State shall be known as the "ECCCNYS."

The 2016 edition of the Energy Standard for Buildings Except Low-Rise Residential Buildings shall be known as "ASHRAE 90.1-2016." All references in this code to ASHRAE 90.1-2016 shall be deemed to be references to ASHRAE 90.1-2016 (AS AMENDED).

The New York State Energy Conservation Construction Code, as contained in Part 1240 of Title 19 of the New York Codes, Rules and Regulations, along with the New York City amendments to such New York State Energy Conservation Construction Code shall be known collectively as the "New York City Energy Conservation Code."

101.2 Scope. This code applies to commercial buildings and residential buildings, as defined in Chapter C2 and Chapter R2 of this code, and the buildings' sites, associated systems and equipment.

101.2.1 References. Where reference is made within this code to the Building Code of New York State, Existing Building Code of New York State, Fire Code of New York State, Fuel Gas Code of New York State, Mechanical Code of New York State, Plumbing Code of New York State, Property Maintenance Code of New York State or Residential Code of New York State, the reference shall be deemed to be to the analogous provision of the New York City Construction Codes (Title 28 of the Administrative Code), the 1968 Building Code (Chapter 1 of Title 27 of the Administrative Code), the New York City Fire Code (Title 29 of the Administrative Code) or the New York City Electrical Code (Chapter 3 of Title 27 of the Administrative Code).

101.2.2 Occupancy classifications. For determination of occupancy classification and use within this code, a comparable occupancy classification shall be made to the New York City Building Code.

101.2.3 Reconciliation with New York State Energy Conservation Construction Code. Whenever any provision of the New York State Energy Conservation Construction Code provides for a more stringent requirement than imposed by this code, the more stringent requirement shall govern.

101.2.4 Other laws. The provisions of this code shall not be deemed to nullify any federal, state or local

law, rule or regulation relating to any matter as to which this code does not provide.

101.2.5 Exceptions. This code shall not apply to the alterations of existing buildings set forth in items 1 through 8, provided that the alteration will not increase the energy usage of the building:

1. Storm windows installed over existing fenestration.

2. Glass-only replacements in an existing sash and frame, provided that the U-factor and the solar heat gain coefficient (SHGC) shall be equal to or lower than before the glass replacement.

3. Alterations, renovations or repairs to roof/ceiling, wall or floor cavities, including spaces between furring strips, provided that such cavities are insulated to the full existing cavity depth with insulation having a minimum nominal value of R-3.0/inch (R-2.0/cm).

4. Alterations, renovations or repairs to walls and floors in cases where the existing structure is without framing cavities and no new framing cavities are created.

5. Reroofing where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.

6. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a conditioned space from the exterior shall not be removed.

7. An alteration that replaces less than 20 percent of the luminaires in a space in residential building or less than 10 percent of the luminaires in a space in a commercial building, provided that such alteration does not increase the installed interior lighting power.

8. An alteration that replaces only the bulb and ballast within the existing luminaires in a space, provided that such alteration does not increase the installed interior lighting power.

101.3 Intent. This code shall regulate the design and construction of buildings for the use and conservation of energy over the life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances. To the fullest extent feasible, use of modern technical methods, devices and improvements that tend to minimize consumption of energy without abridging reasonable requirements for the safety, health and security of the occupants or users of buildings shall be permitted. As far as may be practicable, the improvement of energy conservation construction practices, methods, equipment, materials and techniques shall be encouraged.

Nothing in this section or in any other provision of this code shall be construed to permit the commissioner to approve an application to waive, vary, modify or otherwise alter any provision of this code if such alteration would make such provision less restrictive than a standard or requirement of the New York State Energy Conservation Construction Code, unless the applicant has obtained approval for such alteration pursuant to Section 11-106 of the New York State Energy Law.

101.4 Applicability. The provisions of this code shall apply to the construction of buildings. Where, in any

specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

101.4.1 Mixed occupancy. Where a building includes both commercial and residential occupancies, each occupancy shall be separately considered and shall meet the applicable provisions of Chapters C2, C3, C4 and C5 for commercial, and Chapters R2, R3, R4, and R5 for residential.

101.5 Compliance. Commercial buildings shall comply with the provisions of this code applicable to commercial buildings. Residential buildings shall comply with the provisions of this code applicable to residential buildings.

101.5.1 Compliance software. Compliance with the provisions of this code can be demonstrated through the use of computer software deemed acceptable by the New York State Secretary of State and the commissioner.

101.5.1.1 Mandatory provisions. The use of the software approach to demonstrate compliance with the commercial provisions, residential provisions, or Appendix CA of this code is not a defense for the failure to comply with any mandatory provision of this code. When using the software approach to demonstrate compliance with the provisions of this code, compliance with all applicable mandatory provisions of this code is required.

101.5.2 Demonstration of compliance. For a building project application or applications required to be submitted to the department, the following documentation, as further described in the rules of the department, shall be required in order to demonstrate compliance with this code:

101.5.2.1 Professional statement. Any registered design professional or lead energy professional filing an application or applications for a new building or alteration project shall provide on a signed and sealed drawing a statement of compliance or exemption in accordance with the rules of the department.

101.5.2.2 Energy analysis. For any application that is not exempt from this code and for which a work permit is required in accordance with Section 28-105 of the Administrative Code, an energy analysis shall be provided on a sheet or sheets within the construction drawing set. The energy analysis shall identify the compliance path followed, demonstrate how the design complies with this code and be in a format as prescribed in the rules of the department. The energy analysis shall meet the requirements of this code for the entire project. Projects that utilize trade-offs among disciplines shall use DOE2-based energy modeling programs or other energy-modeling programs as prescribed in the rules of the department and shall be signed and sealed by a lead energy professional.

101.5.2.3 Supporting documentation. For any application that is not exempt from this code and for which a work permit is required in accordance with Section 28-105 of the Administrative Code, supporting documentation shall be required in the approved construction drawings. See Section ECC 103 for further requirements.

101.6 Statutory Limitations. In the event of an addition to or alteration of an existing building or building system in an existing building, nothing in this code shall be interpreted to require any unaltered portion of such existing building or building system to comply with this code.

101.7 Historic Buildings. Historic Buildings, as defined in this code, are exempt from the requirements of this code.

SECTION ECC 102

ALTERNATE MATERIALS, METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

102.1 General. This code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such material, method of construction, design or insulating system has been approved by the commissioner as (1) meeting the intent of this code, (2) achieving energy savings that are equivalent to or greater than would be achieved using prescribed materials, methods of construction, designs or insulating systems, and (3) meeting the requirements of Article 113 of Chapter 1 of Title 28 of the Administrative Code and the remaining New York City Construction Codes.

Nothing in this section shall be construed to permit the commissioner to approve an application that would waive, vary, modify, or otherwise alter any provision, standard, or requirement of this code if such alteration would make such provision less restrictive than a standard or requirement of the Energy Conservation Construction Code of New York State unless the applicant has obtained approval for such alteration pursuant to Section 11-106 of the New York State Energy Law.

SECTION ECC 103

CONSTRUCTION DOCUMENTS

103.1 General. Construction documents shall be prepared in accordance with the provisions of Chapter 1 of Title 28 of the Administrative Code, the New York City Construction Codes, including this code, and the rules of the department.

103.2 Supporting documentation on construction documents. Supporting documentation shall include those construction documents that demonstrate compliance with this code.

103.2.1 Intent. Supporting documentation shall accomplish the following:

1. Demonstrate conformance of approved drawings to the energy analysis for every element and value of the energy analysis;

2. Demonstrate conformance of approved drawings to other mandatory requirements of this code, including, but not limited to, sealing against air leakage from the building envelope and from ductwork as applicable, insulation of ducts and piping as applicable, mechanical and lighting controls with devices shown and operational narratives for each, and additional requirements as set forth in this section;

3. Identify required progress inspections in accordance with the scope of work, this code, the Administrative Code, the New York City Building Code and the rules of the department; and

4. Comply with other requirements as may be set forth in the rules of the department.

103.2.2 Detailed requirements. Construction documents shall be drawn to scale upon suitable material. Electronic media documents are permitted to be submitted in accordance with department procedures. Construction documents for a project shall be fully coordinated and of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, building systems and equipment as herein governed. Details shall include, but are not limited to, as applicable, insulation materials and their R-values; fenestration U-factors and SHGCs; area-weighted U-factor and SHGC calculations; mechanical system design criteria; mechanical and service water heating system and equipment, types, sizes and efficiencies; economizer description; equipment and systems controls; fan motor horsepower and controls; duct sealing, duct and pipe insulation and location; lighting fixture schedule with wattages and control narrative; location of daylight zone on floor plans (as applicable), and air sealing details. The building's thermal envelope shall be represented on the construction documents.

103.3 Examination of documents. In accordance with Article 104 of Chapter 1 of Title 28 of the Administrative Code, the department shall examine or cause to be examined the accompanying construction documents and shall ascertain by such examinations whether the construction indicated and described is in accordance with the requirements of this code and other pertinent laws, rules and regulations.

103.4 Changes during construction. For changes during construction refer to Section 28-104.3 of the Administrative Code.

SECTION ECC 104

INSPECTIONS

104.1 General. Except as otherwise specifically provided, inspections required by this code or by the department during the progress of work may be performed on behalf of the owner by an approved agency. All inspections shall be performed at the sole cost and expense of the owner. Refer to Article 116 of Chapter 1 of Title 28 of the Administrative Code for additional provisions relating to inspections. In addition to any inspections otherwise required by this code or the rules of the department, the following inspections shall be required:

1. Progress inspections. Progress inspections shall be performed in accordance with the rules of the department.

2. Final inspection. Refer to Article 116 of Chapter 1 of Title 28 of the Administrative Code and the rules of the department.

3. Issuance of Certificate of Compliance. Refer to Section 28-116.4.1 of the Administrative Code.

The requirements of this section shall not prohibit the operation of any heating equipment or appliances

installed to replace existing heating equipment or appliances serving an occupied portion of a structure provided that a request for inspection of such heating equipment or appliances has been filed with the department not more than 48 hours after such replacement work is completed, and before any portion of such equipment or appliances is concealed by any permanent portion of the structure.

104.1.1 Approved agencies. Refer to Article 114 of Chapter 1 of Title 28 of the Administrative Code and the rules of the department.

104.1.2 Inspection of prefabricated construction assemblies. Prior to the issuance of a work permit for a prefabricated construction assembly having concealed mechanical work, the department shall require the submittal of an evaluation report by the manufacturer or approved agency on each prefabricated construction assembly, indicating the complete details of the mechanical system, including a description of the system and its components, the basis upon which the system is being evaluated for energy use, test results and similar information, and other data as necessary for the commissioner to determine conformance to this code.

104.1.2.1 Test and inspection records. Required test and inspection records shall be made available to the commissioner at all times during the fabrication of the mechanical system and the erection of the building; or such records as the commissioner designates shall be filed.

104.2 Testing. Envelope, heating, ventilating, air conditioning, service water heating, lighting and electrical systems shall be tested as required in this code and in accordance with Sections 104.2.1 through 104.2.3. Except as otherwise required in this code or in the rules of the department, tests shall be made by the permit holder and witnessed by an approved agency.

104.2.1 New, altered, extended, renovated or repaired systems. New envelope, heating, ventilating, air conditioning, service water heating, lighting and electrical installations or systems, and parts of existing systems that have been altered, extended, renovated or repaired, shall be tested as prescribed herein or in the rules of the department to disclose leaks and defects.

104.2.2 Apparatus, instruments, material and labor for tests. Apparatus, instruments, material and labor required for testing an envelope, heating, ventilating, air conditioning, service water heating, lighting or electrical installation or system, or part thereof, shall be furnished by the permit holder.

104.2.3 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with the New York City Construction Codes, including this code. The work or installation shall then be reinspected or retested by the approved agency.

104.3 Sign-off of completed work. In addition to the requirements of Article 116 of Chapter 1 of Title 28 of the Administrative Code, Section 103.4 of this code and other requirements for sign-off, the project team shall either certify that construction does not differ from the last approved energy analysis or provide a whole-project as-built energy analysis and supporting documents, signed and sealed, for approval prior to sign-off. The as-built energy analysis and supporting documents shall reflect the materials, equipment and values actually used in the construction of the project, and shall demonstrate compliance of the constructed project with this code. Such signed and sealed documents may be accepted with less than full examination by the department based on the professional certification of the registered design professional.

104.4 Temporary connection. The commissioner shall have the authority to allow the temporary connection of an installation to the sources of energy for the purpose of testing the installation or for use under a temporary certificate of occupancy.

SECTION ECC 105

REFERENCED STANDARDS

105.1 Referenced standards. The standards referenced in Chapters C2, C3, C4, and C5 of this code shall be those that are listed in Chapter C6 of this code, and in the rules of the department and such standards shall be considered part of the requirements of the commercial provisions of this code to the prescribed extent of each such reference. The standards referenced in Chapters R2, R3, R4, and R5, of this code shall be those that are listed in Chapter R6 of this code, and in the rules of the department and such standards shall be considered part of the requirements of the residential provisions of this code to the prescribed extent of each such reference. The standards referenced in Appendix CA of this code shall be those that are listed in Section 12 of Appendix CA of this code, and in the rules of the department and such standards shall be considered part of the requirements of the commercial provisions of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and the referenced standards, the provisions of this code shall apply. Refer to Article 103 of Chapter 1 of Title 28 of the Administrative Code for additional provisions relating to referenced standards.

CHAPTER C2

DEFINITIONS

SECTION C201

GENERAL

Section C201.1 Scope.

Section C201.1 - Revise Section C201.1 to read as follows:

C201.1 Scope. Unless stated otherwise, the following words and terms in chapters C2, C3, C4, C5 and C6 of this code shall have the meanings indicated in this chapter.

Section C201.3 Terms defined in other codes.

Section C201.3 - Revise Section C201.3 to read as follows:

C201.3 Terms defined in other codes. Terms that are not defined in this code but are defined in the New York City Construction Codes, New York City Fire Code, or the New York City Electrical Code shall have the meanings ascribed to them in those codes.

Section C201.4 Terms not defined.

Section C201.4 - Revise Section C201.4 to read as follows:

C201.4 Terms not defined. Terms not defined in this chapter or in the New York City Construction Codes, New York City Fire Code, or the New York City Electrical Code shall have ordinarily accepted meanings such as the context implies.

SECTION C202

GENERAL DEFINITIONS

Section C202 - Delete the definitions of "Fire Code of New York State," "Fuel Gas Code of New York State," "Mechanical Code of New York State," "Plumbing Code of New York State," "Residential Code of New York State," and "Uniform Code."

Section C202 - Delete the definition of "Air-impermeable insulation" after the definition of "Air curtain."

Section C202 - Delete the definitions of "Area-weighted average," "ASHRAE 90.1-2016," "ASHRAE 90.1-2016 (as amended), "Approved" and "Approved agency" after the definition of "Alteration."

Section C202 - Add the definitions of "Approval or approved," "Approved agency," "Area-weighted average," "ASHRAE 90.1-2016," "ASHRAE 90.1-2016 (AS AMENDED)" and "Authority having jurisdiction" after the definition of "Alteration," to read as follows:

APPROVAL OR APPROVED. See Section 28-101.5 of the Administrative Code.

APPROVED AGENCY. See Section 28-101.5 of the Administrative Code.

AREA-WEIGHTED AVERAGE. A mathematical technique for combining different amounts of various components, based on proportional relevance, into a single number. Weighted averaging may be used where there is more than one R-value for floor, wall, or ceiling insulation, or more than one U-factor for fenestration in a building. As an example, the area-weighted average for window fenestration U-factors equals (Area 1 x U-factor 1) + (Area 2 x U-factor 2) + …/Total Area = maximum allowable fenestration U-factor.

ASHRAE 90.1-2016. The publication entitled "ANSI/ASHRAE/IES Standard 90.1-2016, Energy Standard for Buildings Except Low-rise Residential Buildings" (October 2016 printing) published by ASHRAE, formerly known as the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE 90.1-2016 is published by ASHRAE and jointly sponsored by the Illuminating Engineering Society of North America and the American National Standards Institute, and is also known as "ANSI/ASHRAE/IES 90.1-2016" or "ANSI/ASHRAE/IESNA 90.1-2016.")

ASHRAE-90.1-2016 (AS AMENDED). ASHRAE 90.1-2016, as amended by 19 NYCRR Part 1240 with revisions as set forth in Appendix CA of this code.

AUTHORITY HAVING JURISDICTION. The commissioner or the commissioner's designee.

Section C202 - Add a new definition of "Basement" after the definition of "Automatic," to read as follows:

BASEMENT. A story that is not a story above grade plane. See the definition of "Story above grade plane."

Section C202 - Revise the definition of "Building" after the definition of "Bubble point," to read as follows:

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy or for affording shelter to persons, animals or property, together with: (1) any mechanical systems, service water heating systems, and electric power and lighting systems located in such structure, and (2) any mechanical systems, service water heating systems, and electric power and lighting systems located on the building site and supporting such structure. The term "building" shall include, but not be limited to, factory manufactured homes, as defined in subdivision 8 of Section 372 of the Executive Law, and mobile homes, as defined in subdivision 13 of Section 372 of the Executive Law.

Section C202 - Revise the definition of "Building entrance" after the definition of "Building commissioning," to read as follows:

BUILDING ENTRANCE. Any doorway, set of doors, revolving door, vestibule, or other form of portal that is ordinarily used to gain access to the building or to exit from the building by its users and occupants. This does not include doors solely used to directly enter mechanical, electrical, and other building utility service equipment rooms.

Section C202 - Revise the definition of "Building official" after the definition of "Building entrance" to read as follows:

BUILDING OFFICIAL. The Commissioner of Buildings of the City of New York or his or her duly authorized representative. See Section 28-101.5 of the Administrative Code.

Section C202 - Revise the definition of "Conditioned space" after the definition of "Conditioned floor area," to read as follows:

CONDITIONED SPACE. An area, room or space that is enclosed within the building thermal envelope and is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ducts, piping or other sources of heating or cooling.

Section C202 - Add a new definition of "DX-dedicated outdoor air system units (DX-DOAS units)" after the definition of "Dwelling unit," to read as follows:

DX-DEDICATED OUTDOOR AIR SYSTEM UNITS (DX-DOAS UNITS). A type of air-cooled, watercooled, or water source factory assembled product that dehumidifies 100 percent outdoor air to a low dew point and includes reheat that is capable of controlling the supply dry-bulb temperature of the dehumidified air to the designed supply air temperature. This conditioned outdoor air is then delivered directly or indirectly to the conditioned spaces. It may precondition outdoor air by containing an enthalpy

wheel, sensible wheel, desiccant wheel, plate heat exchanger, heat pipes, or other heat or mass transfer apparatus.

Section C202 - Revise the definition of "Energy code" after the definition of "Energy analysis," to read as follows:

ENERGY CODE. The New York City Energy Conservation Code.

Section C202 - Add a new definition of "Grade plane" after the definition of "General lighting," to read as follows:

GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

Section C202 - Add a new definition of "Integrated seasonal coefficient of performance (ISCOP)" after the definition of "Integrated part load value (IPLV)," to read as follows:

INTEGRATED SEASONAL COEFFICIENT OF PERFORMANCE (ISCOP). A seasonal efficiency number that is a combined value based on the formula listed in AHRI Standard 920 of the two COP values for the heating season of a DX-DOAS unit water or air source heat pump, expressed in W/W.

Section C202 - Add a new definition of "Integrated seasonal moisture removal efficiency (ISMRE)" after the definition of "Integrated seasonal coefficient of performance (ISCOP)," to read as follows:

INTEGRATED SEASONAL MOISTURE REMOVAL EFFICIENCY (ISMRE). A seasonal efficiency number that is a combined value based on the formula listed in AHRI Standard 920 of the four dehumidification moisture removal efficiency (MRE) ratings required for DX-DOAS units, expressed in lb of moisture/kWh.

Section C202 - Revise the definition of "Labeled" after the definition of "Isolation devices," to read as follows:

LABELED. See Section 28-101.5 of the Administrative Code.

Section C202 - Add a new definition of "Lead energy professional" after the definition of "Labeled," to read as follows:

LEAD ENERGY PROFESSIONAL. The registered design professional who signs and seals the energy analysis for an entire project. Such individual may be the same registered design professional who signs and seals the design drawings for the same project.

Section C202 - Revise the definition of "Listed" after the definition of "Liner system (Ls)," to read as follows:

LISTED. See Section 28-101.5 of the Administrative Code.

Section C202 - Add a new definition of "Moisture removal efficiency (MRE)" after the definition of "Manual,"

to read as follows:

MOISTURE REMOVAL EFFICIENCY (MRE). A ratio of the moisture removal capacity in pounds of moisture per hour to the power input values in kilowatts at any given set of standard rating conditions expressed in lb of moisture/kWh.

Section C202 - Add new definitions of "Professional certification" and "Project" after the definition of "Powered roof/wall ventilators," to read as follows:

PROFESSIONAL CERTIFICATION. See Section 28-101.5 of the Administrative Code.

PROJECT. A design and construction undertaking comprised of work related to one or more buildings and the site improvements. A project is represented by one or more plan/work applications, including construction documents compiled in accordance with Section 107 of the New York City Building Code, that relate either to the construction of a new building or buildings or to the demolition or alteration of an existing building or buildings. Applications for a project may have different registered design professionals and different job numbers, and may result in the issuance of one or more permits.

Section C202 - Add a new definition of "Spandrel panel" after the definition of "Solar heat gain coefficient (SHGC)," to read as follows:

SPANDREL PANEL. An opaque assembly within a fenestration framing system in a wall that is part of the building thermal envelope. Such panels are considered to be a portion of the opaque thermal envelope assembly.

Section C202 - Delete the definition of "Standard reference design".

Section C202 - Add new definitions of "Story," "Story above grade plane," and "Thermal bridge" after the definition of "Storefront," to read as follows:

STORY. The portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above. See the definitions of "Basement" and "Grade plane." A story is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

STORY ABOVE GRADE PLANE. Any story having its finished floor surface entirely above grade plane, or in which the finished surface of the floor next above is:

1. More than 6 feet (1829 mm) above grade plane; or

2. More than 12 feet (3658 mm) above the finished ground level at any point.

THERMAL BRIDGE : Thermal bridges are elements that interrupt areas of uniform thermal resistance in the building envelope.

Clear field thermal bridge: an area-based thermal transmittance associated with elements of a building envelope assembly which repeat at regular intervals. Examples of clear field thermal bridges include

metal or wood studs, brick ties and cladding attachments such as z-girts.

Linear thermal bridge: a length-based thermal transmittance associated with horizontal, vertical, or diagonal elements within the building envelope and with length measured along the exterior surface of the building envelope. Examples of linear thermal bridges include balconies or floor assemblies which penetrate walls in the building envelope, fenestration perimeter interfaces, parapets, and shelf angles. 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 (W/mK).

Point thermal bridge: an element-based thermal transmittance associated with a discrete element that penetrates the building envelope. Examples of point thermal bridges include a beam penetrating a wall, a column penetrating a roof or floor, and an anchor or connection used to attach an element to the building and not otherwise addressed as a clear field thermal bridge or linear thermal bridge. 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 (W/K).

CHAPTER C3

GENERAL REQUIREMENTS

SECTION C301

Section C301 - Delete Section C301 in its entirety and add a new Section C301 to read as follows:

SECTION C301

CLIMATE ZONES

C301.1 General. For projects in the City of New York, Climate Zone 4A shall be used in determining the applicable requirements from Chapter C4.

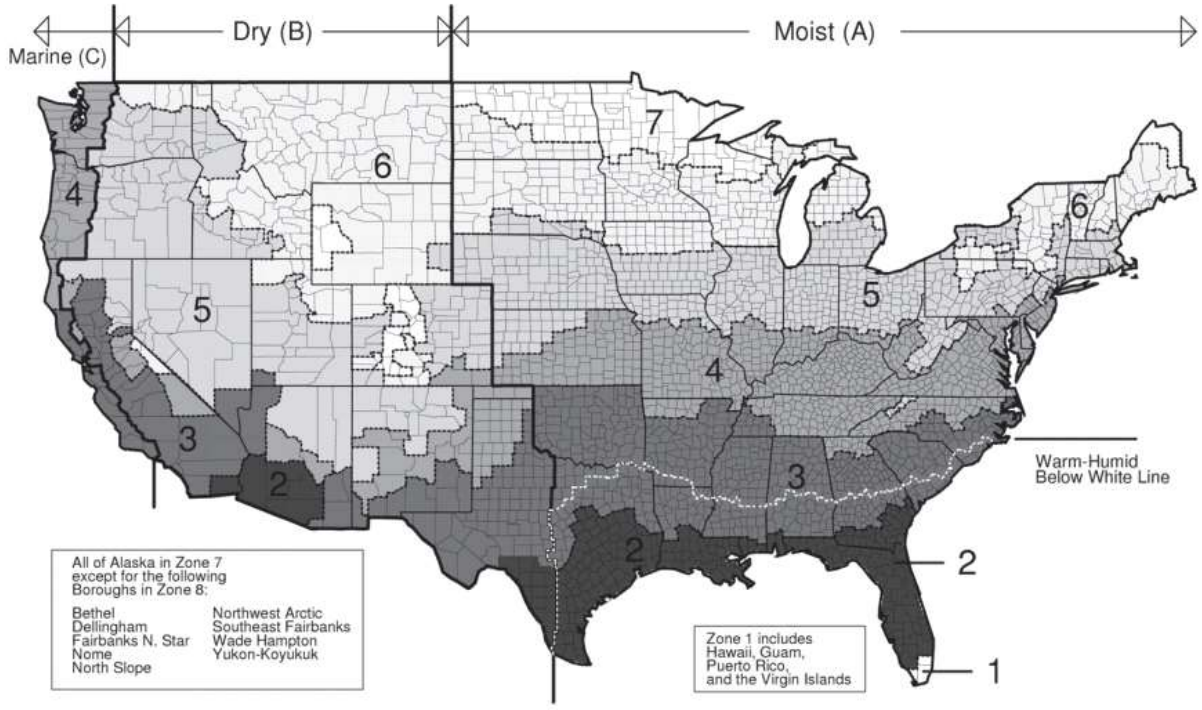


FIGURE C301.1

CLIMATE ZONES

SECTION C303

MATERIALS, SYSTEMS AND EQUIPMENT

Section C303.1.1 Building thermal envelope insulation.

Section C303.1.1 - Revise the exception to Section C303.1.1 to read as follows:

Exception: For roof insulation installed above the deck, the R-value shall be labeled as required by the material standards specified in the New York City Building Code.

Section C303.2 Installation.

Section C303.2 - Revise Section C303.2 to read as follows:

C303.2 Installation. Materials, systems and equipment shall be installed in accordance with (i) the manufacturer's installation instructions and (ii) the applicable provisions of the New York City Construction Codes.

CHAPTER C4

COMMERCIAL ENERGY EFFICIENCY

SECTION C401

GENERAL

Section C401.2 Application.

Section C401.2 - Revise Section C401.2 to read as follows:

C401.2 Application. Commercial buildings shall comply with one of the following compliance paths:

1. ASHRAE Compliance Path: The requirements of ASHRAE 90.1-2016 (as amended), as set forth in Appendix CA.

2. Prescriptive Compliance Path: The requirements of Sections C402 through C405 and C408. In addition, commercial buildings shall comply with Section C406 and tenant spaces shall comply with Section C406.1.1.

3. Performance Compliance Path: The requirements of Section C407.

Section C401.2.1 - Delete Section C401.2.1 in its entirety, and add a new Section C401.2.1 to read as follows:

C401.2.1 Application to Group R-3 buildings. Where Group R-3 buildings must comply with Section C401.2, the requirements of Sections R401.3, R402.4.1.2, and R403.6.2 shall also be met.

SECTION C402

BUILDING ENVELOPE REQUIREMENTS

Section C402.1 General (Prescriptive).

Section C402.1 - Revise Item 1 of Section C402.1 to read as follows:

1. The opaque portions of the building thermal envelope shall comply with the specific insulation requirements of Section C402.2 and the thermal requirements of either the R-value-based method of

Section C402.1.3; the U-, C- and F-factor-based method of Section C402.1.4; or the component performance alternative of Section C402.1.5. When the total area of penetrations from through-the-wall mechanical equipment or equipment listed in Table C403.3.2(3) exceeds 1 percent of the opaque above-grade wall area, the building thermal envelope shall comply with the U-, C- and F-factor-based method of Section C402.1.4.

Section C402.1 - Delete Item 4 of Section C402.1 in its entirety.

Section C402.1.3 Insulation component R-value-based method.

Section C402.1.3 - Revise the first sentence of Section C402.1.3 to read as follows:

Building thermal envelope opaque assemblies shall comply with the requirements of Sections C402.2 and C402.4 based on the climate zone specified in Chapter C3.

Section C402.1.3 - Delete Table C402.1.3 in its entirety and add a new Table C402.1.3 to read as follows:

TABLE C402.1.3

OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a, h]

CLIMATE ZONE	4 EXCEPT MARINE		5 AND MARINE 4		6	
	All other	Group R	All other	Group R	All other	Group R
Roofs						
Insulation entirely above roof deck	R-33ci	R-33ci	R-30ci	R-30ci	R-30ci	R-30ci
Metal buildings[b]	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-19 + R-11 LS	R-25 + R-11 LS	R-25 + R-11
Attic and other	R-53	R-53	R-38	R-49	R-49	R-49
Walls, above grade						
Mass[f]	R-11.2ci	R-13.25ci	R-11.4ci	R-13.3ci	R-13.3ci	R-15.2ci
Metal building	R-13 + R-14.9ci	R-13 + R-14.9ci	R-13 + R-13ci	R-13 + R-13ci	R-13 + R-13c	R-13 + R-13c
Metal framed	R-13 + R-8.5c	R-13 + R-8.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5
Wood framed and other	R-13 + R-4.5c or R-19 + R-1.5ci	R-13 + R-4.5ci or R-19 + R-1.5ci	R-13 + R-3.8ci or R-20	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5ci or R-20 + R-3.8ci	R-13 + R-7.5 or R-20 + R-3.8ci
Walls, below grade						
Below-grade wall[c]	R-7.5ci	R-10ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci
Floors						
Mass[d]	R-14.6ci	R-16.7ci	R-10ci	R-12.5ci	R-12.5ci	R-12.5ci
Joist/framing[e]	R-30	R-30	R-30	R-30	R-30	R-30

Slab-on-grade floors						
Unheated slabs	R-15 for 24" below	R-15 for 24" below	R-10 for 24" below	R-10 for 24" below	R-10 for 24" below	R-15 for 24" below
Heated slabs[g]	R-20 for 48" below + R-5 full slab	R-20 for 48" below + R-5 full slab	R-15 for 36" below + R-5 full slab	R-15 for 36" below + R-5 full slab	R-15 for 36" below + R-5 full slab	R-20 for 48" below + R-5 full slab
Opaque doors						
Nonswinging	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA Appendix A.
b. Where using R-value compliance method, a thermal spacer block shall be provided, otherwise use the U-factor compliance method in Table C402.1.4.
c. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for above grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. Steel floor joist systems shall be insulated to R-38.
f. "Mass walls" shall be in accordance with Section C402.2.2.
g. The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required to extend below the bottom of the slab.
h. Not applicable to garage doors. See Table C402.1.4.

Section C402.1.4 Assembly U-factor, C-factor or F-factor-based method.

Section C402.1.4 - Revise the first sentence of Section C402.1.4 to read as follows:

Building thermal envelope opaque assemblies shall meet the requirements of Sections C402.2 and C402.4 based on the climate zone specified in Chapter C3.

Section C402.1.4 - Revise the last sentence of Section C402.1.4 to read as follows:

Commercial buildings or portions of commercial buildings enclosing occupancies other than Group R shall use the U-, C- or F-factor from the "All other" column of Table C402.1.4.

Table C402.1.4 - Delete Table C402.1.4 in its entirety and add a new Table C402.1.4 to read as follows:

TABLE C402.1.4

OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, U-FACTOR METHOD[a, b]

CLIMATE ZONE	4 EXCEPT MARINE		5 AND MARINE 4		6	
	All other	Group R	All other	Group R	All other	Group R
Roofs						
Insulation entirely above roof deck	U-0.030	U-0.030	U-0.032	U-0.032	U-0.032	U-0.032
Metal buildings	U-0.035	U-0.035	U-0.035	U-0.035	U-0.031	U-0.031
Attic and other	U-0.020	U-0.020	U-0.027	U-0.021	U-0.021	U-0.021

Walls, above grade						
Mass[f]	U-0.099	U-0.086	U-0.090	U-0.080	U-0.080	U-0.071
Metal building	U-0.048	U-0.048	U-0.052	U-0.052	U-0.052	U-0.052
Metal framed	U-0.061	U-0.061	U-0.064	U-0.064	U-0.064	U-0.064
Wood framed and other[c]	U-0.061	U-0.061	U-0.064	U-0.064	U-0.051	U-0.051
Walls, below grade						
Below-grade wall[c]	C-0.119	C-0.092	C-0.119	C-0.119	C-0.119	C-0.119
Floors						
Mass[d]	U-0.057	U-0.051	U-0.074	U-0.064	U-0.064	U-0.064
Joist/framing	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033
Slab-on-grade floors						
Unheated slabs	F-0.52	F-0.52	F-0.54	F-0.54	F-0.54	F-0.52
Heated slabs[e]	F-0.63 0.64	F-0.63 0.64	F-0.79 0.64	F-0.79 0.64	F-0.79 0.55	F-0.69 0.55
Opaque doors						
Swinging door	U-0.50	U-0.50	U-0.37	U-0.37	U-0.37	U-0.37
Garage door <14% glazing	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31	U-0.31

For SI: 1 pound per square foot = 4.88 kg/m^2, 1 pound per cubic foot = 16 kg/m^3.
ci = Continuous insulation, NR = No Requirement, LS = Liner System.

a. Where assembly U-factors, C-factors, and F-factors are established in ANSI/ASHRAE/IESNA 90.1 Appendix A, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table, and provided that the construction, excluding the cladding system on walls, complies with the appropriate construction details from ANSI/ASHRAE/ISNEA 90.1 Appendix A.
b. Where U-factors have been established by testing in accordance with ASTM C1363, such opaque assemblies shall be a compliance alternative where those values meet the criteria of this table. The R-value of continuous insulation shall be permitted to be added to or subtracted from the original tested design.
c. Where heated slabs are below grade, below-grade walls shall comply with the U-factor requirements for above-grade mass walls.
d. "Mass floors" shall be in accordance with Section C402.2.3.
e. The first value is for perimeter insulation and the second value is for full slab insulation.
f. "Mass walls" shall be in accordance with Section C402.2.2.

Section C402.1.4.2 Thermal resistance of spandrel panels.

Section C402.1.4.2 - Add a new Section C402.1.4.2 and a new Table C402.1.4.2 to read as follows:

C402.1.4.2 Thermal resistance of spandrel panels. U-factors of opaque assemblies within fenestration framing systems shall be determined in accordance with Table C402.1.4.2.

TABLE C402.1.4.2
EFFECTIVE U-FACTORS FOR SPANDREL PANELS [a]

FRAME TYPE	SPANDREL PANEL	RATED R-VALUE OF INSULATION BETWEEN FRAMING MEMBERS

		R-4	R-7	R-10	R-15	R-20	R-25	R-30
Aluminum without Thermal Break [b]	Single glass pane, stone, or metal panel	0.242	0.222	0.212	0.203	0.198	0.195	0.193
	Double glass with no low-e coatings	0.233	0.218	0.209	0.202	0.197	0.194	0.192
	Triple or low-e glass	0.226	0.214	0.207	0.200	0.196	0.194	0.192
Aluminum with Thermal Break [c]	Single glass pane, stone, or metal panel	0.211	0.186	0.173	0.162	0.155	0.151	0.149
	Double glass with no low-e coatings	0.200	0.180	0.170	0.160	0.154	0.151	0.148
	Triple or low-e glass	0.191	0.176	0.167	0.159	0.153	0.150	0.148
Structural Glazing [d]	Single glass pane, stone, or metal panel	0.195	0.163	0.147	0.132	0.123	0.118	0.114
	Double glass with no low-e coatings	0.180	0.156	0.142	0.129	0.122	0.117	0.114
	Triple or low-e glass	0.169	0.150	0.138	0.127	0.121	0.116	0.113
No framing or Insulation is Continuous [e]	Single glass pane, stone, or metal panel	0.148	0.102	0.078	0.056	0.044	0.036	0.031
	Double glass with no low-e coatings	0.136	0.097	0.075	0.054	0.043	0.035	0.030
	Triple or low-e glass	0.129	0.093	0.073	0.053	0.042	0.035	0.030

a. Opaque assembly U-factors based on designs tested in accordance with ASTM C1363 or NFRC 100 shall be permitted. Interpolation outside of the table shall not be permitted. Spandrel panel assemblies in the table do not include metal backpans.
b. Aluminum frame without a thermal break shall be used for systems where the mullion provides a thermal bridge through the insulation.
c. Aluminum frame with a thermal break shall be used for systems where a urethane or other nonmetallic element separates the metal exposed to the exterior from the metal that is exposed to the interior condition.
d. Structural glazing frame type shall be used for systems that have no exposed mullion on the interior.
e. No framing or insulation that is continuous shall be used for systems where there is no framing or the insulation is continuous and uninterrupted between framing.

Section C402.1.4.3 Thermal resistance of mechanical equipment penetrations.

Section C402.1.4.3 - Add a new Section C402.1.4.3 to read as follows:

C402.1.4.3 Thermal resistance of mechanical equipment penetrations. When the total area of penetrations from through-the-wall mechanical equipment or equipment listed in Table C403.3.2(3) exceeds 1 percent of the opaque above-grade wall area, the mechanical equipment penetration area shall be calculated as a separate wall assembly with a default U-factor of 0.5.

Exception: Where mechanical equipment has been tested in accordance with testing standards approved by the department, the mechanical equipment penetration area may be calculated as a separate wall assembly with the U-factor as determined by such test.

Section C402.2 Specific building thermal envelope insulation requirements (Prescriptive).

Section C402.2 - Revise Section C402.2 to read as follows:

C402.2 Specific building thermal envelope insulation requirements (Prescriptive). Insulation in building thermal envelope opaque assemblies shall comply with Sections C402.2.1 through C402.2.9 and Table C402.1.3.

Section C402.2.8 Fireplaces.

Section C402.2.8 - Revise Section C402.2.8 to read as follows:

C402.2.8 Fireplaces. New wood-burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air as required by the fireplace construction provisions of the New York City Construction Codes, as applicable. Where using tight-fitting doors on factory-built fireplaces listed and labeled in accordance with UL 127, the doors shall be tested and listed for the fireplace.

Section C402.2.9 Continuous insulation.

Section C402.2.9 - Add a new Section C402.2.9 to read as follows:

C402.2.9 Continuous insulation. In new construction, balconies and parapets that interrupt the building thermal envelope shall comply with one of the following:

1. Shall be insulated with continuous insulation having a minimum thermal resistance equivalent to the continuous insulation component required in the adjacent wall assembly as listed in Table C402.1.3. Where more than one wall assembly is interrupted by an adjacent balcony, the higher thermal resistance shall be followed.

2. Shall incorporate a minimum R-3 thermal break where the structural element penetrates the building thermal envelope.

Table C402.4 Building Envelope Fenestration Maximum U-Factor and SHGC Requirements

Table C402.4 - Delete Table C402.4 in its entirety and add a new Table C402.4 to read as follows:

TABLE C402.4
BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	4 EXCEPT MARINE	
Vertical fenestration		
U-factor [a]		
	Below 95'[b]	95' and above [b]
Nonmetal framing (all)	0.28	0.28
Metal framing fixed	0.30	0.36

Metal framing operable	0.40	0.42
Curtainwall fixed	0.36	0.36
Entrance doors	0.77	
SHGC[c]		
PF < 0.2	0.36	
0.2 ≤ PF < 0.5	0.43	
PF ≥ 0.5	0.58	
Skylights		
U-factor[a]	0.48	
SHGC[c]	0.38	

PF = Projection Factor.

a. U-factor shall be rated in accordance with NFRC 100.
b. Where any portion of the fenestration frame is installed at or above 95 feet (28 950 mm) above grade, the unit may meet the requirements for 95feet (28 950 mm) and above.
c. SHGC shall be rated in accordance with NFRC 200.

Section C402.5.1.2.1 Materials.

Section C402.5.1.2.1- Delete Item 16 of Section C402.5.1.2.1 in its entirety.

Section C402.5.1.3 Air barrier testing.

Section C402.5.1.3 - Add a new Section C402.5.1.3 to read as follows:

C402.5.1.3 Air barrier testing. New buildings and additions of a certain size must comply with the following requirements and the rules of the department:

1. New buildings and additions 10,000 square feet (929 m^2) and greater, but less than 50,000 square feet (4 645.2 m^2), and less than or equal to 75 feet (22.86 m) in height must show compliance through testing in accordance with ASTM E779 or other approved standards. R-2 buildings may alternatively show compliance through testing in accordance with Section R402.4.1.3 of this code.

2. New buildings and additions 10,000 square feet (929 m^2) and greater, but less than 50,000 square feet (4 645.2 m^2), and greater than 75 feet (22.86 m) in height, shall test or inspect each type of unique air barrier joint or seam in the building envelope for continuity and defects, as per an Air Barrier Continuity Plan developed by a registered design professional. Alternatively, such buildings and additions may show compliance through testing in accordance with Item 1 of this section.

3 New buildings and additions 50,000 square feet (4 645.2 m^2) and greater shall test or inspect each type of unique air barrier joint or seam in the building envelope for continuity and defects, as per an Air Barrier Continuity Plan developed by a registered design professional. Alternatively, such buildings and additions may show compliance through testing in accordance with Item 1 of this section.

Section C402.5.3 Rooms containing fuel-burning appliances.

Section C402.5.3 - Revise Item 2.3 of Section C402.5.3 to read as follows:

2.3. The doors into the enclosed room or space shall be fully gasketed.

Section C402.5.3 - Revise the Exception to Section C402.5.3 to read as follows:

Exception: Fireplaces and stoves complying with the New York City Mechanical Code, and the fireplace fireblocking requirements of the New York City Building Code.

Section C402.5.4 Doors and access opening to shafts, chutes, stairways, and elevator lobbies.

Section C402.5.4 - Revise Exceptions 1 and 2 of Section C402.5.4 to read as follows:

1. Door openings required to comply with the duct and air transfer opening requirements of the New York City Building Code.

2. Doors and door openings required to comply with UL 1784 by the New York City Building Code.

Section C402.5.7 Vestibules.

Section C402.5.7 - Revise Exception 4 of Section C402.5.7 to read as follows:

4. Doors that open directly from a space less than 3,000 square feet (298 m^2) in area, in buildings less than 75 feet (22.86 m) in height, and doors that open directly from a space less than 1,000 square feet (92.9 m^2) in area, in buildings 75 feet (22.86 m) and greater in height.

Section C402.5.7 - Delete Exception 7 of Section C402.5.7 in its entirety.

Section C402.6 Thermal bridges (Mandatory).

Section C402.6 - Add new Sections C402.6, C402.6.1, C402.6.2 and C402.6.3, and a new Table C402.6, to read as follows:

C402.6 Thermal bridges (Mandatory). Applications for construction document approval shall include the following documentation of thermal bridges:

C402.6.1 Clear field thermal bridges. Where otherwise not included in pre-calculated assembly U-factors, C-factors, or F-factors outlined in Appendix A of ASHRAE 90.1-2016 (as amended), as set forth in Appendix CA of this code , clear field thermal bridges in a wall, roof, or floor assembly shall be noted as such in the drawings.

C402.6.2 Point thermal bridges. Point thermal bridges greater than or equal in area to 12 in^2 (7744 mm^2) and not associated with HVAC or electrical systems shall be noted as thermal bridges in the drawings.

C402.6.3 Linear thermal bridges. Construction documents shall include the following documentation in tabular format for linear thermal bridges listed in Table C402.6:

1. Linear thermal bridge type.

2. Aggregate length of each type of linear thermal bridge.

3. Relevant detail in the construction documents showing a cross-section through the thermal bridge.

4. Ψ-value for each thermal bridge from Table C402.6.

Exception: Where linear thermal bridges have been tested or modeled using methods approved by the department, alternate values may be used.

TABLE C402.6
AVERAGE THERMAL TRANSMITTANCE FOR UNMITIGATED LINEAR THERMAL BRIDGES

TYPE OF THERMAL BRIDGE	Ψ-value[a] [Btu/hr • ft • °F]
Balcony	0.50
Floor Slab	0.44
Fenestration Perimeter Transition[b]	0.32
Parapet	0.42
Shelf Angle	0.41

a. Psi-values are derived from the BC Hydro Building Envelope Thermal Bridging Guide Version 1.2-September 2018, and are based on poor performing details.
b. Fenestration Perimeter Transition is the thermal bridge between any fenestration frame and the typical wall, roof or floor assembly it abuts or is mounted within.

SECTION C403
BUILDING MECHANICAL SYSTEMS

Section C403.1.1 Calculation of heating and cooling loads (Mandatory).

Section C403.1.1 - Revise the first sentence of Section C403.1.1 to read as follows:

Design loads associated with heating, ventilating and air conditioning of the building shall be determined in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure using the design parameters specified in Chapter C3.

Section C403.2.2 Ventilation (Mandatory).

Section C403.2.2 - Revise Section C403.2.2 to read as follows:

C403.2.2 Ventilation (Mandatory). Ventilation, either natural or mechanical, shall be provided in accordance with Chapter 4 of the New York City Mechanical Code. Where mechanical ventilation is provided, the system shall provide the capability to reduce the outdoor air supply to the minimum required by Chapter 4 of the New York City Mechanical Code.

Section C403.3.2 HVAC equipment performance requirements (Mandatory).

Section C403.3.2 - Revise the first two sentences of Section C403.3.2 to read as follows:

Equipment shall meet the minimum efficiency requirements of Tables C403.3.2(1) through C403.3.2(8) and Tables C403.3.2(10) through C403.3.2(14) when tested and rated in accordance with the applicable test procedure. Plate-type liquid-to-liquid heat exchangers shall meet the minimum requirements of Table C403.3.2(9).

Table C403.3.2(1) Minimum efficiency requirements: Electrically operated unitary air conditioners and condensing units

Table C403.3.2(1) - Delete Table C403.3.2(1) in its entirety and add a new Table C403.3.2(1) to read as follows:

TABLE C403.3.2(1)

MINIMUM EFFICIENCY REQUIREMENTS: ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS

EQUIPMENT TYPE	SIZE CATEGORY	HEATING SECTION TYPE	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY[c]	TEST PROCEDURE[a]
Air conditioners, air cooled	< 65,000 Btu/h[b]	All	Split System, three phase	13.0 SEER	AHRI 210/240
			Single Package, three phase	14.0 SEER	
Through-the-wall (air cooled)	≤ 30,000 Btu/h[b]	All	Split system, three phase	12.0 SEER	
			Single Package, three phase	12.0 SEER	
Small-duct high-velocity (air cooled)	< 65,000 Btu/h[b]	All	Split System, three phase	11.0 SEER	
Air conditioners, air cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.2 EER 12.9 IEER	AHRI 340/360
		All other	Split System and Single Package	11.0 EER 12.7 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.0 EER 12.4 IEER	
		All other	Split System and Single Package	10.8 EER 12.2 IEER	
	≥ 240,000 Btu/h and < 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	10.0 EER 11.6 IEER	
		All other	Split System and Single Package	9.8 EER 11.4 IEER	
	≥ 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	9.7 EER 11.2 IEER	
		All other	Split System and Single Package	9.5 EER 11.0 IEER	
Air conditioners, water cooled	< 65,000 Btu/h[b]	All	Split System and Single Package	12.1 EER 12.3 IEER	AHRI 210/240

	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.1 EER 13.9 IEER	AHRI 340/360
		All other	Split System and Single Package	11.9 EER 13.7 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.5 EER 13.9 IEER	
		All other	Split System and Single Package	12.3 EER 13.7 IEER	
	≥ 240,000 Btu/h and < 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.4 EER 13.6 IEER	
		All other	Split System and Single Package	12.2 EER 13.4 IEER	
	≥ 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.2 EER 13.5 IEER	
		All other	Split System and Single Package	12.0 EER 13.3 IEER	

EQUIPMENT TYPE	SIZE CATEGORY	HEATING SECTION TYPE	SUB-CATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY [c]	TEST PROCEDURE [a]
Air conditioners, evaporatively cooled	< 65,000 Btu/h[b]	All	Split System and Single Package	12.1 EER 12.3 IEER	AHRI 210/240
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.1 EER 12.3 IEER	AHRI 340/360
		All other	Split System and Single Package	11.9 EER 12.1 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	12.0 EER 12.2 IEER	
		All other	Split System and Single Package	11.8 EER 12.0 IEER	
	≥ 240,000 Btu/h and < 760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.9 EER 12.1 IEER	
		All other	Split System and Single Package	11.7 EER 11.9 IEER	
	≥760,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.7 EER 11.9 IEER	
		All other	Split System and Single Package	11.5 EER 11.7 IEER	
Condensing units, air cooled	≥ 135,000 Btu/h	-	-	10.5 EER 11.8 IEER	AHRI 365
Condensing units, water cooled	≥ 135,000 Btu/h	-	-	13.5 EER 14.0 IEER	
Condensing units, evaporatively cooled	≥ 135,000 Btu/h	-	-	13.5 EER 14.0 IEER	

For SI: 1 British thermal unit per hour = 0.2931 W.

a. Chapter C6 contains a complete specification of the referenced test procedure, including the reference year version of the test procedure.

b. Single-phase, air-cooled air conditioners less than 65,000 Btu/h are regulated by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430. SEER values for single-phase products are set by the U.S. Department of Energy.
c. See ASHRAE 90.1-2016 Informative Appendix F for the U.S. Department of Energy minimum efficiency requirements of single-phase air conditioners.

Table C403.3.2(2) Minimum efficiency requirements: Electrically operated unitary and applied heat pumps

Table C403.3.2(2) - Delete Table C403.3.2(2) in its entirety and add a new Table C403.3.2(2) to read as follows:

TABLE C403.3.2(2)

MINIMUM EFFICIENCY REQUIREMENTS: ELECTRICALLY OPERATED UNITARY AND APPLIED HEAT PUMPS

EQUIPMENT TYPE	SIZE CATEGORY	HEATING SECTION TYPE	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY[c]	TEST PROCEDURE[a]
Air cooled (cooling mode)	< 65,000 Btu/h[b]	All	Split System, three phase	14.0 SEER	AHRI 210/240
			Single Package, three phase	14.0 SEER	
Through-the-wall, air cooled (cooling mode)	≤ 30,000 Btu/h[b]	All	Split System, three phase	12.0 SEER	
			Single Package, three phase	12.0 SEER	
Single-duct, high-velocity, air cooled	< 65,000 Btu/h[b]	All	Split System, three phase	11.0 SEER	
Air cooled (cooling mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	11.0 EER 12.2 IEER	AHRI 340/360
		All other	Split System and Single Package	10.8 EER 12.0 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	10.6 EER 11.6 IEER	
		All other	Split System and Single Package	10.4 EER 11.4 IEER	
	≥ 240,000 Btu/h	Electric Resistance (or None)	Split System and Single Package	9.5 EER 10.6 IEER	
		All other	Split System and Single Package	9.3 EER 10.4 IEER	
Water to Air, Water Loop (cooling mode)	< 17,000 Btu/h	All	86°F entering water	12.2 EER	ISO 13256-1
	≥ 17,000 Btu/h and < 65,000 Btu/h	All	86°F entering water	13.0 EER	
	≥ 65,000 Btu/h and < 135,000 Btu/h	All	86°F entering water	13.0 EER	

Water to Air, Ground Water (cooling mode)	< 135,000 Btu/h	All	59°F entering water	18.0 EER	ISO 13256-1
Brine to Air, Ground Loop (cooling mode)	< 135,000 Btu/h	All	77°F entering fluid	14.1 EER	ISO 13256-1
Water to Water, Water Loop (cooling mode)	< 135,000 Btu/h	All	86°F entering water	10.6 EER	ISO 13256-2
Water to Water, Ground Water (cooling mode)	< 135,000 Btu/h	All	59°F entering water	16.3 EER	
Brine to Water, Ground Loop (cooling mode)	< 135,000 Btu/h	All	77°F entering fluid	12.1 EER	
Air cooled (heating mode)	< 65,000 Btu/h[b] (cooling capacity)	-	Split System, three phase	8.2 HSPF	AHRI 210/240
		-	Single Package, three phase	8.0 HSPF	
Through-the-wall, air cooled (heating mode)	≤ 30,000 Btu/h[b] (cooling capacity)	-	Split System, three phase	7.4 HSPF	
		-	Single Package, three phase	7.4 HSPF	
Small-duct, high velocity, air cooled (heating mode)	< 65,000 Btu/h[b]	-	Split System, three phase	6.8 HSPF	
Air cooled (heating mode)	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)	-	47ºF db/43ºF wb outdoor air	3.3 COP_H	AHRI 340/360
			17ºF db/15ºF wb outdoor air	2.25 COP_H	
	≥ 135,000 Btu/h (cooling capacity)	-	47ºF db/43ºF wb outdoor air	3.2 COP_H	
			17ºF db/15ºF wb outdoor air	2.05 COP_H	
Water to Air, Water Loop (heating mode)	< 135,000 Btu/h (cooling capacity)	-	68°F entering water	4.3 COP_H	ISO 13256-1
Water to Air, Ground Water (heating mode)	< 135,000 Btu/h (cooling capacity)	-	50°F entering water	3.7 COP_H	
Brine to Air, Ground Loop (heating mode)	< 135,000 Btu/h (cooling capacity)	-	32°F entering fluid	3.2 COP_H	
Water to Water, Water Loop (heating mode)	< 135,000 Btu/h (cooling capacity)	-	68°F entering water	3.7 COP_H	ISO 13256-2
Water to Water, Ground Water (heating mode)	< 135,000 Btu/h (cooling capacity)	-	50°F entering water	3.1 COP_H	
Brine to Water, Ground Loop (heating mode)	< 135,000 Btu/h (cooling capacity)	-	32°F entering fluid	2.5 COP_H	

For SI: 1 British thermal unit per hour = 0.2931 W, °C = [(°F) - 32]/1.8.

a. Chapter C6 contains a complete specification of the referenced test procedure, including the reference year version of the test procedure.

b. Single-phase, air-cooled heat pumps less than 65,000 Btu/h are regulated by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430. SEER and HSPF values for single-phase products are set by the U.S. Department of Energy.
c. See ASHRAE 90.1-2016 Informative Appendix F for the U.S. Department of Energy minimum efficiency requirements of single-phase air conditioners.

Table C403.3.2(3) Minimum efficiency requirements: Electrically operated packaged terminal air conditioners, packaged terminal heat pumps, single-package vertical air conditioners, single-package vertical heat pumps, room air conditioners and room air-conditioner heat pumps

Table C403.3.2(3) - Delete Table C403.3.2(3) in its entirety and add a new Table C403.3.2(3) to read as follows:

TABLE C403.3.2(3)

MINIMUM EFFICIENCY REQUIREMENTS: ELECTRICALLY OPERATED PACKAGED TERMINAL AIR CONDITIONERS,

PACKAGED TERMINAL HEAT PUMPS, SINGLE-PACKAGE VERTICAL AIR CONDITIONERS, SINGLE-PACKAGE VERTICAL HEAT PUMPS, ROOM AIR CONDITIONERS AND ROOM AIR-CONDITIONER HEAT PUMPS

EQUIPMENT TYPE	SIZE CATEGORY (INPUT)	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE[a]
PTAC (cooling mode) standard size	All Capacities	95°F db outdoor air	14.0 - (0.300 × Cap/1000)[c] EER	AHRI 310/380
PTAC (cooling mode) nonstandard size[b]	All Capacities	95°F db outdoor air	10.9 - (0.213 × Cap/1000)[c] EER	
PTHP (cooling mode) standard size	All Capacities	95°F db outdoor air	14.0 - (0.300 × Cap/1000)[c] EER	
PTHP (cooling mode) nonstandard size[b]	All Capacities	95°F db outdoor air	10.8 - (0.213 × Cap/1000)[c] EER	
PTHP (heating mode) standard size	All Capacities	-	3.7 - (0.052 × Cap/1000)[c] COP_H	
PTHP (heating mode) nonstandard size[b]	All Capacities	-	2.9 - (0.026 × Cap/1000)[c] COP_H	
SPVAC (cooling mode)	< 65,000 Btu/h	95°F db/ 75°F wb outdoor air	11.0 EER	AHRI 390
	≥ 65,000 Btu/h and < 135,000 Btu/h		10.0 EER	
	≥ 135,000 Btu/h and < 240,000 Btu/h		10.0 EER	
SPVHP (cooling mode)	< 65,000 Btu/h	95°F db/ 75°F wb outdoor air	11.0 EER	
	≥ 65,000 Btu/h and < 135,000 Btu/h		10.0 EER	
	≥ 135,000 Btu/h and < 240,000 Btu/h		10.0 EER	
SPVHP (heating mode)	< 65,000 Btu/h	47°F db/ 43°F wb outdoor air	3.3 COP_H	AHRI 390
	≥ 65,000 Btu/h and < 135,000 Btu/h		3.0 COP_H	

	≥ 135,000 Btu/h and < 240,000 Btu/h		3.0 COP_H	
SPVAC (cooling mode), nonweatherized space constrained	≤ 30,000 Btu/h	95°F db/ 75°F wb outdoor air	9.2 EER	AHRI 390
	> 30,000 Btu/h and ≤ 36,000 Btu/h		9.0 EER	
SPVHP (cooling mode), nonweatherized space constrained	≤ 30,000 Btu/h	95°F db/ 75°F wb outdoor air	9.2 EER	
	> 30,000 Btu/h and ≤ 36,000 Btu/h		9.0 EER	
SPVHP (heating mode), nonweatherized space constrained	≤ 30,000 Btu/h	47°F db/ 43°F wb outdoor air	3.0 COP_H	
	> 30,000 Btu/h and ≤ 36,000 Btu/h		3.0 COP_H	
Room air conditioners, without reverse cycle, with louvered sides	< 6,000 Btu/h	-	11.0 CEER	10 CFR Part 430, Subpart B, Appendix F
	≥ 6,000 Btu/h and < 8,000 Btu/h	-	11.0 CEER	
	≥ 8,000 Btu/h and < 14,000 Btu/h	-	10.9 CEER	
	≥ 14,000 Btu/h and < 20,000 Btu/h	-	10.7 CEER	
	≥ 20,000 Btu/h and < 28,000 Btu/h	-	9.4 CEER	
	≥ 28,000 Btu/h	-	9.0 CEER	
Room air conditioners, without reverse cycle, without louvered sides	< 6,000 Btu/h	-	10.0 CEER	
	≥ 6,000 Btu/h and < 8,000 Btu/h	-	10.0 CEER	
	≥ 8,000 Btu/h and < 11,000 Btu/h	-	9.6 CEER	
	≥ 11,000 Btu/h and < 14,000 Btu/h	-	9.5 CEER	
	≥ 14,000 Btu/h and < 20,000 Btu/h	-	9.3 CEER	
	≥ 20,000 Btu/h	-	9.4 CEER	
Room air-conditioners, with reverse cycle, with louvered sides	< 20,000 Btu/h	-	9.8 CEER	
	≥ 20,000 Btu/h	-	9.3 CEER	

Room air-conditioners, with reverse cycle, without louvered sides	< 14,000 Btu/h	-	9.3 CEER	
	≥ 14,000 Btu/h	-	8.7 CEER	
Room air conditioner, casement only	All capacities	-	9.5 CEER	10 CFR Part 430, Subpart B, Appendix F
Room air conditioner, casement slider	All capacities	-	10.4 CEER	

For SI: 1 British thermal unit per hour = 0.2931 W, °C = [(°F) - 32]/1.8, wb = wet bulb, db = dry bulb.

a. Chapter C6 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. Nonstandard size units must be factory labeled as follows: "MANUFACTURED FOR NONSTANDARD SIZE APPLICATIONS ONLY: NOT TO BE INSTALLED IN NEW STANDARD PROJECTS." Nonstandard size efficiencies apply only to units being installed in existing sleeves having an external wall opening of less than 16 inches (406 mm) high or less than 42 inches (1067 mm) wide and having a cross-sectional area less than 670 in^2.

c. "Cap" means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7,000 Btu/h, use 7,000 Btu/h in the calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculations.

Table C403.3.2(4) Warm-air furnaces and combination warm-air furnaces/air conditioning units, warm-air duct furnaces and unit heaters, minimum efficiency requirements.

Table C403.3.2(4) - Delete Table C403.3.2(4) in its entirety and add a new Table C403.3.2(4) to read as follows:

TABLE C403.3.2(4)

WARM-AIR FURNACES AND COMBINATION WARM-AIR FURNACES/AIR-CONDITIONING UNITS,

WARM-AIR DUCT FURNACES AND UNIT HEATERS, MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SIZE CATEGORY (INPUT)	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE[a]
Warm-air furnaces, gas fired	< 225,000 Btu/h	Maximum capacity[c]	80% AFUE or 80%E_t[b,d]	DOE 10 CFR Part 430 or Section 2.39, Thermal Efficiency, ANSI Z21.47
	≥ 225,000 Btu/h		80%E_t[d]	Section 2.39, Thermal Efficiency, ANSI Z21.47
Warm-air furnaces, oil fired	< 225,000 Btu/h	Maximum capacity[c]	83% AFUE or 80%E_t[b,d]	DOE 10 CFR Part 430 or Section 42, Combustion, UL 727
	≥ 225,000 Btu/h		81%E_t[d]	Section 42, Combustion, UL 727
Warm-air duct furnaces, gas fired	All capacities	Maximum capacity[c]	80%E_c[e,f]	Section 2.10, Efficiency, ANSI Z83.8
Warm-air unit heaters, gas fired	All capacities	Maximum capacity[c]	80%E_c[e,f]	Section 2.10, Efficiency, ANSI Z83.8

Warm-air unit heaters, oil fired	All capacities	Maximum capacity[c]	80%E_{t}[c]	Section 40, Combustion, UL 731

For SI: 1 British thermal unit per hour = 0.2931 W.

a. Chapter C6 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. Combination units not covered by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430 (three-phase power or cooling capacity greater than or equal to 65,000 Btu/h) may comply with either rating.

c. Compliance of multiple firing rate units shall be at the maximum firing rate.

d. E_t = thermal efficiency. Units must also include an interrupted or intermittent ignition device (IID), have jacket losses not exceeding 0.75 percent of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

e. E_c = combustion efficiency (100 percent less flue losses). See test procedure for detailed discussion.

f. As of August 8, 2008, according to the Energy Policy Act of 2005, units must also include an interrupted or intermittent ignition device (IID) and have either power venting or an automatic flue damper.

Table C403.3.2(5) Minimum efficiency requirements: gas and oil-fired boilers.

Table C403.3.2(5) - Delete Table C403.3.2(5) in its entirety and add a new Table C403.3.2(5) to read as follows:

TABLE C403.3.2(5)

MINIMUM EFFICIENCY REQUIREMENTS: GAS- AND OIL-FIRED BOILERS

EQUIPMENT TYPE[a]	SUBCATEGORY OR RATING CONDITION	SIZE CATEGORY (INPUT)	MINIMUM EFFICIENCY[b,c]	TEST PROCEDURE
Boilers, hot water	Gas-fired	< 300,000 Btu/h[f,g]	82% AFUE	10 CFR Part 430
		≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h[d]	80% E_t	10 CFR Part 431
		> 2,500,000 Btu/h[a]	82% E_c	
	Oil-fired[e]	< 300,000 Btu/h[g]	84% AFUE	10 CFR Part 430
		≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h[d]	82% E_t	10 CFR Part 431
		> 2,500,000 Btu/h[a]	84% E_t	
Boilers, steam	Gas-fired	< 300,000 Btu/h[f]	80% AFUE	10 CFR Part 430
	Gas-fired- all, except natural draft	≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h[d]	79% E_t	10 CFR Part 431
		> 2,500,000 Btu/h[a]	79% E_t	
	Gas-fired-natural draft	≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h[d]	77% E_t 79% E_t (as of 3/2/2020)	
		> 2,500,000 Btu/h[a]	77% E_t 79% E_t (as of 3/2/2020)	
	Oil-fired[e]	< 300,000 Btu/h	82% AFUE	10 CFR Part 430
		≥ 300,000 Btu/h an ≤ 2,500,000 Btu/h[d]	81% E_t	10 CFR Part 431
		> 2,500,000 Btu/h[a]	81% E_t	

For SI: 1 British thermal unit per hour = 0.2931 W.

a. These requirements apply to boilers with rated input of 8,000,000 Btu/h or less that are not packaged boilers and to all packaged boilers. Minimum efficiency requirements for boilers cover all capacities of packaged boilers.
b. E_c = combustion efficiency (100 percent less flue losses). See reference document for detailed information.
c. E_t = thermal efficiency. See reference document for detailed information.
d. Maximum capacity-minimum and maximum ratings as provided for and allowed by the unit's controls.
e. Includes oil-fired (residual).
f. Boilers shall not be equipped with a constant burning pilot light.
g. A boiler not equipped with a tankless domestic water-heating coil shall be equipped with an automatic means for adjusting the temperature of the water such that an incremental change in inferred heat load produces a corresponding incremental change in the temperature of the water supplied.

Table C403.3.2(6) Minimum efficiency requirements: condensing units, electrically operated.

Table C403.3.2(6) - Delete Table C403.3.2(6) in its entirety.

Table C403.3.2(7) Water chilling packages - efficiency requirements.

Table C403.3.2(7) - Delete Table C403.3.2(7) in its entirety and add a new Table C403.3.2(6) to read as follows:

TABLE C403.3.2(6)

WATER CHILLING PACKAGES - EFFICIENCY REQUIREMENTS[a, b, d]

EQUIPMENT TYPE	SIZE CATEGORY	UNITS	Path A	Path B	TEST PROCEDURE[c]
Air-cooled chillers	< 150 Tons	EER (Btu/W)	≥ 10.100 FL	≥ 9.700 FL	AHRI 550/590
			≥ 13.700 IPLV	≥ 15.800 IPLV	
	≥ 150 Tons		≥ 10.100 FL	≥ 9.700 FL	
			≥ 14.000 IPLV	≥ 16.100 IPLV	
Air cooled without condenser, electrically operated	All capacities	EER (Btu/W)	Air-cooled chillers without condenser shall be rated with matching condensers and complying with air-cooled chiller efficiency requirements.		
Water cooled, electrically operated positive displacement	< 75 Tons	kW/ton	≤ 0.750 FL	≤ 0.780 FL	
			≤ 0.600 IPLV	≤ 0.500 IPLV	
	≥ 75 tons and < 150 tons		≤ 0.720 FL	≤ 0.750 FL	
			≤ 0.560 IPLV	≤ 0.490 IPLV	
	≥ 150 tons and < 300 tons		≤ 0.660 FL	≤ 0.680 FL	
			≤ 0.540 IPLV	≤ 0.440 IPLV	

	≥ 300 tons and < 600 tons		≤ 0.610 FL	≤ 0.625 FL	
			≤ 0.520 IPLV	≤ 0.410 IPLV	
	≥ 600 tons		≤ 0.560 FL	≤ 0.585 FL	
			≤ 0.500 IPLV	≤ 0.380 IPLV	
Water cooled, electrically operated centrifugal	< 150 Tons	kW/ton	≤ 0.610 FL	≤ 0.695 FL	
			≤ 0.550 IPLV	≤ 0.440 IPLV	
	≥ 150 tons and < 300 tons		≤ 0.610 FL	≤ 0.635 FL	
			≤ 0.550 IPLV	≤ 0.400 IPLV	
	≥ 300 tons and < 400 tons		≤ 0.560 FL	≤ 0.595 FL	
			≤ 0.520 IPLV	≤ 0.390 IPLV	
	≥ 400 tons and < 600 tons		≤ 0.560 FL	≤ 0.585 FL	
			≤ 0.500 IPLV	≤ 0.380 IPLV	
	≥ 600 Tons		≤ 0.560 FL	≤ 0.585 FL	
			≤ 0.500 IPLV	≤ 0.380 IPLV	
Air cooled, absorption, single effect	All capacities	COP	≥ 0.600 FL	NA[c]	AHRI 560
Water cooled absorption, single effect	All capacities	COP	≥ 0.700 FL	NA[c]	
Absorption, double effect, indirect fired	All capacities	COP	≥ 1.000 FL	NA[c]	
			≥ 1.050 IPLV		
Absorption double effect direct fired	All capacities	COP	≥ 1.000 FL	NA[c]	
			≥ 1.050 IPLV		

a. The requirements for centrifugal chillers shall be adjusted for nonstandard rating conditions in accordance with Section C403.3.2.1 and are only applicable for the range of conditions listed in Section C403.3.2.1. The requirements for air-cooled, water-cooled positive displacement and absorption chillers are at standard rating conditions defined in the reference test procedure.

b. Both the full-load and IPLV requirements shall be met or exceeded to comply with this standard. Where there is a Path B, compliance can be with either Path A or Path B for any application.

c. NA means the requirements are not applicable for Path B and only Path A can be used for compliance.

d. FL represents the full-load performance requirements and IPLV the part-load performance requirements.

Table C403.3.2(8) Minimum efficiency requirements: heat rejection equipment[a, b, d].

Table C403.3.2(8) - Delete Table C403.3.2(8) in its entirety and add a new Table C403.3.2(7) to read as follows:

TABLE C403.3.2(7)

MINIMUM EFFICIENCY REQUIREMENTS: HEAT REJECTION EQUIPMENT

EQUIPMENT TYPE	TOTAL SYSTEM HEAT REJECTION CAPACITY AT RATED CONDITIONS	SUBCATEGORY OR RATING CONDITION[i]	PERFORMANCE REQUIRED[a, b, c, d, g, h]	TEST PROCEDURE[e, f]
Propeller or axial fan open-circuit cooling towers	All	95°F entering water 85°F leaving water 75°F entering wb	≥ 40.2 gpm/hp	CTI ATC-105 and CTI STD-201 RS
Centrifugal fan open-circuit cooling towers	All	95°F entering water 85°F leaving water 75°F entering wb	≥ 20.0 gpm/hp	CTI ATC-105 and CTI STD-201 RS
Propeller or axial fan closed-circuit cooling towers	All	102°F entering water 90°F leaving water 75°F entering wb	≥ 16.1 gpm/hp	CTI ATC-105S and CTI STD-201 RS
Centrifugal fan closed- circuit cooling towers	All	102°F entering water 90°F leaving water 75°F entering wb	≥ 7.0 gpm/hp	CTI ATC-105S and CTI STD-201 RS
Propeller or axial fan evaporative condensers	All	Ammonia Test Fluid 140°F entering gas temperature 96.3°F condensing temperature 75°F entering wb	≥ 134,000 Btu/h × hp	CTI ATC-106
Centrifugal fan evaporative condensers	All	Ammonia Test Fluid 140°F entering gas temperature 96.3°F condensing temperature 75°F entering wb	≥110,000 Btu/h × hp	CTI ATC-106
Propeller or axial fan evaporative condensers	All	R-507A Test Fluid 165°F entering gas temperature 105°F condensing temperature 75°F entering wb	≥ 157,000 Btu/h × hp	CTI ATC-106
Centrifugal fan evaporative condensers	All	R-507A Test Fluid 165°F entering gas temperature 105°F condensing temperature 75°F entering wb	≥ 135,000 Btu/h × hp	CTI ATC-106
Air-cooled condensers	All	125°F Condensing Temperature 190°F Entering Gas Temperature 15°F subcooling 95°F entering db	≥ 176,000 Btu/h × hp	AHRI 460

For SI: °C = [(°F) - 32]/1.8, L/s • kW = (gpm/hp)/(11.83), COP = (Btu/h • hp)/(2550.7),
db = dry bulb temperature, °F, wb = wet bulb temperature, °F.

a. The efficiencies and test procedures for both open- and closed-circuit cooling towers are not applicable to hybrid cooling towers that contain a combination of wet and dry heat exchange sections.
b. For purposes of this table, open circuit cooling tower performance is defined as the water flow rating of the tower at the thermal rating condition, divided by the fan nameplate-rated motor power.
c. For purposes of this table, closed-circuit cooling tower performance is defined as the process water flow rating of the tower at the thermal rating condition, divided by the sum of the fan motor nameplate power and the integral spray pump motor nameplate power.
d. For purposes of this table, air-cooled condenser performance is defined as the heat rejected from the refrigerant divided by the fan motor nameplate power.
e. Chapter C6 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure. The certification requirements do not apply to field-erected cooling towers.

f. Where a certification program exists for a covered product and it includes provisions for verification and challenge of equipment efficiency ratings, then the product shall be listed in the certification program; or, where a certification program exists for a covered product, and it includes provisions for verification and challenge of equipment efficiency ratings, but the product is not listed in the existing certification program, the ratings shall be verified by an independent laboratory test report.

g. Cooling towers shall comply with the minimum efficiency listed in the table for that specific type of tower with the capacity effect of any project-specific accessories and/or options included in the capacity of the cooling tower.

h. For purposes of this table, evaporative condenser performance is defined as the heat rejected at the specified rating condition in the table divided by the sum of the fan motor nameplate power and the integral spray pump nameplate power.

i. Requirements for evaporative condensers are listed with ammonia (R-717) and R-507A as test fluids in the table. Evaporative condensers intended for use with halocarbon refrigerants other than R-507A shall meet the minimum efficiency requirements listed in this table with R -507A as the test fluid.

Table C403.3.2(9) Minimum efficiency air conditioners and condensing units serving computer rooms.

Table C403.3.2(9) - Renumber Table C403.3.2(9) as Table C403.3.2(8).

Table C403.3.2(10) Heat transfer equipment.

Table C403.3.2(10) - Renumber Table C403.3.2(10) as C403.3.2(9) and revise footnote a of such table to read as follows:

a. Chapter C6 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

Table C403.3.2(10) Minimum efficiency requirements: electrically operated variable refrigerant flow air conditioners.

Table C403.3.2(10) - Add a new Table C403.2.3(10) to read as follows:

TABLE C403.3.2(10)
Minimum Efficiency Requirements:
ELECTRICALLY OPERATED VARIABLE-REFRIGERANT-FLOW AIR CONDITIONERS

EQUIPMENT TYPE	SIZE CATEGORY	HEATING SECTION TYPE	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE
VRF air conditioners, air cooled	< 65,000 Btu/h	All	VRF multisplit system	13.0 SEER	AHRI 1230
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric resistance (or none)	VRF multisplit system	11.2 SEER 15.5 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric resistance (or none)	VRF multisplit system	11.0 EER 14.9 IEER	
	≥ 240,000 Btu/h	Electric resistance (or none)	VRF multisplit system	10.0 EER 13.9 IEER	

Table C403.3.2(11) Minimum efficiency requirements: electrically operated variable-refrigerant-flow air-to-air and applied heat pumps.

Table C403.3.2(11) - Add a new Table C403.3.2(11) to read as follows:

TABLE C403.3.2(11)
MINIMUM EFFICIENCY REQUIREMENTS:
ELECTRICALLY OPERATED VARIABLE-REFRIGERANT-FLOW AIR-TO-AIR AND APPLIED HEAT PUMPS

EQUIPMENT TYPE	SIZE CATEGORY	HEATING SECTION TYPE	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE
VRF air cooled (cooling mode)	< 65,000 Btu/h	All	VRF multisplit system	13.0 SEER	AHRI 1230
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric resistance (or none)	VRF multisplit system	11.0 EER 14.6 IEER	
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric resistance (or none)	VRF multisplit system with heat recovery	10.8 EER 14.4 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric resistance (or none)	VRF multisplit system	10.6 EER 13.9 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric resistance (or none)	VRF multisplit system with heat recovery	10.4 EER 13.7 IEER	
	≥ 240,000 Btu/h	Electric resistance (or none)	VRF multisplit system	9.5 EER 12.7 IEER	
	≥ 240,000 Btu/h	Electric resistance (or none)	VRF multisplit system with heat recovery	9.3 EER 12.5 IEER	
VRF water source (cooling mode)	< 65,000 Btu/h	All	VRF multisplit systems 86°F entering water	12.0 EER 16 IEER	AHRI 1230
	< 65,000 Btu/h	All	VRF multisplit systems with heat recovery 86°F entering water	11.8 EER 15.8 IEER	
	≥ 65,000 Btu/h and < 135,000	All	VRF multisplit systems 86°F entering water	12.0 EER 16.0 IEER	
	≥ 65,000 Btu/h and < 135,000	All	VRF multisplit systems with heat recovery 86°F entering water	11.8 EER 15.8 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	All	VRF multisplit systems 86°F entering water	10.0 EER 14.0 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	All	VRF multisplit systems with heat recovery 86°F entering water	9.8 EER 13.8 IEER	

	≥ 240,000 Btu/h	All	VRF multisplit systems 86°F entering water	10.0 EER 12.0 IEER	
	≥ 240,000 Btu/h	All	VRF multisplit systems with heat recovery 86°F entering water	9.8 EER 11.8 IEER	
VRF ground source (cooling mode)	< 135,000 Btu/h	All	VRF multisplit system 59°F entering water	16.2 EER	AHRI 1230
	< 135,000 Btu/h	All	VRF multisplit system with heat recovery 59°F entering water	16.0 EER	
	≥ 135,000 Btu/h	All	VRF multisplit system 59°F entering water	13.8 EER	
	≥ 135,000 Btu/h	All	VRF multisplit system with heat recovery 59°F entering water	13.6 EER	
VRF ground source (cooling mode)	< 135,000 Btu/h	All	VRF multisplit system 77°F entering water	13.4 EER	AHRI 1230
	< 135,000 Btu/h	All	VRF multisplit system with heat recovery 77°F entering water	13.2 EER	
	≥ 135,000 Btu/h	All	VRF multisplit system 77°F entering water	11.0 EER	
	≥ 135,000 Btu/h	All	VRF multisplit system with heat recovery 77°F entering water	10.8 EER	
VRF air cooled (heating mode)	< 65,000 Btu/h (cooling capacity)	-	VRF multisplit system	7.7 HSPF	AHRI 1230
	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 47°F db/43°F wb outdoor air	3.3 COP_H	
			17°F db/15°F wb outdoor air	2.25 COP_H	
	≥ 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 47°F db/43°F wb outdoor air	3.2 COP_H	
			17°F db/15°F wb outdoor air	2.05 COP_H	
VRF water source (heating mode)	< 65,000 Btu/h (cooling capacity)	-	VRF multisplit system 68°F entering water	4.3 COP_H	AHRI 1230

	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 68°F entering water	4.3 COP_H	
	≥ 135,000 Btu/h and < 240,000 Btu/h (cooling capacity)	-	VRF multisplit system 68°F entering water	4.0 COP_H	
	≥ 240,000 Btu/h (cooling capacity)	-	VRF multisplit system 68°F entering water	3.9 COP_H	
VRF groundwater source (heating mode)	< 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 50°F entering water	3.6 COP_H	AHRI 1230
	≥ 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 50°F entering water	3.3 COP_H	
VRF ground source (heating mode)	< 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 32°F entering water	3.1 COP_H	AHRI 1230
VRF ground source (heating mode)	≥ 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 32°F entering water	2.8 COP_H	AHRI 1230

Table C403.3.2(12) Vapor compression based indoor pool dehumidifiers - minimum efficiency requirements.

Table C403.3.2(12) - Add a new Table C403.3.2(12) to read as follows:

TABLE C403.3.2(12)
VAPOR COMPRESSION BASED INDOOR POOL DEHUMIDIFIERS - MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE
Single package indoor[a] (with or without economizer)	Rating Conditions: A, B, or C	3.5 MRE	AHRI 910
Single package indoor water-cooled (with or without economizer)		3.5 MRE	
Single package indoor air-cooled (with or without economizer)		3.5 MRE	
Split system indoor air-cooled (with or without economizer)		3.5 MRE	

a. Units without air-cooled condenser.

Table C403.3.2(13) Electrically operated dx-doas units, single-package and remote condenser, without energy recovery - minimum efficiency requirements.

Table C403.3.2(13) - Add a new Table C403.3.2(13) to read as follows:

TABLE C403.3.2(13)
ELECTRICALLY OPERATED DX-DOAS UNITS, SINGLE-PACKAGE AND REMOTE CONDENSER, WITHOUT ENERGY RECOVERY - MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE
Air cooled (dehumidification mode)		4.0 ISMRE	AHRI 920
Air source heat pumps (dehumidification mode)		4.0 ISMRE	AHRI 920
Water cooled (dehumidification mode)	Cooling tower condenser water	4.9 ISMRE	AHRI 920
	Chilled Water	6.0 ISMRE	
Air source heat pump (heating mode)		2.7 ISCOP	AHRI 920
Water source heat pump (dehumidification mode)	Ground source, closed loop	4.8 ISMRE	AHRI 920
	Ground-water source	5.0 ISMRE	
	Water source	4.0 ISMRE	
Water source heat pump (heating mode)	Ground source, closed loop	2.0 ISCOP	AHRI 920
	Ground-water source	3.2 ISCOP	
	Water source	3.5 ISCOP	

Table C403.3.2(14) Electrically Operated DX-DOAS Units, Single-Package and Remote Condenser, with Energy Recovery - Minimum Efficiency Requirements

Table C403.3.2(14) - Add a new Table C403.3.2(14) to read as follows:

TABLE C403.3.2(14)
ELECTRICALLY OPERATED DX-DOAS UNITS, SINGLE-PACKAGE AND REMOTE CONDENSER, WITH ENERGY RECOVERY - MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SUBCATEGORY OR RATING CONDITION	MINIMUM EFFICIENCY	TEST PROCEDURE
Air cooled (dehumidification mode)		5.2 ISMRE	AHRI 920

Air source heat pumps (dehumidification mode)		5.2 ISMRE	AHRI 920
Water cooled (dehumidification mode)	Cooling tower condenser water	5.3 ISMRE	AHRI 920
	Chilled Water	6.6 ISMRE	
Air source heat pump (heating mode)		3.3 ISCOP	AHRI 920
Water source heat pump (dehumidification mode)	Ground source, closed loop	5.2 ISMRE	AHRI 920
	Ground-water source	5.8 ISMRE	
	Water source	4.8 ISMRE	
Water source heat pump (heating mode)	Ground source, closed loop	3.8 ISCOP	AHRI 920
	Ground-water source	4.0 ISCOP	
	Water source	4.8 ISCOP	

Section C403.3.2.1 Water-cooled centrifugal chilling packages (Mandatory).

Section C403.3.2.1 - Revise Equation 4-7 to read as follows:

$$PLV_{adj} = IPLV/K_{adj} \quad \textbf{(Equation 4-7)}$$

where:

K = $A \times B$

FL_{adj} = Full-load kW/ton value as specified in Table C403.3.2(6).

FL = Maximum full-load kW/ton rating, adjusted for nonstandard conditions.

$IPLV_{adj}$ = Value as specified in Table C403.3.2(6).

PLV = Maximum NPLV rating, adjusted for nonstandard conditions.

A_{adj} = $0.00000014592 \times (LIFT)^4 - 0.0000346496 \times (LIFT)^3 + 0.00314196 \times (LIFT)^2 - 0.147199 \times (LIFT) + 3.9302$

B = $0.0015 \times L_{vg}E_{vap} + 0.934$

$LIFT$ = $L_{vg}Cond - L_{vg}E_{vap}$

$L_{vg}Cond$ = Full-load condenser leaving fluid temperature (°F).

$L_{vg}E_{vap}$ = Full-load evaporator leaving temperature (°F).

Section C403.3.2.2 Positive displacement (air- and water-cooled) chilling packages (Mandatory).

Section C403.3.2.2 - Revise Section C403.3.2.2 to read as follows:

C403.3.2.2 Positive displacement (air- and water-cooled) chilling packages (Mandatory). Equipment with a leaving fluid temperature higher than 32°F (0°C) and water-cooled positive displacement chilling packages with a condenser leaving fluid temperature below 115°F (46°C) shall meet the requirements of Table C403.3.2(6) when tested or certified with water at standard rating conditions, in accordance with the referenced test procedure.

Section C403.3.5 Buildings with high efficiency space heating gas boiler systems.

Section C403.3.5 - Add a new Section C403.3.5 read as follows:

C403.3.5 Buildings with high efficiency space heating gas boiler systems. New buildings where space heating is served by one or more gas hot water boilers with a minimum thermal efficiency (Et) of 90 percent when rated in accordance with the test procedures in Table C403.3.2(5) shall comply with this section, unless otherwise approved by the authority having jurisdiction. The hot water distribution system shall be designed so that the coils and other heat exchangers are selected such that at outdoor design conditions, the hot water return temperature entering the boilers is 120°F (49°C) or less when the boiler is firing.

Table C403.4.4 Variable speed drive (VSD) requirements for demand controlled pumps.

Table C403.4.4 - Revise the text in the last row of Table C403.4.4 to read as follows:

CHILLED WATER AND HEAT REJECTION LOOP PUMPS IN THESE CLIMATE ZONES	HEATING WATER PUMPS IN THESE CLIMATE ZONES	VSD REQUIRED FOR MOTORS WITH RATED OUTPUT OF:
-	4A	≥ 10 hp

Section C403.5 Economizers (Prescriptive).

Section C403.5 - Revise Items 2 and 3 of Section C403.5 to read as follows:

2. Individual fan systems with cooling capacity greater than or equal to 54,000 Btu/h (15.8 kW) serving other than Group R occupancies.

   The total supply capacity of all fan cooling units serving other than Group R occupancies not provided with economizers shall not exceed 20 percent of the total supply capacity of all fan cooling units serving other than Group R occupancies or 300,000 Btu/h (88 kW), whichever is greater.

3. Individual fan systems with cooling capacity greater than or equal to 270,000 Btu/h (79.1 kW) serving Group R occupancies.

   The total supply capacity of all fan cooling units serving Group R occupancies not provided with

economizers shall not exceed 20 percent of the total supply capacity of all fan cooling units serving Group R occupancies or 1,500,000 Btu/h (440 kW), whichever is greater.

Section C403.5.1 Integrated economizer control.

Section C403.5.1 - Revise Item 2 of Section C403.5.1 to read as follows:

2. Direct expansion (DX) units that control 75,000 Btu/h (22 kW) or greater of rated capacity of the mechanical cooling directly based on occupied space temperature shall have not fewer than two stages of mechanical cooling capacity.

Section C403.5.5 Economizer fault detection and diagnostics (Mandatory).

Section C403.5.5 - Revise the first paragraph of Section C403.5.5 to read as follows:

Air-cooled unitary direct-expansion units listed in Tables C403.3.2(1) through C403.3.2(3) and variable refrigerant flow (VRF) units listed in Tables C403.3.2(10) and C403.3.2(11) that are equipped with an economizer in accordance with Sections C403.5 through C403.5.4 shall include a fault detection and diagnostics system complying with the following:

Section C403.6.1 Variable air volume and multiple-zone systems.

Section C403.6.1 - Revise Item 3 of Section C403.6.1 to read as follows:

3. The outdoor airflow rate required to meet the minimum ventilation requirements of Chapter 4 of the New York City Mechanical Code.

Sections C403.6.6 Multiple-zone VAV system ventilation optimization control.

Section C403.6.6 - Revise the first paragraph of Section C403.6.6 to read as follows:

Multiple-zone VAV systems with direct digital control of individual zone boxes reporting to a central control panel shall have automatic controls configured to reduce outdoor air intake flow below design rates in response to changes in system ventilation efficiency (E_v) as defined by the New York City Mechanical Code.

Section C403.7.1 Demand control ventilation (Mandatory).

Section C403.7.1 - Revise the first paragraph of Section C403.7.1 to read as follows:

Demand control ventilation (DCV) shall be provided for spaces larger than 500 square feet (46.5 m^2) and with an average occupant load of 25 people or greater per 1,000 square feet (93 m^2) of floor area, as established in the New York City Mechanical Code, and served by systems with one or more of the following:

Section C403.7.2 Enclosed parking garage ventilation controls (Mandatory).

Section C403.7.2 - Revise the first paragraph in Section C403.7.2 to read as follows:

Enclosed parking garages used for storing or handling automobiles operating under their own power shall

employ contamination-sensing devices and automatic controls configured to stage fans or modulate fan average airflow rates to 50 percent or less of design capacity, or intermittently operate fans less than 20 percent of the occupied time or as required to maintain acceptable contaminant levels in accordance with New York City Mechanical Code provisions. Failure of contamination-sensing devices shall cause the exhaust fans to operate continuously at design airflow.

Section C403.7.2 - Revise Exception 1 of Section C403.7.2 to read as follows:

1. Garages with a total exhaust capacity less than 5,000 cfm (2 360 L/s) with ventilation systems that do not utilize heating or mechanical cooling.

Section C403.7.4 Energy recovery ventilation systems (Mandatory).

Section C403.7.4 - Revise Exception 1 of Section C403.7.4 to read as follows:

1. Where energy recovery systems are prohibited by the New York City Mechanical Code.

Section C403.7.4 - Revise Exception 8 of Section C403.7.4 to read as follows:

8. Where the sum of the airflow rates exhausted and relieved within 30 feet of each other is less than 75 percent of the design ventilation outdoor air flow rate, excluding exhaust air that is any of the following:

    a. used for another energy recovery system,

    b. not allowed by ASHRAE Standard 170 for use in energy recovery systems with leakage potential,

    c. prohibited by the New York City Mechanical Code, or

    d. of Class 4 as defined in ASHRAE 62.1.

Section C403.7.7 Shutoff dampers (Mandatory).

Section C403.7.7 - Add a new Exception to the first paragraph of Section C403.7.7 to read as follows:

Exception: Shutoff dampers are not required in ventilation or exhaust systems that are required by the New York City Mechanical Code to have fans that operate continuously, 24 hours per day, 7 days per week.

Section C403.7.7 - Revise the second paragraph of Section C403.7.7 to read as follows:

Outdoor air intake and exhaust dampers shall be installed with automatic controls configured to close when the systems or spaces served are not in use or during unoccupied period warm-up and setback operation, unless the systems served require outdoor or exhaust air in accordance with the New York City Mechanical Code or the dampers are opened to provide intentional economizer cooling.

Section C403.7.7 - Revise the Exception to Section 403.7.7, which appears after the third paragraph of such

section, to read as follows:

Exception: Nonmotorized gravity dampers shall be an alternative to motorized dampers for exhaust and relief openings in any of the following conditions:

1. In buildings less than three stories in height above grade plane.

2. In buildings of any height located in Climate Zones 1, 2 or 3.

3. Where the design exhaust capacity is not greater than 300 cfm (142 L/s).

Section C403.8.5.1 Fan airflow control.

Section C403.8.5.1 - Revise Exception 2 of Section C403.8.5.1 to read as follows:

2. Where the volume of outdoor air required to comply with the ventilation requirements of the New York City Mechanical Code at low speed exceeds the air that would be delivered at the speed defined in Section C403.8.5, the minimum speed shall be selected to provide the required ventilation air.

Section C403.9 Heat rejection equipment.

Section C403.9 - Revise the Exception to Section C403.9 to read as follows:

Exception: Heat rejection devices where energy usage is included in the equipment efficiency ratings listed in Tables C403.3.2(1) and C403.3.2(7).

Section C403.9.1 Fan speed control.

Section C403.9.1 - Revise the last sentence of the first paragraph of Section C403.9.1 to read as follows:

Fan motor power input shall be not more than 30 percent of design wattage at 50 percent of the design airflow.

Table C403.10.1(1) Minimum efficiency requirements: commercial refrigeration.

Table C403.10.1(1) - Revise the title of Table C403.10.1(1) to read as follows:

TABLE C403.10.1(1) COMMERCIAL REFRIGERATORS AND FREEZERS - MINIMUM EFFICIENCY REQUIREMENTS

Table C403.10.1(2) Minimum efficiency requirements: commercial refrigerators and freezers.

Delete Table C403.10.1(2) in its entirety and add a new Table C403.10.1(2) to read as follows:

TABLE C403.10.1(2)COMMERCIAL REFRIGERATION - MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	ENERGY USE LIMITS (kWh/day)[a, b]	TEST PROCEDURE

Equipment Class	Family Code	Operating Mode	Rating Temperat		
VOP.RC.M	Vertical open	Remote condensi	Medium	0.82 × TDA + 4.07	AHRI 1200
SVO.RC.M	Semivertical ope	Remote condensi	Medium	0.83 × TDA + 3.18	
HZO.RC.M	Horizontal open	Remote condensi	Medium	0.35 × TDA + 2.88	
VOP.RC.L	Vertical open	Remote condensi	Low	2.27 × TDA + 6.85	
HZO.RC.L	Horizontal open	Remote condensi	Low	0.57 × TDA + 6.88	
VCT.RC.M	Vertical transpar door	Remote condensi	Medium	0.22 × TDA + 1.95	
VCT.RC.L	Vertical transpar door	Remote condensi	Low	0.56 × TDA + 2.61	
SOC.RC.M	Service over counter	Remote condensi	Medium	0.51 × TDA + 0.11	
VOP.SC.M	Vertical open	Self-contained	Medium	1.74 × TDA + 4.71	
SVO.SC.M	Semivertical ope	Self-contained	Medium	1.73 × TDA + 4.59	
HZO.SC.M	Horizontal open	Self-contained	Medium	0.77 × TDA + 5.55	
HZO.SC.L	Horizontal open	Self-contained	Low	1.92 × TDA + 7.08	
VCT.SC.I	Vertical transpar door	Self-contained	Ice cream	0.67 × TDA + 3.29	
VCS.SC.I	Vertical solid do	Self-contained	Ice cream	0.38 × V + 0.88	
HCT.SC.I	Horizontal transparent door	Self-contained	Ice cream	0.56 × TDA + 0.43	
SVO.RC.L	Semivertical ope	Remote condensi	Low	2.27 × TDA + 6.85	
VOP.RC.I	Vertical open	Remote condensi	Ice cream	2.89 × TDA + 8.7	
SVO.RC.I	Semivertical ope	Remote condensi	Ice cream	2.89 × TDA + 8.7	
HZO.RC.I	Horizontal open	Remote condensi	Ice cream	0.72 × TDA + 8.74	
VCT.RC.I	Vertical transpar door	Remote condensi	Ice cream	0.66 × TDA + 3.05	
HCT.RC.M	Horizontal transparent door	Remote condensi	Medium	0.16 × TDA + 0.13	

EQUIPMENT TYPE				ENERGY USE LIMITS (kWh/day) [a,b]	TEST PROCEDURE
Equipment Class	Family Code	Operating Mode	Rating Tempera		
HCT.RC.L	Horizontal trans door	Remote condens	Low	0.34 × TDA + 0.26	AHRI 1200
HCT.RC.I	Horizontal trans door	Remote condens	Ice cream	0.4 × TDA + 0.31	
VCS.RC.M	Vertical solid do	Remote condens	Medium	0.11 × V + 0.26	
VCS.RC.L	Vertical solid do	Remote condens	Low	0.23 × V + 0.54	
VCS.RC.I	Vertical solid do	Remote condens	Ice cream	0.27 × V + 0.63	
HCS.RC.M	Horizontal solid	Remote condens	Medium	0.11 × V + 0.26	
HCS.RC.L	Horizontal solid	Remote condens	Low	0.23 × V + 0.54	
HCS.RC.I	Horizontal solid	Remote condens	Ice cream	0.27 × V + 0.63	
HCS.RC.I	Horizontal solid	Remote condens	Ice cream	0.27 × V + 0.63	

SOC.RC.L	Service over cou	Remote condens	Low	1.08 × TDA + 0.22	
SOC.RC.I	Service over cou	Remote condens	Ice cream	1.26 × TDA + 0.26	
VOP.SC.L	Vertical open	Self-contained	Low	4.37 × TDA + 11.82	
VOP.SC.I	Vertical open	Self-contained	Ice cream	5.55 × TDA + 15.02	
SVO.SC.L	Semivertical ope	Self-contained	Low	4.34 × TDA + 11.51	
SVO.SC.I	Semivertical ope	Self-contained	Ice cream	5.52 × TDA + 14.63	
HZO.SC.I	Horizontal open	Self-contained	Ice cream	2.44 × TDA + 9.0	
SOC.SC.I	Service over cou	Self-contained	Ice cream	1.76 × TDA + 0.36	
HCS.SC.I	Horizontal solid	Self-contained	Ice cream	0.38 × V + 0.88	

a. V = Volume of the case in feet, as measured in accordance with Appendix C of AHRI 1200.
b. TDA = Total display area of the case in square feet, as measured in accordance with Appendix D of AHRI 1200.
c. Equipment class designations consist of a combination [in sequential order separated by periods (AAA).(BB).(C)] of:

(AAA) An equipment family code where:

VOP	=	vertical open
SVO	=	semivertical
HZO	=	horizontal op
VCT	=	vertical trans
VCS	=	vertical solid
HCT	=	horizontal tra
HCS	=	horizontal so
SOC	=	service over

(BB) An operating mode code:

RC	=	remote co
SC	=	self-contai

(C) A rating temperature code:

M	=	medium tem
L	=	low tempera
I	=	ice-cream te

For example, “VOP.RC.M” refers to the “vertical-open, remote-condensing, medium-temperature” equipment class.

Section C403.11.1 Duct and plenum insulation and sealing (Mandatory).

Section C403.11.1 - Revise the last sentence of Section C403.11.1 to read as follows:

Joints and seams shall comply with the New York City Mechanical Code.

Section C403.11.2 Duct construction (Mandatory).

Section C403.11.2 - Revise Section C403.11.2 to read as follows:

C403.11.2 Duct construction (Mandatory). Ductwork shall be constructed and erected in accordance with the New York City Mechanical Code.

Section C403.11.2.1 Low-pressure duct systems (Mandatory).

Section C403.11.2.1- Revise the first paragraph of Section C403.11.2.1 to read as follows:

Longitudinal and transverse joints, seams and connections of supply and return ducts operating at a static pressure less than or equal to 2 inches water gauge (w.g.) (498 Pa) shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes installed in accordance with the manufacturer's instructions. Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the New York City Mechanical Code.

Section C403.11.2.2 Medium-pressure duct systems (Mandatory).

Section C403.11.2.2 - Revise the last sentence of Section C403.11.2.2 to read as follows:

Pressure classifications specific to the duct system shall be clearly indicated on the construction documents in accordance with the New York City Mechanical Code.

Section C403.11.3 Piping insulation (Mandatory).

Section C403.11.3 - Delete Exception 4 of Section C403.11.3 in its entirety, and renumber Exceptions 5 and 6 of such Section as Exceptions 4 and 5, respectively, of such Section.

SECTION C405
ELECTRICAL POWER AND LIGHTING SYSTEMS

Section C405.1 General (Mandatory).

Section C405.1 - Add a new sentence to the end of the second paragraph of Section C405.1 to read as follows:

Lighting controls shall be commissioned and completed in accordance with the requirements of Section C408.3.

Section C405.1.1 Exit Signs.

Section C405.1.1 - Add a new Section C405.1.1 to read as follows:

C405.1.1 Exit signs. Internally illuminated exit signs shall not exceed 5 W per face.

Section C405.2 Lighting controls (Mandatory).

Section C405.2 - Revise Exception 2 of Section C405.2 to read as follows:

2. Interior exit stairways, interior exit ramps and exit passageways, as defined by the New York City

Building Code.

Section C405.2.1 Occupant sensor controls.

Section C405.2.1 - Add new Items 12, 13 and 14 to Section C405.2.1 to read as follows:

12. Janitorial closets.

13. Corridors/transition areas.

14. Cafeteria and fast food dining areas.

Section C405.2.1.1 Occupant sensor control function.

Section C405.2.1.1 - Delete Section C405.2.1.1 in its entirety and add a new Section C405.2.1.1 to read as follows:

C405.2.1.1 Occupant sensor control function. Occupant sensor controls in warehouses shall comply with Section C405.2.1.2. Occupant sensor controls in open plan office areas, cafeteria dining areas, and fast food dining areas, 300 square feet (28 m^2) or greater in area, shall comply with Section C405.2.1.3. Occupant sensor controls for all other spaces specified in Section C405.2.1 shall comply with the following:

1. They shall automatically turn off lights within 15 minutes after all occupants have left the space.

2. They shall be manual-on or controlled to automatically turn on the lighting to not more than 50-percent power.

Exceptions:

1. Full automatic-on controls shall be permitted to control lighting in public corridors, stairways, restrooms, primary building entrance areas and lobbies, and areas where manual-on operation would endanger the safety or security of the room or building occupants.

2. Manual-on controls shall be required for classrooms (not including shop classrooms, laboratory classrooms, and preschool classrooms), conference/meeting rooms, employee lunch and break rooms, and offices smaller than 200 square feet (18.5 m^2) in area. Such sensors and controls shall not have an override switch that converts from manual-on to automatic-on functionality, and may have a grace period of up to 30 seconds to turn on the lighting automatically after the sensor has turned off the lighting if occupancy is detected.

3. They shall incorporate a manual control to allow occupants to turn off lights.

Exception: Remote location of this local control device or devices shall be permitted for reasons of safety or security when each remote control device has an indicator pilot light as part of or next to the control device and the light is clearly labeled to identify the controlled lighting.

Section C405.2.1.3 Occupant sensor control function in open plan office areas.

Section C405.2.1.3 - Revise Section C405.2.1.3 to read as follows:

C405.2.1.3 Occupant sensor control function in open plan office areas, cafeteria dining areas, and fast food dining areas . Occupant sensor controls in open plan office spaces, cafeteria dining areas, and fast food dining areas less than 300 square feet (28 m^2) in area shall comply with Section C405.2.1.1. Occupant sensor controls in all other open plan office spaces, cafeteria dining spaces, and fast food dining spaces shall comply with all of the following:

1. The controls shall be configured so that general lighting can be controlled separately in control zones with floor areas not greater than 600 square feet (55 m^2) within the open plan office space or dining space.

2. The controls shall automatically turn off general lighting in all control zones within 15 minutes after all occupants have left the open plan office space or dining space.

3. The controls shall be configured so that general lighting power in each control zone is reduced by not less than 80 percent of the full zone general lighting power in a reasonably uniform illumination pattern within 15 minutes of all occupants leaving that control zone. Control functions that switch control zone lights completely off when the zone is vacant meet this requirement.

4. The controls shall be configured such that any daylight responsive control will activate open plan office space general lighting or control zone general lighting only when occupancy for the same area is detected.

Section C405.2.1.4 Occupant sensor control function for egress illumination.

Section C405.2.1.4 - Add a new Section C405.2.1.4 to read as follows:

C405.2.1.4 Occupant sensor control function for egress illumination. In new buildings, luminaires serving the exit access and providing means of egress illumination required by the New York City Building Code, including luminaires that function as both normal and emergency means of egress illumination shall be controlled by a combination of listed emergency relay and occupancy sensors, or signal from another building control system, that automatically reduces the lighting power by 50 percent when unoccupied for a period longer than 15 minutes.

Exceptions :

1. Means of egress illumination serving the exit access that does not exceed 0.02 watts per square foot of building area is exempt from this requirement.

2. Emergency lighting designated to meet the requirements of the New York City Building Code.

Section C405.2.3 Daylight-responsive controls.

Section C405.2.3 - Revise Items 1 and 2 of Section C405.2.3 to read as follows:

1. Spaces with a total of more than 100 watts of general lighting within sidelit zones complying with Section C405.2.3.2. General lighting does not include lighting that is required to have specific application control in accordance with Section C405.2.4.

2. Spaces with a total of more than 100 watts of general lighting within toplit zones complying with Section C405.2.3.3.

Section C405.2.3.1 Daylight-responsive control function.

Section C405.2.3.1 - Revise the Exception to Section C405.2.3.1 to read as follows:

Exception: Up to 100 watts of lighting in each space is permitted to be controlled together with lighting in a daylight zone facing a different cardinal orientation.

Figure C405.2.3.2 Sidelit zone

Figure C405.2.3.2 - Delete Figure C405.2.3.2 in its entirety and add a new Figure C405.2.3.2 to read as follows:

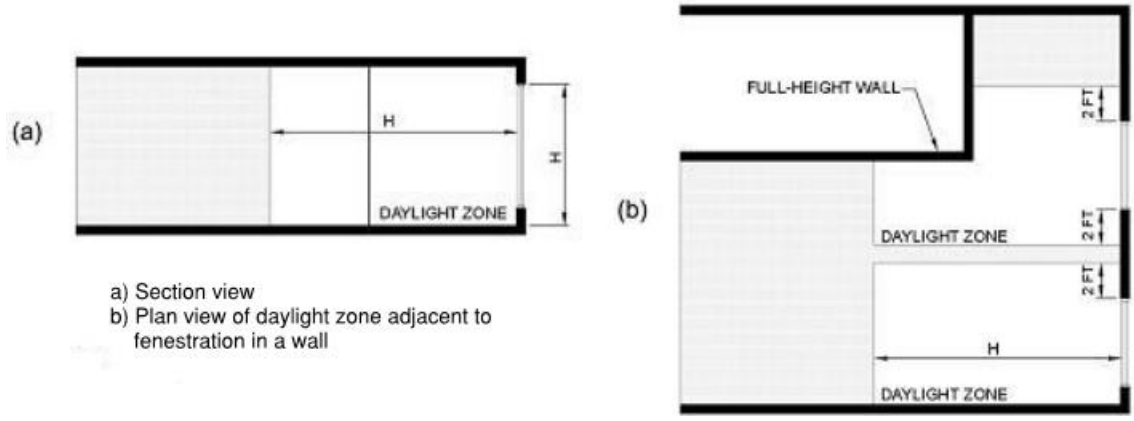
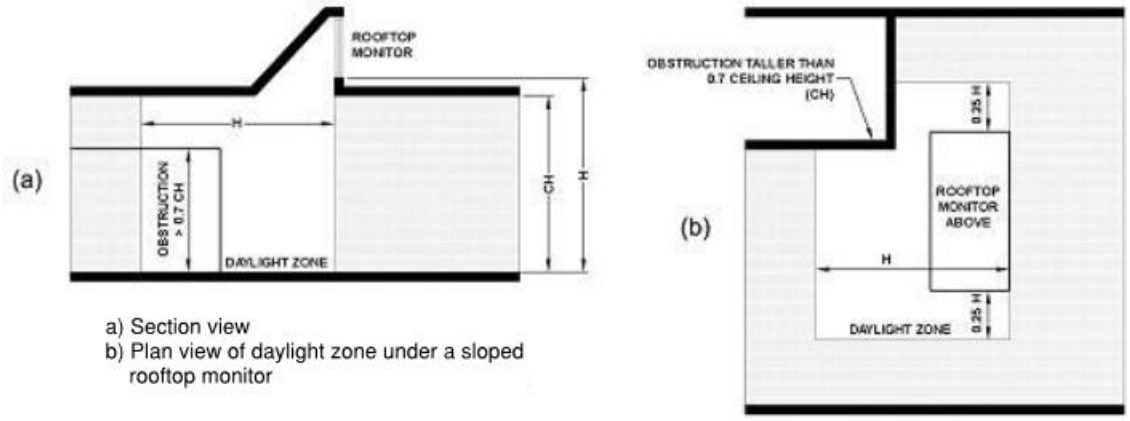


FIGURE C405.2.3.2
SIDELIT ZONE

Figure C405.2.3.3(3) Daylight zone under a sloped rooftop monitor

Figure C405.2.3.3(3) - Delete Figure C405.2.3.3(3) in its entirety and add a new Figure C405.2.3.3(3) to read as follows:



a) Section view
b) Plan view of daylight zone under a sloped rooftop monitor

FIGURE C405.2.3.3(3)
DAYLIGHT ZONE UNDER A SLOPED ROOFTOP MONITOR

Section C405.2.6 Exterior lighting controls.

Section C405.2.6 - Revise the first sentence of Section C405.2.6 to read as follows:

Exterior lighting systems shall be provided with controls that comply with Sections C405.2.6.1 through C405.2.6.5.

Section C405.2.6.3 Lighting setback.

Section C405.2.6.3 - Delete Section C405.2.6.3 in its entirety and add a new Section C405.2.6.3 to read as follows:

C405.2.6.3 Lighting setback. Lighting that is not controlled in accordance with Section C405.2.6.2 shall be controlled so that the total wattage of such lighting is automatically reduced by not less than 50 percent by selectively switching off or dimming luminaires at one of the following times:

1. From not later than midnight to not earlier than 6 a.m.
2. From not later than one hour after business closing to not earlier than one hour before business opening.
3. During any time where activity has not been detected for 15 minutes or more.

Section C405.2.6.5 Outdoor parking area lighting control.

Section C405.2.6.5 - Add a new Section C405.2.6.5 to read as follows:

C405.2.6.5 Outdoor parking area lighting control. Luminaires serving outdoor parking areas and having a rated input wattage of greater than 78 W and a mounting height of 24 feet (7.3 m) or less above the ground shall be controlled to automatically reduce the power of each luminaire by a minimum of 50 percent when no activity has been detected in the area illuminated by the controlled luminaires for a time of no longer than 15 minutes. No more than 1500 W of lighting power shall be controlled together.

Section C405.3.1 Total connected interior lighting power.

Section C405.3.1- Revise the sentence after Equation 4-10 and its key, and before the enumerated list, in Section C405.3.1 to read as follows:

Exception: The connected power associated with the following lighting equipment and applications is not included in calculating

total connected lighting power.

Section C405.3.2 Interior lighting power allowance.

Section C405.3.2- Add a new sentence to the end of the first paragraph to read as follows:

Buildings with unfinished spaces shall use the Space-by-Space Method.

Table C405.3.2(1) Interior Lighting Power Allowances: Building Area Method

Table C405.3.2(1) - Delete Table C405.3.2(1) in its entirety and add a new Table C405.3.2(1) to read as follows:

TABLE C405.3.2(1)

INTERIOR LIGHTING POWER ALLOWANCES:

BUILDING AREA METHOD

BUILDING AREA TYPE	LPD (watts/sq.ft)
Automotive facility	0.64
Convention center	0.70
Courthouse	0.74
Dining: bar lounge/leisure	0.69
Dining: cafeteria/fast food	0.66
Dining: family	0.61
Dormitory[a, b]	0.52
Exercise center	0.65
Fire station[a]	0.50
Gymnasium	0.67
Health care clinic	0.68
Hospital[a]	0.86
Hotel/Motel[a, b]	0.70
Library	0.78
Manufacturing facility	0.60
Motion picture theater	0.62
Multifamily[c]	0.49
Museum	0.68
Office	0.69
Parking garage	0.12
Penitentiary	0.67
Performing arts theater	0.85
Police station	0.68

Post office	0.62
Religious building	0.72
Retail	0.91
School/university	0.67
Sports arena	0.76
Town hall	0.72
Transportation	0.51
Warehouse	0.41
Workshop	0.83

a. Where sleeping units are excluded from lighting power calculations by application of Section R404.1, neither the area of the sleeping units nor the wattage of lighting in the sleeping units is counted.

b. Where dwelling units are excluded from lighting power calculations by application of Section R404.1, neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.

c. Dwelling units are excluded. Neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.

Table C405.3.2(2) Interior Lighting Power Allowances: Space-by-space Method

Table C405.3.2(2) - Delete Table C405.3.2(2) in its entirety and add a new Table C405.3.2(2) to read as follows:

TABLE C405.3.2(2)

INTERIOR LIGHTING POWER ALLOWANCES:

SPACE-BY-SPACE METHOD

COMMON SPACE TYPES [a]	LPD (watts/sq.ft)
Atrium	
Less than 40 feet in height	0.03 per foot in total height
Greater than 40 feet in height	0.40 + 0.02 per foot in total height
Audience seating area	
In an auditorium	0.63
In a convention center	0.65
In a gymnasium	0.43
In a motion picture theater	0.64
In a penitentiary	0.28
In a performing arts theater	2.03
In a religious building	1.53
In a sports arena	0.42
Otherwise	0.40

Banking activity area	0.79
Breakroom (See Lounge/breakroom)	
Classroom/lecture hall/training room	
In a penitentiary	1.06
Otherwise	0.74
Computer room	1.16
Conference/meeting/multipurpose room	0.93
Confinement cells	0.52
Copy/print room	0.50
Corridor	
In a facility for the visually impaired (and not used primarily by the staff)[b]	0.81
In a hospital	0.81
In a manufacturing facility	0.28
Otherwise	0.58
Courtroom	1.06
Dining area	
In bar/lounge or leisure dining	0.62
In cafeteria or fast food dining	0.53
In a facility for the visually impaired (and not used primarily by the staff)[b]	1.48
In family dining	0.54
In a penitentiary	0.72
Otherwise	0.53
Electrical/mechanical room	0.39
Emergency vehicle garage	0.41
Food preparation area	0.92
Guestroom[c, d]	0.75
Laboratory	
In or as a classroom	1.04
Otherwise	1.45
Laundry/washing area	0.43
Loading dock, interior	0.51
Lobby	
For an elevator	0.52
In a facility for the visually impaired (and not used primarily by the staff)[b]	2.03
In a hotel	0.68
In a motion picture theater	0.38
In a performing arts theater	0.82
Otherwise	0.90

Locker room	0.45
Lounge/breakroom	
In a healthcare facility	0.53
Otherwise	0.44
Office	
Enclosed	0.85
Open plan	0.78
Parking area, interior[i]	0.11
Pharmacy area	1.23
Restroom	
In a facility for the visually impaired (and not used primarily by the staff[b]	0.81
Otherwise	0.75
Sales area	1.06
Seating area, general	0.38
Stairway (see Space containing stairway)	
Stairwell	0.50
Storage room	0.43
Vehicular maintenance area	0.53
Workshop	1.09
BUILDING TYPE SPECIFIC SPACE TYPES[a]	**LPD (watts/sq.ft)**
Automotive (see Vehicular maintenance area above)	
Convention Center-exhibit space	0.69
Dormitory-living quarters[c, d]	0.46
Facility for the visually impaired[b]	
In a chapel (and not used primarily by the staff)	0.89
In a recreation room (and not used primarily by the staff)	1.53
Fire Station-sleeping quarters[c]	0.19
Gymnasium/fitness center	
In an exercise area	0.50
In a playing area	0.75
Healthcare facility	
In an exam/treatment room	1.16
In an imaging room	0.98
In a medical supply room	0.54
In a nursery	0.94
In a nurse's station	0.75
In an operating room	1.87
In a patient room[c]	0.45

In a physical therapy room	0.84
In a recovery room	0.89
Library	
In a reading area	0.77
In the stacks	1.20
Manufacturing facility	
In a detailed manufacturing area	0.86
In an equipment room	0.61
In an extra-high-bay area (greater than 50' floor-to-ceiling height)	0.73
In a high-bay area (25-50' floor-to-ceiling height)	0.58
In a low-bay area (less than 25' floor-to- ceiling height)	0.61
Museum	
In a general exhibition area	0.61
In a restoration room	0.77
Performing arts theater-dressing room	0.35
Post office-sorting area	0.66
Religious buildings	
In a fellowship hall	0.54
In a worship/pulpit/choir area	0.98
Retail facilities	
In a dressing/fitting room	0.49
In a mall concourse	0.79
Sports arena-playing area	
For a Class I facility[e, j]	2.26
For a Class II facility[f, j]	1.45
For a Class III facility[g, j]	1.08
For a Class IV facility[h, j]	0.72
Transportation facility	
In a baggage/carousel area	0.40
In an airport concourse	0.31
At a terminal ticket counter	0.48
Warehouse-storage area	
For medium to bulky, palletized items	0.27
For smaller, hand-carried items	0.65

a. In cases where both a common space type and a building area specific space type are listed, the building area specific space type shall apply.

b. A 'Facility for the Visually Impaired' is a facility that is licensed or will be licensed by local or state authorities for senior long-term care, adult daycare, senior support or people with special visual needs.

c. Where sleeping units are excluded from lighting power calculations by application of Section R404.1, neither the area of the sleeping units

nor the wattage of lighting in the sleeping units is counted.

d. Where dwelling units are excluded from lighting power calculations by application of Section R404.1, neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.

e. Class I facilities consist of professional facilities; and semiprofessional, collegiate, or club facilities with seating for 5,000 or more spectators.

f. Class II facilities consist of collegiate and semiprofessional facilities with seating for fewer than 5,000 spectators; club facilities with seating for between 2,000 and 5,000 spectators; and amateur league and high-school facilities with seating for more than 2,000 spectators.

g. Class III facilities consist of club, amateur league and high-school facilities with seating for 2,000 or fewer spectators.

h. Class IV facilities consist of elementary school and recreational facilities; and amateur league and high-school facilities without provision for spectators.

i. The wattage of lighting in daylight transition zones and ramps without parking is excluded.

j. Pool surfaces are excluded. Neither the surface area of the swimming or spa pool nor the wattage of the lighting serving them shall be counted.

Section C405.3.2.2 Space-by-Space Method.

Section C405.3.2.2- Add a new sentence after the first sentence and before the last sentence of Section C405.3.2.2 to read as follows:

Where a building has unfinished spaces, the lighting power allowance for the unfinished spaces shall be the total connected lighting power for those spaces, or 0.2 watts per square foot, whichever is less.

Table C405.4.2(2) Lighting Power Allowances for Building Exteriors

Table C405.4.2(2) - Delete Table C405.4.2(2) in its entirety and add a new Table C405.4.2(2) to read as follows:

TABLE C405.4.2(2)

LIGHTING POWER ALLOWANCES FOR BUILDING EXTERIORS

	LIGHTING ZONES			
	Zone 1	**Zone 2**	**Zone 3**	**Zone 4**
Base Site Allowance	350 W	400 W	500 W	900 W
Uncovered Parking Areas				
Parking areas and drives	0.03W/ft^2	0.04 W/ft^2	0.05W/ft^2	0.05W/ft^2
Building Grounds				
Walkways and ramps less than 10 feet wide	0.5 W/linear foot	0.5 W/linear foot	0.6 W/linear foot	0.7 W/linear foot
Walkways and ramps 10 feet wide or greater, plaza areas, special feature areas	0.10 W/ft^2	0.10 W/ft^2	0.11 W/ft^2	0.14 W/ft^2
Dining areas	0.65 W/ft^2	0.65 W/ft^2	0.75 W/ft^2	0.95 W/ft^2
Stairways	0.6 W/ft^2	0.7 W/ft^2	0.7 W/ft^2	0.7 W/ft^2
Pedestrian tunnels	0.12 W/ft^2	0.12 W/ft^2	0.14 W/ft^2	0.21 W/ft^2
Landscaping	0.03 W/ft^2	0.04 W/ft^2	0.04 W/ft^2	0.04 W/ft^2
Building Entrances and Exits				

Pedestrian and vehicular entrances and exits	12.6W/linear foot opening	12.6W/linear foot opening	20W/linear foot of opening	20W/linear foot of opening
Entry canopies	0.20 W/ft^2	0.25 W/ft^2	0.4 W/ft^2	0.4 W/ft^2
Loading docks	0.35 W/ft^2	0.35 W/ft^2	0.35 W/ft^2	0.35 W/ft^2
Sales Canopies				
Free-standing and attached	0.40 W/ft^2	0.40 W/ft^2	0.6 W/ft^2	0.7 W/ft^2
Outdoor Sales				
Open areas (including vehicle sales lots)	0.20 W/ft^2	0.20 W/ft^2	0.35 W/ft^2	0.50 W/ft^2
Street frontage for vehicle sales lots in addition to "open area" allowance	No allowance	7 W/linear foot	7 W/linear foot	21 W/linear foot

For SI: 1 foot = 304.8 mm, 1 watt per square foot = W/0.0929 m^2.
W = watts.

Table C405.4.2(3) Individual Lighting Power Allowances for Building Exteriors

Table C405.4.2(3) - Revise the first footnote to Table C405.4.2(3) to read as follows:

For SI: 1 foot = 304.8 mm, 1 watt per square foot = W/0.0929 m^2.

Section C405.5 Dwelling electrical meter (Mandatory).

Section C405.5- Delete Section C405.5 in its entirety and add new Sections C405.5, C405.5.1 and C405.5.2, to read as follows:

C405.5 Electrical meter (Mandatory). Electrical service within buildings shall comply with the following:

C405.5.1 Dwelling electrical meter. Each dwelling unit located in a Group R-2 building shall have a separate electrical meter.

C405.5.2 Electrical meters for tenant spaces in covered buildings. The terms meter, sub-meter, covered building, tenant space and covered tenant space shall have the same meanings as defined in Section 28-311.2 of the Administrative Code. Each covered tenant space in a new building shall be equipped with a separate meter or sub-meter to measure the electrical consumption of such space when let or sublet. Where the covered tenant space is a floor with multiple tenancies, each tenancy with an area less than that as defined in Section 28-311.2 of the Administrative Code shall (i) be equipped with a separate meter or sub-meter, (ii) share a meter or sub-meter with other tenant spaces on the floor, or (iii) share a meter or sub-meter covering the entire floor. As new covered tenant spaces are created, they shall be equipped with meters or sub-meters as provided in this section.

Exception: Covered tenant space for which the electrical consumption within such space is measured by a meter dedicated exclusively to that space.

Section C405.8.1 Elevator cabs.

Section C405.8.1- Revise the heading of Section C405.8.1 to read as follows:

C405.8.1 Elevator equipment and cabs.

Section C405.8.1.1 Power conversion system.

Section C405.8.1.1 - Add new Sections C405.8.1.1, C405.8.1.1.1, C405.8.1.1.2 and C405.8.1.1.3, to read as follows:

C405.8.1.1 Power conversion system. New traction elevators with a rise of 75 feet (23 m) or more in new buildings shall have a power conversion system that complies with Sections 405.8.1.1.1 through 405.8.1.1.3.

C405.8.1.1.1 Motor. Induction motors with a Class IE2 efficiency rating, as defined by IEC EN 60034-30, or alternative technologies, such as permanent magnet synchronous motors that have equal or better efficiency, shall be used.

C405.8.1.1.2 Transmission. Transmissions shall not reduce the efficiency of the combined motor/transmission below that shown for the Class IE2 motor for elevators with capacities below 4,000 pounds (1814 kg). Gearless machines shall be assumed to have a 100 percent transmission efficiency.

C405.8.1.1.3 Drive. Potential energy released during motion shall be recovered with a regenerative drive that supplies electrical energy to the building electrical system.

C405.10 Commercial kitchen equipment.

Section C405.10 - Add a new Section C405.10 to read as follows:

C405.10 Commercial kitchen equipment. Commercial kitchen equipment shall comply with the minimum efficiency requirements of Tables C405.10(1) through C405.10(5).

TABLE C405.10(1)
MINIMUM EFFICIENCY REQUIREMENTS: COMMERCIAL FRYERS

	HEAVY-LOAD COOKING ENERGY EFFICIENCY	IDLE ENERGY RATE	TEST PROCEDURE
Standard Open Deep-Fat Gas Fryers	≥ 50%	≤ 9,000 Btu/hr	ASTM Standard F1361-17
Standard Open Deep-Fat Electric Fryers	≥ 83%	≤ 800 watts	
Large Vat Open Deep-Fat Gas Fryers	≥ 50%	≤ 12,000 Btu/hr	ASTM Standard F2144-17
Large Vat Open Deep-Fat Electric Fryers	≥ 80%	≤ 1,100 watts	

TABLE C405.10(2)

MINIMUM EFFICIENCY REQUIREMENTS: COMMERCIAL HOT FOOD HOLDING CABINETS

PRODUCT INTERIOR VOLUME (CUBIC FEET)	MAXIMUM IDLE ENERGY CONSUMPTION RATE (WATTS)	TEST PROCEDURE
0 < V < 13	≤ 21.5 V	ASTM Standard F2140-11
13 ≤ V < 28	≤ 2.0 V + 254.0	
28 ≤ V	≤ 3.8 V + 203.5	

TABLE C405.10(3)

MINIMUM EFFICIENCY REQUIREMENTS: COMMERCIAL STEAM COOKERS

FUEL TYPE	PAN CAPACITY	COOKING ENERGY EFFICIENCY [a]	IDLE RATE	TEST PROCEDURE
Electric Steam	3-pan	50%	400 watts	ASTM Standard F1484-18
	4-pan	50%	530 watts	
	5-pan	50%	670 watts	
	6-pan and larger	50%	800 watts	
Gas Steam	3-pan	38%	6,250 Btu/h	
	4-pan	38%	8,350 Btu/h	
	5-pan	38%	10,400 Btu/h	
	6-pan and larger	38%	12,500 Btu/h	

a. Cooking Energy Efficiency is based on heavy load (potato) cooking capacity.

TABLE C405.10(4)
MINIMUM EFFICIENCY REQUIREMENTS: COMMERCIAL DISHWASHERS

MACHINE TYPE	HIGH TEMP EFFICIENC REQUIREMENTS		LOW TEMP EFFICIENCY REQUIREMENTS		TEST PROCEDUR E
	Idle Energy Rate [a]	Water Consumption	Idle Energy Rate [a]	Water Consumption [b]	
Under Counter	≤ 0.50 kW	≤ 0.86 GPR	≤ 0.50 kW	≤ 1.19 GPR	ASTM F1696-18 ASTM F1920-15
Stationary Single Tank Door	≤ 0.70 kW	≤ 0.89 GPR	≤ 0.60 kW	≤ 1.18 GPR	

Pot, Pan , and Utensil	≤ 1.20 kW	≤ 0.58 GPR	≤ 1.00 kW	≤ 0.58 GPR	
Single Tank Conveyor	≤ 1.50 kW	≤ 0.70 GPR	≤ 1.50 kW	≤ 0.79 GPR	
Multiple Tank Conveyor	≤ 2.25 kW	≤ 0.54 GPR	≤ 2.00 kW	≤ 0.54 GPR	
Single Tank Flight Type	Reported	GPH ≤ 2.975x 55.00	Reported	GPH ≤ 2.975x 55.00	
Multiple Tank Flight Type	Reported	GPH ≤ 4.96x 17.00	Reported	GPH ≤ 4.96x + 17.00	

a. Idle results shall be measured with the door closed and represent the total idle energy consumed by the machine including all tank heater(s) and controls. Booster heater (internal or external) energy consumption should not be part of this measurement unless it cannot be separately monitored per US EPA Energy Star Commercial Dishwasher Specification Version 2.0.

b. GPR = gallons per rack; GPSF = gallons per square foot of rack; GPH = gallons per hour; x = sf of conveyer belt (i.e., W*L)/ min (maximum conveyor speed)

TABLE C405.10(5)
MINIMUM EFFICIENCY REQUIREMENTS: COMMERCIAL OVENS

FUEL TYPE	CLASSIFICATION	IDLE RATE	COOKING-ENERGY EFFICIENCY, %	TEST PROCEDURE
Convection Ovens				
Gas	Full-Size	≤ 12,000 Btu/h	≥ 46	ASTM F1496 - 13
Electric	Half-Size	≤ 1.0 Btu/h	≥ 71	
	Full-Size	≤ 1.60 Btu/h		
Combination Ovens				
Gas	Steam Mode	≤ 200P[a] + 6,511 Btu/h	≥ 41	ASTM F2861 - 17
	Convection Mode	≤ 150P[a] + 5,425 Btu/h	≥ 56	
Electric	Steam Mode	≤ 0.133P[a] + 0.6400 kW	≥ 55	
	Convection Mode	≤ 0.080P[a] + 0.4989 kW	≥ 76	
Rack Ovens				
Gas	Single	≤ 25,000 Btu/h	≥ 48	ASTM F2093 - 18
	Double	≤ 30,000 Btu/h	≥ 52	

a. P = Pan Capacity: The number of steam table pans the combination oven is able to accommodate as per the ASTM F1495 - 05 standard specification.

C405.11 Whole building energy monitoring.

Section C405.11 - Add a new Section C405.11 to read as follows:

C405.11 Whole building energy monitoring. Measurement devices shall be installed in new buildings to individually monitor energy use of each of the following types of energy supplied by a utility, energy provider, or plant that is not within the building:

1. Natural gas
2. Fuel oil
3. Propane
4. Steam
5. Chilled water
6. Hot water

Exceptions:

1. Buildings less than 25,000 square feet (2 325 m^2).
2. Group R buildings with less than 10,000 square feet (930 m^2)of common area.
3. Fuel use for on-site emergency equipment.

C405.12 Whole building electrical monitoring.

Section C405.12 - Add a new Section C405.12 to read as follows:

C405.12 Whole building electrical monitoring. Each new building shall have a measurement device capable of recording electrical energy use every 60 minutes and the capability to report that use on an hourly, daily, monthly and annual basis. The measurement device shall be capable of retaining the recorded data for 36 months.

Exceptions:

1. Buildings less than 25,000 square feet (2 325 m^2).
2. Group R buildings with less than 10,000 square feet (930 m^2) of common area.
3. Fuel use for on-site emergency equipment.

SECTION C406
ADDITIONAL EFFICIENCY PACKAGE OPTIONS

Section C406 Additional Efficiency Package Options.

Section C406 - Delete Section C406 in its entirety and add a new Section C406 to read as follows:

SECTION C406

ADDITIONAL EFFICIENCY PACKAGE OPTIONS

C406.1 Requirements. Buildings shall comply with one or more of the following:

1. More efficient HVAC equipment performance in accordance with Section C406.2.
2. Reduced lighting power in accordance with Section C406.3.
3. Enhanced digital lighting controls in accordance with Section C406.4.
4. Provision of a dedicated outdoor air system with energy recovery ventilation for certain HVAC equipment in accordance with Section C406.5.
5. High-efficiency service water heating in accordance with Section C406.6.
6. Enhanced envelope performance in accordance with Section C406.7.
7. Reduced air infiltration in accordance with Section C406.8.

C406.1.1 Tenant spaces. Tenant spaces shall comply with Section C406.2, C406.3, C406.4, C406.5 or C406.6.

Exception: Previously occupied tenant spaces that comply with this code in accordance with Section C501.

C406.2 More efficient HVAC equipment performance. Equipment shall exceed the minimum efficiency requirements listed in Tables C403.3.2(1) through C403.3.2(14) by 10 percent, in addition to the requirements of Section C403. Where multiple performance requirements are provided, the equipment shall exceed all requirements by 10 percent. Equipment not listed in Tables C403.3.2(1) through C403.3.2(14) shall be limited to 10 percent of the total building system capacity.

C406.3 Reduced lighting power. The total connected interior lighting power calculated in accordance with Section C405.3.1 shall be less than 90 percent of the total lighting power allowance calculated in accordance with Section C405.3.2.

C406.4 Enhanced digital lighting controls. Interior lighting in the building shall have the following enhanced lighting controls that shall be located, scheduled and operated in accordance with Sections C405.2.1 through C405.2.3 .

1. Luminaires shall be configured for continuous dimming.

2. Luminaires shall be addressed individually. Where individual addressability is not available for the luminaire class type, a controlled group of not more than four luminaries shall be allowed.

3. Not more than eight luminaires shall be controlled together in a daylight zone.

4. Fixtures shall be controlled through a digital control system that includes the following function:

4.1. Control reconfiguration based on digital addressability.

4.2. Load shedding.

4.3. Individual user control of overhead general illumination in open offices.

4.4. Occupancy sensors shall be capable of being reconfigured through the digital control system.

5. Construction documents shall include submittal of a Sequence of Operations, including a specification outlining each of the functions in Item 4.

6. Functional testing of lighting controls shall comply with Section C408.

C406.5 Dedicated outdoor air system. Buildings containing equipment or systems regulated by Section C403.3.4, C403.4.3, C403.4.4, C403.4.5, C403.6, C403.8.4, C403.8.5, C403.8.5.1, C403.9.1, C403.9.2, C403.9.3 or C403.9.4 shall be equipped with an independent ventilation system designed to provide not less than the minimum 100-percent outdoor air to each individual occupied space, as specified by the New York City Mechanical Code. The ventilation system shall be equipped with an energy recovery system meeting the requirements of Section C403.7.4, without exception (Note: Section C406.5 cannot be selected where ERV is prohibited by the New York City Mechanical Code or otherwise prohibited). The HVAC system shall include supply-air temperature controls that automatically reset the supply-air temperature in response to representative building loads, or to outdoor air temperatures. The controls shall reset the supply-air temperature not less than 25 percent of the difference between the design supply-air temperature and the design room-air temperature.

C406.6 Reduced energy use in service water heating. Buildings shall be of the following types to use this compliance method:

1. Group R-1: Boarding houses, hotels or motels.

2. Group I-2: Hospitals, psychiatric hospitals and nursing homes.

3. Group A-2: Restaurants and banquet halls or buildings containing food preparation areas.

4. Group F: Laundries.

5. Group R-2.

6. Group A-3: Health clubs and spas.

C406.6.1 Load fraction. The building service water-heating system shall have one or more of the following that are sized to provide not less than 60 percent of the building's annual hot water requirements, or sized to provide 100 percent of the building's annual hot water requirements if the building shall otherwise comply with Section C403.9.5:

1. Waste heat recovery from service hot water, heat-recovery chillers, building equipment, or process equipment.

2. On-site renewable energy water-heating systems.

C406.7 Enhanced envelope performance. The thermal performance of the envelope as designed shall demonstrate a minimum 15 percent improvement compared to the prescriptive U-,C-, F-factor requirements of Section C402.1.4.

C406.8 Reduced air infiltration. Air infiltration shall be verified by whole-building pressurization testing conducted in accordance with ASTM E779 or ASTM E1827 by an independent third party. The measured air-leakage rate of the building envelope shall not exceed 0.25 cfm/ft^2 (2.0 L/s × m^2) under a pressure differential of 0.3 inches water column (75 Pa), with the calculated surface area being the sum of the above- and below-grade building envelope. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the building owner.

Exception: For buildings having over 250,000 square feet (23 225.8 m^2) of conditioned floor area, air leakage testing need not be conducted on the whole building where testing is conducted on representative above-grade sections of the building. Tested areas shall total not less than 25 percent of the conditioned floor area and shall be tested in accordance with this section.

SECTION C407

TOTAL BUILDING PERFORMANCE

Section C407 Total Building Performance.

Section C407 - Delete Section C407 in its entirety and add a new Section C407 to read as follows:

SECTION C407

TOTAL BUILDING PERFORMANCE

C407.1 Scope. This section establishes criteria for compliance using total building performance. Buildings following the total building performance path must comply with ASHRAE 90.1-2016 (as amended), as set forth in Appendix CA of this code, demonstrating compliance under Section 11 or Appendix G of such

standard.

SECTION C408

MAINTENANCE INFORMATION

AND SYSTEM COMMISSIONING

Section C408.2 Mechanical systems commissioning and completion requirements.

Section C408.2 - Delete Section C408.2 in its entirely and add a new Section C408.2 to read as follows:

C408.2 Mechanical, renewable energy, and service water heating systems commissioning and completion requirements. Prior to passing the final mechanical and plumbing inspections, the approved agency shall provide evidence of mechanical systems commissioning and completion in accordance with the provisions of this section.

Construction document notes shall clearly indicate provisions for commissioning and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner or owner's authorized agent and made available to the building official upon request in accordance with Sections C408.2.4 and C408.2.5.

Mechanical systems, renewable energy, and service water heating systems shall include but are not limited to, at a minimum, the following heating, ventilating, air conditioning, service water heating, indoor air quality and refrigeration systems (mechanical and/or passive) and associated controls:

1. Heating, cooling, air handling and distribution, ventilation, and exhaust systems, and their related air quality monitoring systems.

2. Air, water, and other energy recovery systems.

3. Manual or automatic controls, whether local or remote, on energy using systems including but not limited to temperature controls, setback sequences, and occupancy based control, including energy management functions of the building management system.

4. Plumbing, including insulation of piping and associated valves, domestic and process water pumping, and mixing systems.

5. Mechanical heating systems and service water heating systems.

6. Refrigeration systems.

7. Renewable energy and energy storage systems.

8. Other systems, equipment and components that are used for heating, cooling or ventilation and

that affect energy use.

Exceptions: The following systems are exempt:

1. Mechanical systems and service water heating systems in new buildings, additions, or alterations where the total mechanical equipment capacity being installed or the total mechanical equipment connected load serving the alteration space is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water-heating and space-heating capacity.

2. Renewable energy systems being installed with a generating capacity of less than 25 kW.

Section C408.2.1 Commissioning plan.

Section C408.2.1 - Revise the opening clause of Section C408.2.1 to read as follows:

A commissioning plan shall be developed by an approved agency and shall include the following items:

Section C408.2.1 - Revise Item 2 of Section C408.2.1 to read as follows:

2. A listing of the specific equipment, appliances or systems to be tested, their full sequences of operation, and a description of the tests to be performed, including prerequisite activities and reference to specific checklists or worksheets which are necessary or required by the department.

Section C408.2.2 Systems adjusting and balancing.

Section C408.2.2 - Revise the first sentence of Section C408.2.2 to read as follows:

HVAC systems shall be balanced in accordance with ASHRAE 111, "Testing, Adjusting, and Balancing of Building HVAC Systems" or other accepted engineering standards as approved by the department.

Section C408.2.2.1 Air systems balancing.

Section C408.2.2.1 - Revise the first sentence of Section C408.2.2.1 to read as follows:

Each supply air outlet and zone terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the New York City Mechanical Code.

Section C408.2.2.1 - Delete the Exception to Section C408.2.2.1 in its entirety.

Section C408.2.3.1 Equipment.

Section C408.2.3.1 - Revise the Exception to Section C408.2.3.1 to read as follows:

Exception: Unitary or packaged HVAC equipment listed in Tables C403.3.2(1) through C403.3.2(3) that do not require supply air economizers shall only be required to demonstrate functioning under full-load and part-load conditions.

Section C408.2.4 Preliminary commissioning report.

Section C408.2.4 - Revise the first sentence of Section C408.2.4 to read as follows:

A preliminary report of commissioning test procedures and results shall be completed and certified by the approved agency and provided to the building owner or owner's authorized agent.

Figure C408.2.4 Commissioning Compliance Checklist.

Figure C408.2.4 - Revise Figure C408.2.4 to read as follows:

Job Number(s): _____Job Name: _____

Job Address: _____

Commissioning Authority (Approved Agency):_____

Commissioning Plan (Section C408.2.1)

☐Commissioning Plan was used during construction and includes all items required by Section C408.2.1

☐Systems Adjusting and Balancing has been completed.

☐HVAC Equipment Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ HVAC Controls Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Economizer Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Lighting Controls Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Service Water Heating System Functional Testing has been executed. If applicable, deferred and follow-up testing is scheduled to be provided on: _____

☐ Manual, record documents and training have been completed or scheduled.

☐ Preliminary Commissioning Report submitted to owner and includes all items required by Section C408.2.4.

I hereby certify that the commissioning authority (approved agency) has provided me with evidence of mechanical, service water heating and lighting systems commissioning in accordance with the 2020 NYCECC.

Signature of Building Owner or Owner's Representative _____Date_____

FIGURE C408.2.4
COMMISSIONING COMPLIANCE CHECKLIST

Section C408.2.4.1 Acceptance of report.

Section C408.2.4.1 - Revise Section C408.2.4.1 to read as follows:

C408.2.4.1 Acceptance of report. Buildings, or portions thereof, shall not be considered as acceptable for a final inspection pursuant to Chapter 1 of this code until the building official has received a letter of transmittal from the building owner acknowledging that the building owner or owner's authorized agent has received the Preliminary Commissioning Report.

Section C408.2.5 Documentation requirements.

Section C408.2.5 - Revise Sections C408.2.5, C408.2.5.1 and C408.2.5.2, and add new Section C408.2.5.3 and C408.2.5.4, to read as follows:

C408.2.5 Documentation requirements. The construction documents shall specify that the documents described in Sections C408.2.5.1 through C408.2.5.3 be provided to the building owner or owner's authorized agent within 90 days of the date of receipt of the certificate of occupancy or letter of completion. The construction documents shall also specify that the Final Commissioning Report be provided to the building owner or owner's authorized agent in accordance with the requirements of Section C408.2.5.4.

C408.2.5.1 Drawings. Construction documents shall include the location and performance data on each piece of equipment.

C408.2.5.2 Manuals. An operating and maintenance manual shall be provided and include all of the following:

1. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance.

2. Manufacturer's operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.

3. Name and address of at least one service agency.

4. HVAC and service hot water controls system maintenance and calibration information, including wiring diagrams, schematics and control sequence descriptions. Desired or field-determined set points shall be permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.

5. Submittal data indicating all selected options for each piece of lighting equipment and lighting controls.

6. Operation and maintenance manuals for each piece of lighting equipment. Required routine maintenance actions, cleaning and recommended relamping shall be clearly identified.

7. A schedule for inspecting and recalibrating all lighting controls.

8. A narrative of how each system is intended to operate, including recommended set points.

C408.2.5.3 System balancing report. A written report describing the activities and measurements completed in accordance with Section C408.2.2.

C408.2.5.4 Final commissioning report. Within 30 months for new buildings 500,000 gross square feet (46 452 m²) or greater, excluding R-2 occupancies, or within 18 months for R-2 occupancies and all other buildings, of the issuance of the certificate of occupancy or letter of completion, an approved agency shall prepare a report of test procedures and results, including test procedures and results performed after occupancy, identified as the "Final Commissioning Report," provide such report to the building owner, and submit a certification to the department with applicable fees in accordance with department rules. The owner of a building 500,000 gross square feet (46 452 m²) or greater may apply for an extension of time to the building official based on good cause, in accordance with department rules. Such report shall include the following:

1. Results of functional performance tests.

2. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.

3. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability.

Exception: Deferred tests that cannot be performed at the time of report preparation due to climatic conditions.

Section C408.3.1 Functional testing.

Section C408.3.1 - Revise the first sentence of Section C408.3.1 to read as follows:

Prior to passing final inspection, the approved agency shall provide evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the construction documents and manufacturer's instructions.

Section C408.4 Air barrier commissioning.

Section C408 - Add new Sections C408.4, C408.4.1, C408.4.2 and C408.4.3 to read as follows:

C408.4 Air barrier commissioning . For new buildings or additions that are 10,000 gross square feet (929 m^2) and greater, prior to passing final inspection, the approved agency shall provide evidence of air barrier commissioning and substantial completion in accordance with the provisions of Sections C408.4.1 through

C408.4.3.

C408.4.1 Documentation . Construction documents shall include documentation of the continuous air barrier components included in the design and a field inspection checklist that includes all requirements necessary for maintaining air barrier continuity and durability in accordance with Section C402.5.1.

C408.4.2 Field inspections . Reports from field inspections during project construction showing compliance with continuous air barrier requirements including proper material handling and storage, use of approved materials and material substitutes, proper material and surface preparation, and air barrier continuity shall be provided to the owner and, upon request, to the building official. Air barrier continuity shall be determined by testing or inspecting each type of unique air barrier joint or seam in the building envelope for continuity and defects.

C408.4.3 Report . A Final Commissioning Report indicating compliance with the continuous air barrier requirements shall be provided to the building owner and, upon request, to the building official.

CHAPTER C5

EXISTING BUILDINGS

SECTION C501

GENERAL

Section C501.4 Compliance.

Section C501.4 - Delete Section C501.4 in its entirety and add a new Section C501.4 to read as follows:

C501.4 Compliance. Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall comply with (i) all applicable provisions of this code, (ii) the provisions for alterations, repairs, additions and changes of occupancy or relocation, respectively, in the New York City Construction Codes, (iii) the New York City Fire Code, and (iv) the New York City Electrical Code.

SECTION C502

ADDITIONS

Section C502.1 General.

Section C502.1- Revise the second paragraph of Section C502.1 to read as follows:

Additions complying with ASHRAE 90.1-2016 (as amended), as set forth in Appendix CA of this code, need not comply with Sections C402, C403, C404 and C405.

Section C502.2.3.1 Commissioning.

Section C502.2.3.1 - Add a new Section C502.2.3.1 to read as follows:

C502.2.3.1 Commissioning. New heating, cooling and duct system components that are part of the addition and the controls that serve them shall comply with Section C408.

Exception: Mechanical systems where either the total equipment being installed or the total mechanical equipment connected load serving the addition is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water heating and space heating capacity.

Section C502.2.4.1 Commissioning.

Section C502.2.4.1 - Add a new Section C502.2.4.1 to read as follows:

C502.2.4.1 Commissioning. New service water heating system components that are part of the addition and the controls that serve them shall comply with Section C408.

Exception: Service water heating systems where either the total equipment being installed or the total equipment connected load serving the addition is less than 600,000 Btu/h (175.8 kW) combined service water heating and space heating capacity.

SECTION C503

ALTERATIONS

Section C503.1 General.

Section C503.1- Revise first sentence of the second paragraph of Section C503.1 to read as follows:

Alterations complying with ASHRAE 90.1-2016 (as amended), as set forth in Appendix CA of this code, need not comply with Sections C402, C403, C404 and C405.

Section C503.1- Revise Exception 8 of Section C503.1 to read as follows:

8. Alterations that replace less than ten percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.

Section C503.3.2 Vertical fenestration.

Section C503.3.2- Revise Section C503.3.2, to read as follows:

C503.3.2 Vertical fenestration. The addition of vertical fenestration that results in a total building fenestration area less than or equal to that specified in Section C402.4.1 shall comply with Section C402.1.5, C402.4.3 or C407. The addition of vertical fenestration that results in a total building fenestration area greater than Section C402.4.1 shall comply with Section C402.4.1.1 for the space adjacent to the new fenestration only. Alterations that result in a total building vertical fenestration area exceeding that specified in Section C402.4.1.1 shall comply with Section C402.1.5 or C407.

C503.3.4 Application to replacement fenestration products.

Section C503.3.4 - Add a new Section C503.3.4 to read as follows:

C503.3.4 Application to replacement fenestration products. Where some portion or all of an existing fenestration unit is replaced with a new fenestration product, including sash and glazing, the replacement fenestration unit shall meet the applicable requirements for U-factor and SHGC in Table C402.4.

Exception: An area-weighted average of the U-factor of replacement fenestration products being installed in the building for each fenestration product category listed in Table C402.4 shall be permitted to satisfy the U-factor requirements for each fenestration product category listed in Table C402.4. Individual fenestration products from different product categories listed in Table C402.4 shall not be combined in calculating the area-weighted average U-factor.

Section C503.4 .2 Commissioning.

Section C503.4.2 - Add a new Section C503.4.2 to read as follows:

C503.4.2 Commissioning. New heating, cooling and duct systems components that are part of the alteration and the controls that serve them shall comply with Section C408.

Exception: Mechanical systems where the total equipment being installed or the total mechanical equipment connected load serving the alteration is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water heating and space heating capacity.

Section C503.5.1 Commissioning.

Section C503.5.1 - Add a new Section C503.5.1 to read as follows:

C503.5.1 Commissioning. New service water heating system components that are part of the alteration and the controls that serve them shall comply with Section C408.

Exception: Service water heating systems where the total equipment being installed or the total equipment connected load serving the alteration is less than 600,000 Btu/h (175.8 kW) combined service water heating and space heating capacity.

CHAPTER C6

REFERENCED STANDARDS

Chapter C6 - Delete Chapter C6 in its entirety and add a new chapter C6 to read as follows:

CHAPTER C6

REFERENCED STANDARDS

This chapter lists the standards that are referenced in various sections of the commercial provisions of this code. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section ECC 105. Refer to the rules of the department for any subsequent additions, modifications or deletions that may have been made to the referenced standards set forth herein in accordance with Section 28-103.19 of the Administrative Code.

AAMA

American Architectural Manufacturers Association 1827 Walden Office Square Suite 550 Schaumburg, IL 60173-4268

AAMA/WDMA/CSA 101/I.S.2/A C440-17: North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights
Table C402.5.2

ACCA

Air Conditioning Contractors of America 2800 Shirlington Road #300 Arlington, VA 22206

ANSI /ASHRAE/ACCA Standard 183-2007 (RA2014): Peak Cooling and Heating Load Calculations in Buildings, Except Low-rise Residential Buildings
C403.1.1

AHAM

Association of Home Appliance Manufacturers 1111 19th Street NW, Suite 402 Washington, DC 20036

AHAM HRF-1-2016: Energy, Performance and Capacity of Household Refrigerators, Refrigerator-Freezers and Freezers

Table C403.10.1(1)

AHRI

Air-Conditioning, Heating, & Refrigeration Institute 2111 Wilson Blvd, Suite 500 Arlington, VA 22201

ISO/AHRI/ASHRAE 13256-1 (1998 RA2014): Water -to-Air and Brine-to-Air Heat Pumps-Testing and Rating for Performance
Table C403.3.2(2)

ISO/AHRI/ASHRAE 13256-2 (1998 RA2014): Water -to-Water and Brine-to-Water Heat Pumps -Testing and Rating for Performance
Table C403.3.2(2)

210/240-2016: Performance Rating of Unitary Air-conditioning and Air-source Heat Pump Equipment
Table C403.3.2(1), Table C403.3.2(2)

310/380-2014 (CSA-C744-04): Standard for Packaged Terminal Air Conditioners and Heat Pumps
Table C403.3.2(3)

340/360-2015: Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment
Table C403.3.2(1), Table C403.3.2(2)

365(I-P)-2009: Commercial and Industrial Unitary Air-conditioning Condensing Units
Table C403.3.2(1)

390 (I-P)-2015: Performance Rating of Single Package Vertical Air-conditioners and Heat Pumps
Table C403.3.2(3)

400 (I-P)-2015: Performance Rating of Liquid to Liquid Heat Exchangers
Table C403.3.2(9)

440-2008: Performance Rating of Room Fan Coils-with Addendum 1
C403.11.3

460-2005: Performance Rating of Remote Mechanical-draft Air-cooled Refrigerant Condensers
Table C403.3.2(7)

550/590 (I-P)-2015: Performance Rating of Water-chilling and Heat Pump Water-heating Packages Using the Vapor Compression Cycle
C403.3.2.1, Table C403.3.2(6)

560-00: Absorption Water Chilling and Water Heating Packages
Table C403.3.2(6)

840-15: Performance Rating of Unit Ventilators
C403.11.3

910-2014: Performance Rating of Indoor Pool Dehumidifiers
Table C403.3.2(12)

920-2015: Performance Rating of DX-Dedicated Outdoor Air System Units
C202, Table C403.3.2(13), Table C403.3.2(14)

1160 (I-P) -2014: Performance Rating of Heat Pump Pool Heaters
Table C404.2

1200 (I-P)-2013: Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets
C403.10, Table C403.10.1(1), Table C403.10.1(2)

ANSI/AHRI 1230-10 with Addendum 1: Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment
Table C403.3.2(10), Table C403.3.2(11)

AMCA

Air Movement and Control Association International 30 West University Drive Arlington Heights, IL 60004-1806

205-12: Energy Efficiency Classification for Fans
C403.8.3

500D-12: Laboratory Methods for Testing Dampers for Rating
C403.7.7

ANSI

American National Standards Institute 25 West 43rd Street, 4th Floor New York, NY 10036

ANSI /ASHRAE/ACCA Standard 183-2007 (RA2014): Peak Cooling and Heating Load Calculations in Buildings, Except Low-rise Residential Buildings
C403.1.1

ANSI/AHRI 1230-10 with Addendum 1: Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment
Table C403.3.2(10), Table C403.3.2(11)

ANSI/ASHRAE/IESNA 90.1-2016: Energy Standard for Buildings Except Low-rise Residential Buildings
CH1 (Intro Statement), 101.1.1, C202

ANSI/ASHRAE / IES 90.1-2016 (AS AMENDED) with revisions as set forth in Appendix CA of this code

101.1.1, 101.5.1.1, 105.1, C202, C401.2, Table C402.1.3, Table C402.1.4, C402.6.1, Table C403.3.2(1), Table C403.3.2(2), C407.1, C501.7, C502.1, C503.1, C504.1

ANSI/CRRC-S100-2016: Standard Test Methods for Determining Radiative Properties of Materials

Table C402.3, C402.3.1

ANSI/DASMA 105-2016: Test Method for Thermal Transmittance and Air Infiltration of Garage Doors and Rolling Doors

C303.1.3, Table C402.5.2

Z21.10.3/CSA 4.3-11: Gas Water Heaters, Volume III -Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating Tank and Instantaneous

Table C404.2

Z21.47/CSA 2.3-12: Gas-fired Central Furnaces

Table C403.3.2(4)

Z83.8/CSA 2.6-09: Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters and Gas-fired Duct Furnaces

Table C403.3.2(4)

APSP

The Association of Pool & Spa Professionals 2111 Eisenhower Avenue, Suite 580 Alexandria, VA 22314

14-2014: American National Standard for Portable Electric Spa Energy Efficiency

C404.10

ASHRAE

ASHRAE 1791 Tullie Cir

ANSI/ASHRAE/IESNA 90.1-2016: Standard for Buildings Except Low-rise Residential Buildings

CH1 (Intro Statement), 101.1.1, C202

ANSI / ASHRAE /IES 90.1-2016 (AS AMENDED) with revisions as set forth in Appendix CA of this code

101.1.1, 101.5.1.1, 105.1, C202, C401.2, Table C402.1.3, Table C402.1.4, C402.6.1, Table C403.3.2(1), Table C403.3.2(2), C407.1, C501.7, C502.1, C503.1, C504.1

ASHRAE 111-2008: Testing, Adjusting, and Balancing of Building HVAC Systems

C408.2.2

ASHRAE 127-2007: Method of Testing for Rating Computer

Table C403.3.2(8)

ASHRAE Standard 170-2013

C403.7.4

ANSI/ASHRAE/ACCA Standard 183-2007 (RA2014): Peak Cooling and Heating Load Calculations in Buildings, Except Low-rise Residential Buildings

C403.1.1

ASHRAE-2016: ASHRAE HVAC Systems and Equipment Handbook

C403.1.1

ISO/AHRI/ASHRAE 13256-1 (1998 RA2014): Water-to-Air and Brine-to-Air Heat Pumps-Testing and Rating for Performance

Table C403.3.2(2)

ISO/AHRI/ASHRAE 13256-2 (1998 RA2014): Water-to-Water and Brine-to-Water Heat Pumps-Testing and Rating for Performance

Table C403.3.2(2)

ASHRAE 62.1-2013

C403.7.4

146-2011: Testing and Rating Pool Heaters

Table C404.2

ASME

American Society of Mechanical Engineers Two Park Avenue New York, NY 10016-5990

ASME A17.1-2016/CSA B44-16: Safety Code for Elevators and Escalators

C405.8.2

ASTM

ASTM International 100 Barr Harbor Drive, P.O. Box C700 West Conshohocken, PA 19428-2959

C1363-11: Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus

C303.1.4.1, Table C402.1.4, Table C402.1.4.2, C402.2.7

C1371-15: Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers

Table C402.3

C1549-09(2014): Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer

Table C402.3

D1003-13: Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics

C402.4.2.2

E283-04(2012): Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
C402.5.1.2.2, Table C402.5.2, C402.5.8

E408-13: Test Methods for Total Normal Emittance of Surfaces Using Inspection-meter Techniques
Table C402.3

E779-10: Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
C402.5, C402.5.1.3, C406.8

E903-12: Standard Test Method Solar Absorptance, Reflectance and Transmittance of Materials Using Integrating Spheres (Withdrawn 2005)
Table C402.3

E1677-11: Specification for Air Barrier (AB) Material or Systems for Low-rise Framed Building Walls
C402.5.1.2.2

E1827-11: Standard Test Methods for Determining Airtightness of Building Using an Orifice Blower Door
C406.8

E1918-06(2015): Standard Test Method for Measuring Solar Reflectance of Horizontal or Low-sloped Surfaces in the Field
Table C402.3

E1980-11: Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-sloped Opaque Surfaces
Table C402.3

E2178-13: Standard Test Method for Air Permanence of Building Materials
C402.5.1.2.1

E2357-11: Standard Test Method for Determining Air Leakage of Air Barriers Assemblies
C402.5.1.2.2

F1361-17: Standard Test Method for Performance of Open Deep Fat Fryers
Table C405.10(1)

F1484-18: Standard Test Methods for Performance of Steam Cookers
Table C405.10(3)

F1495 -05: Standard Specification for Combination Oven Electric or Gas Fired
Table C405.10(5)

F1496-13: Standard Test Method for Performance of Convection Ovens
Table C405.10(5)

F1696-18: Standard Test Method for Energy Performance of Stationary-Rack, Door-Type Commercial Dishwashing Machines
Table C405.10(4)

F1920-15: Standard Test Method for Performance of Rack Convevor Commercial Dishwashing Machines

Table C405.10(4)

F2093-18: Standard Test Method for Performance of Rack

Table C405.10(5)

F2140-11: Standard Test Method for Performance of Hot Food Holding Cabinets

Table C405.10(2)

F2144-17: Standard Test Method for Performance of Large Open Vat Fryers

Table C405.10(1)

F2861-17: Standard Test Method for Enhanced Performance of Combination Oven in Various Modes

Table C405.10(5)

BC HYDRO

BC Hydro Power Smart 333 Dunsmuir Street Vancouver, BC V6B 5R

Building Envelope Thermal Bridging Guide Version 1.2 - 18

Table C402.6

CRRC

Cool Roof Rating Council 449 15th Street, Suite 400 Oakland, CA 94612

ANSI/CRRC-S100-2016: Standard Test Methods for Determining Radiative Properties of Materials

Table C402.3, C402.3.1

CSA

CSA Group 8501 East Pleasant Valley Road Cleveland, OH 44131-5516

AAMA/WDMA/CSA 101/I.S.2/A440-17: North American Fenestration Standard/Specification for Windows, Doors and Unit Skylights

Table C402.5.2

ASME A17.1-2016/CSA B44-16: Safety Code for Elevators and Escalators

C405.8.2

CSA B55.1-2015: Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units

C404.8

CSA B55.2-2015: Drain Water Heat Recovery Units

C404.8

Z21.10.3/CSA 4.3-11: Gas Water Heaters, Volume III -Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating Tank and Instantaneous
Table C404.2

Z21.47/CSA 2.3-12: Gas-fired Central Furnaces
Table C403.3.2(4)

Z83.8/CSA 2.6-09: Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters and Gas-fired Duct Furnaces
Table C403.3.2(4)

CTI

Cooling Technology Institute
P. O. Box 681807 Houston, TX 77268

ATC 105 (00): Acceptance Test Code for Water Cooling Tower
Table C403.3.2(7)

ATC 105S-11: Acceptance Test Code for Closed Circuit Cooling Towers
Table C403.3.2(7)

ATC 106-11: Acceptance Test for Mechanical Draft Evaporative Vapor Condensers
Table C403.3.2(7)

STD 201-11: Standard for Certification of Water Cooling Towers Thermal Performances
Table C403.3.2(7)

CTI STD 201 RS(15): Performance Rating of Evaporative Heat Rejection Equipment
Table C403.3.2(7)

DASMA

Door & Access Systems Manufacturers Association, International 1300 Sumner Avenue Cleveland, OH 44115-2851

105-2016: Test Method for Thermal Transmittance and Air Infiltration of Garage Doors and Rolling Doors
C303.1.3, Table C402.5.2

DOE

U.S. Department of Energy c/o Superintendent of Documents 1000 Independence Avenue SW Washington, DC 20585

10 CFR, Part 430-2015: Energy Conservation Program for Consumer Products: Test Procedures and Certification and Enforcement Requirement for Plumbing Products; and Certification and Enforcement Requirements for Residential Appliances; Final Rule

Table C403.3.2(1), Table C403.3.2(2), Table C403.3.2(4), Table C403.3.2 (5), Table C404.2

10 CFR, Part 430, Subpart B, Appendix F-(2015): Uniform Test Method for Measuring the Energy Consumption of Room Air Conditioners

Table C403.3.2(3)

10 CFR, Part 430, Subpart B, Appendix N-(2015): Uniform Test Method for Measuring the Energy Consumption of Furnaces and Boilers

C202

10 CFR, Part 431-2015: Energy Efficiency Program for Certain Commercial and Industrial Equipment: Test Procedures and Efficiency Standards; Final Rules

Table C403.3.2(5), C405.6, Table C405.6, C405.7

10 CFR 431 Subpart B App B: Uniform Test Method for Measuring Nominal Full Load Efficiency of Electric Motors

C403.8.4, Table C405.7(1), Table C405.7(2), Table C405.7(3), C405.7(4)

ICC

International Code Council, Inc. 500 New Jersey Avenue NW 6th Floor Washington, DC 20001

IECC-18: International Energy Conservation Code

CH1 (Intro Statement), 101.1.1

IEC

International Electrotechnical Commission IEC Regional Centre for North America 446 Main Street 16th Floor Worcester, MA 01608 U.S.A.

IEC EN 60034-30-1-2014: Efficiency classes of line operated AC motors

C405.8.1.1.1

IEEE

Institute of Electrical and Electronic Engineers 3 Park Avenue, 17th Floor New York, NY 10016

IEEE 515.1-2012: IEE Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Trace Heating for Commercial Applications

C404.6.2

IES

Illuminating Engineering Society 120 Wall Street, 17th Floor New York, NY 10005-4001

ANSI/ASHRAE/IESNA 90.1-2016: Energy Standard for Buildings, Except Low-rise Residential Buildings

CH1 (Intro Statement), 101.1.1, C202

ANSI/ASHRAE/IES 90.1-2016 (AS AMENDED) with revisions as set forth in Appendix CA of this code

101.1.1, 101.5.1.1, 105.1, C202, C401.2, Table C402.1.3, Table C402.1.4, C402.6.1, Table C403.3.2(1), Table C403.3.2(2), C407.1, C501.7, C502.1, C503.1, C504.1

ISO

International Organization for Standardization Chemin de Blandonnet 8, CP 401, 1214 Vernier Geneva, Switzerland

ISO/AHRI/ASHRAE 13256-1(1998 RA2014): Water-to-Air and Brine-to-Air Heat Pumps -Testing and Rating for Performance

Table C403.3.2(2)

ISO/AHRI/ASHRAE 13256-2(1998 RA2014): Water-to-Water and Brine-to-Water Heat Pumps -Testing and Rating for Performance

Table C403.3.2(2)

NEMA

National Electrical Manufacturers Association 1300 North 17th Street, Suite 900 Rosslyn, VA 22209

MG1-2014: Motors and Generators

C202

NFRC

National Fenestration Rating Council, Inc. 6305 Ivy Lane, Suite 140 Greenbelt, MD 20770

100-2017: Procedure for Determining Fenestration Products U-factors

C303.1.3, Table C402.1.4.2, C402.2.1.1, Table C402.4

200-2017: Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence

C303.1.3, Table C402.4, C402.4.1.1

400-2017: Procedure for Determining Fenestration Product Air Leakage

Table C402.5.2

NYC

New York City Department of Buildings 280 Broadway New York, NY 10007

1968 Building Code

101.2.1

NYCAC-14: New York City Administrative Code

CH1 (Intro Statement), 101.1, 101.2.1, 101.5.2.2, 101.5.2.3, 102.1, 103.1, 103.2.1, 103.3, 103.4, 104.1, 104.1.1, 104.3, 105.1, C202, C405.5.2

NYCBC-14: New York City Building Code

101.2.1, 101.2.2, 103.2.1, C202, C303.1.1, C402.5.3, C402.5.4, C405.2, C405.2.1.4

NYCCC-14: New York City Construction Codes

101.2.1, 102.1, 103.1, 104.2.3, C201.3, C201.4, C303.2, C402.2.8, C501.4

NYCEC-11: New York City Electrical Code

101.2.1, C201.3, C201.4, C501.4

NYCFC-14: New York City Fire Code

101.2.1, C201.3, C201.4, C501.4

NYCMC-14: New York City Mechanical Code

101.2.1, C402.5.3, C403.2.2, C403.6.1, C403.6.6, C403.7.1, C403.7.2, C403.7.4, C403.7.7, C403.8.5.1, C403.11.1, C403.11.2, C403.11.2.1, C403.11.2.2, C406.5, C408.2.2.1

NYS

New York Department of State One Commerce Plaza, 99 Washington Ave Albany, NY 12231-0001

BCNYS-20: Building Code of New York State
C202

ECCCNYS-20: Energy Conservation Construction Code of New York State
CH1 (Intro Statement), 101.1.1, 101.2.3, 101.3

SMACNA

Sheet Metal and Air Conditioning Contractors' National Association, Inc. 4021 Lafayette Center Drive Chantilly, VA 20151-1219

SMACNA-2012: HVAC Air Duct Leakage Test Manual Second Edition
C403.11.2.3

UL

UL LLC 333 Pfingsten Road Northbrook, IL 60062-2096

127-11: Standard for Factory-Built Fireplaces
C402.2.8

710-12: Exhaust Hoods for Commercial Cooking Equipment-with Revisions through November 2013
C403.7.5

727-06: Oil-fired Central Furnaces-with Revisions through October 2013
Table C403.3.2(4)

731-95: Oil-fired Unit Heaters-with Revisions through October 2013
Table C403.3.2(4)

1784-01: Air Leakage Tests of Door Assemblies-with Revisions through February 2015
C402.5.4

US-FTC

United States-Federal Trade Commission 600 Pennsylvania Avenue NW Washington, DC 20580

CFR Title 16 (2015): R-value Rule
C303.1.4

WDMA

Window and Door Manufacturers Association
2025 M Street NW, Suite 800 Washington, DC 20036-3309

AAMA/WDMA/CSA 101/I.S.2/A440-17: North American Fenestration Standard/Specification for Windows, Doors and Unit Skylights
Table C402.5.2

APPENDIX CA

SOLAR-READY ZONE - COMMERCIAL

Appendix CA Solar-Ready Zone - Commercial.

Appendix CA - Delete Appendix CA in its entirety.

CHAPTER R2

DEFINITIONS

SECTION R201

GENERAL

Section R201.1 Scope.

Section R201.1 - Revise Section R201.1 to read as follows:

R201.1 Scope. Unless stated otherwise, the following words and terms in chapters R2, R3, R4, R5 and R6 of this code shall have the meanings indicated in this chapter.

Section R201.3 Terms defined in other codes.

Section R201.3 - Revise Section R201.3 to read as follows:

R201.3 Terms defined in other codes. Terms that are not defined in this code but are defined in the New York City Construction Codes, New York City Fire Code, or the New York City Electrical Code shall have the meanings ascribed to them in those codes.

Section R201.4 Terms not defined.

Section R201.4 - Revise Section R201.4 to read as follows:

R201.4 Terms not defined. Terms not defined in this chapter or in the New York City Construction Codes, New York City Fire Code, or the New York City Electrical Code shall have ordinarily accepted meanings such as the context implies.

SECTION R202

GENERAL DEFINITIONS

Section R202 - Revise the definition of "Air-impermeable insulation" after the definition of "Air barrier," to read as follows:

AIR-IMPERMEABLE INSULATION. An insulation having an air permeance equal to or less than 0.02 L/s-m^2 at 75 Pa pressure differential tested according to ASTM E2178 or E283.

Section R202 - Revise the definitions of "Approval or approved," and "Approved agency" after the definition of "Alteration," to read as follows:

APPROVAL OR APPROVED. See Section 28-101.5 of the Administrative Code.

APPROVED AGENCY. See Section 28-101.5 of the Administrative Code.

Section R202 - Revise the definition of "ASHRAE 90.1-2016 (as amended)" after the definition of "ASHRAE 90.1-2016," to read as follows:

ASHRAE 90.1-2016 (AS AMENDED). ASHRAE 90.1-2016, as amended by 19 NYCRR Part 1240 with revisions as set forth in Appendix CA of this code.

Section R202 - Add a new definition of "Basement" after the definition of "Automatic," to read as follows:

BASEMENT. A story that is not a story above grade plane. See the definition of "Story above grade plane."

Section R202 - Revise the definition of "Building," after the definition of "Basement wall," to read as follows:

BUILDING. Any structure used or intended for supporting or sheltering any use or occupancy or for affording shelter to persons, animals or property, including any (i) mechanical systems, service water heating systems, and electric power and lighting systems located in such structure, and (ii) any mechanical systems, service water heating systems, and electric power and lighting systems located on the building site and supporting the building. The term "building" shall include, but not be limited to, factory manufactured homes, as defined in subdivision 8 of Section 372 of the Executive Law, and mobile homes, as defined in subdivision 13 of Section 372 of the Executive Law.

Section R202 - Delete the definition of "Building site."

Section R202- Revise the definition of "Building official," after the definition of "Building code of New York State" to read as follows:

BUILDING OFFICIAL. The Commissioner of Buildings of the City of New York or his or her duly authorized representative. See Section 28-101.5 of the Administrative Code.

Section R202 - Add the definition of "Building site," after the definition of "Building official," to read as follows.

BUILDING SITE. A contiguous area of land that is under the ownership or control of one entity.

Section R202 - Revise the definition of "Conditioned space," after the definition of "Conditioned Floor Area," to read as follows:

CONDITIONED SPACE. An area, room or space that is enclosed within the building thermal envelope and that is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ducts, piping or other sources of heating or cooling.

Section R202 - Revise the definition of "Energy code," after the definition of "Energy analysis," to read as follows:

ENERGY CODE . The New York City Energy Conservation Code.

Section R202 - Delete the definition of "Fire Code of New York State" after the definition of "Fenestration product, site-built."

Section R202 - Add a new definition of "Grade Plane" after the definition of "Fenestration product, site-built," to read as follows:

GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

Section R202 - Delete the definition of "High-efficacy lamps" after the definition of "Heated slabs."

Section R202 - Revise the definition of "Labeled" after the definition of "Insulating sheathing," to read as follows:

LABELED. See Section 28-101.5 of the Administrative Code.

Section R202 - Add a new definition of "Lead energy professional" after the definition of "Labeled," to read as follows:

LEAD ENERGY PROFESSIONAL. The registered design professional who signs and seals the energy analysis for an entire project. Such individual may be the same registered design professional who signs and seals the design drawings for the same project.

Section R202 - Revise the definition of "Listed" after the definition of "Lead energy professional," to read as follows:

LISTED. See Section 28-101.5 of the Administrative Code.

Section R202 - Delete the definition of "Mechanical Code of New York State" after the definition of "Manual."

Section R202 - Delete the definition of "Plumbing Code of New York State" after the definition of "Opaque door."

Section R202 - Add new definitions of "Professional certification" and "Project" after the definition of "Opaque door," to read as follows:

PROFESSIONAL CERTIFICATION. See Section 28-101.5 of the Administrative Code.

PROJECT. A design and construction undertaking comprised of work related to one or more buildings and the site improvements. A project is represented by one or more plan/work applications, including construction documents compiled in accordance with Section 107 of the New York City Building Code, that relate either to the construction of a new building or buildings or to the demolition or alteration of an existing building or buildings. Applications for a project may have different registered design professionals and different job numbers, and may result in the issuance of one or more permits.

Section R202 - Delete the definition of "Residential Code of New York State" after the definition of "Residential building."

Section R202 - Add the new definitions of "Story" and "Story above grade plane" after the definition of "Standard reference design," to read as follows:

STORY. The portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above. See the definitions of "Basement" and "Grade plane." A story is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

STORY ABOVE GRADE PLANE. Any story having its finished floor surface entirely above grade plane, or in which the finished surface of the floor next above is:

1. More than 6 feet (1829 mm) above grade plane; or

2. More than 12 feet (3658 mm) above the finished ground level at any point.

Section R202 - Add a new definition of "Thermal bridge" after the definition of "Sunroom," to read as follows:

THERMAL BRIDGE : Thermal bridges are elements that interrupt areas of uniform thermal resistance in the building envelope.

Clear field thermal bridge: an area-based thermal transmittance associated with elements of a building envelope assembly which repeat at regular intervals. Examples of clear field thermal bridges include metal or wood studs, brick ties, and cladding attachments such as z-girts.

Linear thermal bridge: a length-based thermal transmittance associated with horizontal, vertical, or diagonal elements within the building envelope and with length measured along the exterior surface of the building envelope. Examples of linear thermal bridges include balconies or floor assemblies which penetrate walls in the building envelope, fenestration perimeter interfaces, parapets, and shelf angles. 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 (W/mK).

Point thermal bridge: an element-based thermal transmittance associated with a discrete element that penetrates the building envelope. Examples of point thermal bridges include a beam penetrating a wall, a column penetrating a roof or floor, and an anchor or connection used to attach an element to the building and not otherwise addressed as a clear field thermal bridge or linear thermal bridge. 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 (W/K).

Section R202 - Delete the definition of "Uniform code" after the definition of "U-factor (thermal transmittance)."

CHAPTER R3

GENERAL REQUIREMENTS

SECTION R301

Section R301 - Delete Section R301 in its entirety and add a new Section R301 to read as follows:

SECTION R301

CLIMATE ZONES

R301.1 General. For projects in the City of New York, Climate Zone 4A shall be used in determining the

applicable requirements from Chapter R4.

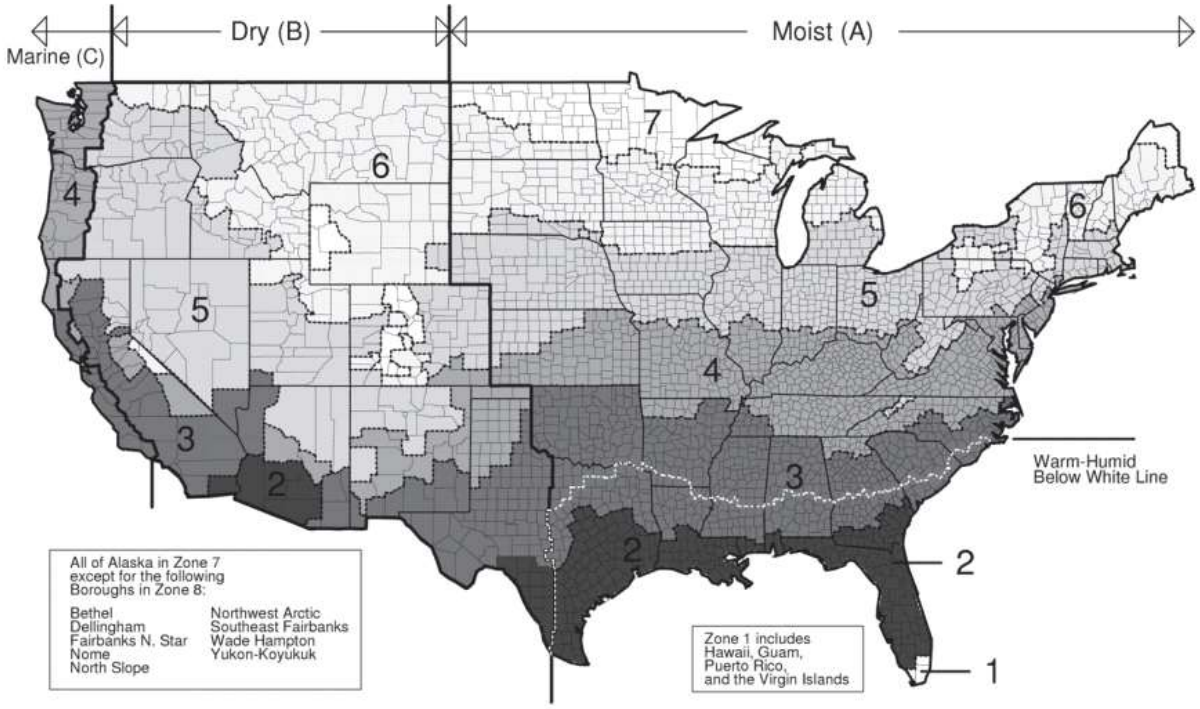


FIGURE R301.1
CLIMATE ZONES

SECTION R303

MATERIALS, SYSTEMS AND EQUIPMENT

Section R303.1.1 Building thermal envelope insulation.

Section R303.1.1 - Revise the Exception to Section R303.1.1 to read as follows:

Exception: For roof insulation installed above the deck, the R-value shall be labeled as required by the material standards specified in the New York City Building Code.

Section R303.2 Installation.

Section R303.2 - Revise Section R303.2 to read as follows:

R303.2 Installation. Materials, systems and equipment shall be installed in accordance with (i) the manufacturer's installation instructions and (ii) the applicable provisions of the New York City Construction Codes.

CHAPTER R4

RESIDENTIAL ENERGY EFFICIENCY

SECTION R401

GENERAL

Section R401.2 Compliance.

Section R401.2 - Delete Section R401.2 in its entirety and add a new Section R401.2 to read as follows:

R401.2 Compliance . Projects shall comply with one of the following:

1. The provisions of Sections R401 through R404.

2. For Group R-2 and Group R-3 buildings, the provisions of Section R405 and the provisions of Sections R401 through R404 labeled "Mandatory." The building energy cost shall be equal to or less than 80 percent of the standard reference design building.

3. The provisions of Section R406.

Section R401.2.1 Reserved.

Section R401.2.1- Delete Section R401.2.1 in its entirety.

Section R402.1.1 Vapor retarder.

Section R402.1.1 - Revise Section R402.1.1 to read as follows:

R402.1.1 Vapor retarder. Wall assemblies in the building thermal envelope shall comply with the vapor retarder requirements of the New York City Building Code, as applicable.

Section R402.1.2 Insulation and fenestration criteria.

Section R402.1.2 - Revise Section R402.1.2 to read as follows:

R402.1.2 Insulation and fenestration criteria. The building thermal envelope shall meet the requirements of Table R402.1.2, based on the climate zone specified in Chapter R3.

Table R402.1.2 Insulation and Fenestration Requirements by Component [a]

Revise Table R402.1.2 to read as follows:

TABLE R402.1.2

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT [a]

CLIMATE ZONE	FENESTRATION U-FACTOR [b]	SKYLIGHT [b] U-FACTOR	GLAZED FENESTRATION SHGC [b, e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE [i]	FLOOR R-VALUE	BASEMENT [c] WALL R-VALUE	SLAB [d] R-VALUE & DEPTH	CRAWL SPACE [c] WALL R-VALUE
4	0.27	0.50	0.40	49	20+5 or 13+10 [h]	15/20	30 [g]	15 /19	10, 4 ft	15/19
5	0.30	0.55	NR	49	20 or 13+5 [h]	13/17	30 [g]	15/19	10, 2 ft	15/19
6	0.30	0.55	NR	49	20+5 [h] or 13+10 [h]	15/20	30 [g]	15/19	10, 4 ft	15/19

NR = Not Required.

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. U-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed R-value of the insulation shall be not less than the R-value specified in the table. For steel-framed assemblies, see Section R402.2.6.

b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

c. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation on the interior of the basement wall.
"15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. Alternatively, compliance with "15/19" shall be R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.

d. R-10 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation R-value for slabs as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.

e. Not used.

f. Not used.

g. Alternatively, in alterations of existing buildings, insulation sufficient to fill the framing cavity and providing not less than an R-value of R-19.

h. The first value is cavity insulation, the second value is continuous insulation. Therefore, as an example, "13+10" means R-13 cavity insulation plus R-10 continuous insulation.

i. Mass walls shall be in accordance with Section R402.2.5. The second R-value applies where more than half of the insulation is on the interior of the mass wall.

Table R402.1.4 Equivalent U-Factors [a]

Revise Table R402.1.4 to read as follows:

TABLE R402.1.4

EQUIVALENT U-FACTORS [a]

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR [b]	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
4	0.27	0.50	0.026	0.045	0.056	0.033	0.050	0.042
5	0.30	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.30	0.55	0.026	0.045	0.060	0.033	0.050	0.055

a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source. For steel-framed assemblies, see Section R402.2.6.
b. Mass walls shall be in accordance with Section R402.2.5. Where more than half the insulation is on the interior, the mass wall U-factor shall not exceed 0.056.

Section R402.2.2 Ceilings without attic spaces.

Section R402.2.2 - Revise the first sentence in Section R402.2.2 to read as follows:

Where Section R402.1.2 requires insulation R-values greater than R-38 in the ceiling and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation R-value for such roof/ceiling assemblies shall be R-38.

Section R402.2.4 Access hatches and doors.

Section R402.2.4 - Revise the Exception to Section R402.2.4 to read as follows:

Exception: Vertical doors providing access from conditioned spaces to unconditioned spaces that comply with the fenestration requirements of Table R402.1.2 based on the applicable climate zone specified in Chapter R3.

Section R402.2.11 Crawl Space Walls.

Section R402.2.11 - Revise the third sentence of Section R402.2.11 to read as follows:

Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the New York City Building Code.

Section R402.4 Air Leakage (Mandatory).

Section R402.4 - Revise Section R402.4 to read as follows:

R402.4 Air leakage (Mandatory). The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.6.

Table R402.4.1.1 Air Barrier Insulation Installation [a]

Table R402.4.1.1- Revise Table R402.4.1.1 to read as follows:

TABLE R402.4.1.1
AIR BARRIER AND INSULATION INSTALLATION [a]

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA

General requirements	A continuous air barrier shall be installed in the building envelope.	Air-permeable insulation shall not be used as a sealing material. Insulation installed in a cavity must uniformly fill each cavity side-to-side and top-to-bottom, without substantial gaps or voids around obstructions, and shall be split or fitted tightly around wiring and other penetrations in the cavity. Not more than 2 percent of the total insulated area shall be compressed below the thickness required to attain the labeled R-value or contain gaps or voids in the insulation.
	The exterior thermal envelope shall contain a continuous air barrier.	
	Breaks or joints in the air barrier shall be sealed.	
Ceiling/attic	The air barrier in any dropped ceiling or soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.
	Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be sealed.	
Walls	The junction of the foundation and sill plate shall be sealed.	Cavities within corners and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance, R-value, of not less than R-3 per inch.
	The junction of the top plate and the top of exterior walls shall be sealed.	Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
	Knee walls shall be sealed.	
Windows, skylights and doors	The space between framing and skylights, and the jambs of windows and doors, shall be sealed.	-
Rim joists	Rim joists shall include the air barrier.	Rim joists shall be insulated by completely filling the cavity with a material having a thermal resistance, R-value, of not less than R-3 per inch.
Floors, including cantilevered floors and floors above garages	The air barrier shall be installed at any exposed edge of insulation.	Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking. Alternatively, floor framing cavity insulation shall be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing; and shall extend from the bottom to the top of all perimeter floor framing members.
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.	Crawl space insulation, where provided instead of floor insulation, shall be permanently attached to the walls.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.	-

Narrow cavities	-	Batts to be installed in narrow cavities shall be cut to fit or narrow cavities shall be filled with insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.	-
Recessed lighting	Recessed light fixtures penetrating the building thermal envelope shall be sealed to the air barrier.	Recessed light fixtures penetrating the building thermal envelope shall be air tight and IC rated.
Plumbing and wiring	-	In exterior walls, batt insulation shall be cut neatly to fit around wiring and plumbing or insulation, that on installation readily conforms to available space, and shall extend behind piping and wiring.
Shower/tub on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate the wall from the shower or tub.	Exterior walls adjacent to showers and tubs shall be insulated.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical and communication boxes. Alternatively, air-sealed boxes shall be installed.	-
HVAC register boots	HVAC supply and return register boots that penetrate building thermal envelope shall be sealed to the subfloor, wall covering or ceiling penetrated by the boot.	-
Concealed sprinklers	Where required to be sealed, concealed fire sprinklers shall only be sealed in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.	-

a. Inspection of log walls shall be in accordance with the provisions of ICC 400.

Section R402.4.1.2 Testing.

Section R402.4.1.2 - Revise the first Item 4 following the first paragraph of Section R402.4.1.2 to read as follows:

4. Exterior or interior terminations for continuous ventilation systems and heat recovery ventilators shall be closed and sealed.

Section R402.4.1.3 Optional testing procedure for buildings with two or more dwelling units within the building thermal envelope.

Section R402.4.1.3 - Revise the first Item 4 following the third paragraph of Section R402.4.1.3 to read as follows:

4. Exterior or interior terminations for continuous ventilation systems and heat recovery ventilators shall be

closed and sealed.

Section R402.4.1.3.1 Buildings with more than seven dwelling units.

Section R402.4.1.3.1 - Revise the first sentence of Section R402.4.1.3.1 to read as follows:

When the optional testing procedure authorized by Section R402.4.1.3 is used for a building with more than seven dwelling units, testing each testing unit shall not be required, and testing of sample testing units selected in accordance with the provisions set forth below in this section shall be permitted, when approved by the building official.

Section R402.4.2 Fireplaces.

Section R402.4.2 - Revise Section R402.4.2 to read as follows:

R402.4.2 Fireplaces. New wood-burning fireplaces shall have tight-fitting flue dampers or doors, and outdoor combustion air as required by the fireplace construction provisions of the New York City Construction Codes, as applicable. Where using tight-fitting doors on factory-built fireplaces listed and labeled in accordance with UL 127, the doors shall be tested and listed for the fireplace.

Section R402.4.4 Rooms containing fuel-burning appliances.

Section R402.4.4 - Revise Exception 2 of Section R402.4.4 to read as follows:

2. Fireplaces and stoves complying with Section R402.4.2 and the New York City Mechanical Code.

Section R402.4.6 Tenant separation walls (Mandatory).

Section R402.4.6 - Revise Section R402.4.6 to read as follows:

R402.4.6 Tenant separation walls (Mandatory). Fire separations between dwelling units in two-family dwellings and multiple single-family dwellings (townhouses) shall be insulated to no less than R-10 and the walls shall be air sealed in accordance with Section R402.4 of this chapter.

Section R402.5 Maximum fenestration U-factor and SHGC (Mandatory).

Section R402.5 - Delete Section R402.5 in its entirety and add a new Section R402.5 to read as follows:

R402.5 Maximum fenestration U-factor and SHGC (Mandatory). The area-weighted average maximum fenestration U-factor permitted using tradeoffs from Section R402.1.5 or R405 shall be 0.40 for vertical fenestration, and 0.75 for skylights.

Section R402.6 Thermal bridges (Mandatory).

Section R402.6 - Add new Sections R402.6, R402.6.1, R402.6.2 and R402.6.3, and new Table R402.6, to read as follows:

R402.6 Thermal bridges (Mandatory). Applications for construction document approval shall include

documentation of thermal bridges.

R402.6.1 Clear field thermal bridges. Where otherwise not included in pre-calculated assembly U-factors, C-factors, or F-factors outlined in Appendix A of ASHRAE 90.1-2016 (as amended), as set forth in Appendix CA of this code, clear field thermal bridges in a wall, roof, or floor assembly shall be noted as such in the drawings.

R402.6.2 Point thermal bridges. Point thermal bridges greater than or equal in area to 8 in^2 (5161 mm^2) and not associated with HVAC or electrical systems shall be noted as thermal bridges in the drawings.

R402.6.3 Linear thermal bridges. Construction documents shall include the following documentation in tabular format for linear thermal bridges listed in Table R402.6:

1. Linear thermal bridge type.
2. Aggregate length of each type of linear thermal bridge.
3. Relevant detail in the construction documents showing a cross-section through the thermal bridge.
4. Ψ-value for each thermal bridge from Table R402.6.

Exception: Where linear thermal bridges have been tested or modeled using methods approved by the department, alternate values may be used as long as supporting documentation is provided.

TABLE R402.6
AVERAGE THERMAL TRANSMITTANCE FOR UNMITIGATED LINEAR THERMAL BRIDGES

TYPE OF THERMAL BRIDGE	Ψ-value[a] [Btu/hr • ft • °F]	Ψ-value[a] W/mK
Steel Frame, Steel Stud, Poured-in-place Concrete, Concrete Block, Curtain-wall		
Balcony	0.50	0.871
Floor[b]	0.44	0.755
Slab to Ground	n/a	n/a
Fenestration Perimeter Transition[c]	0.32	0.550
Parapet	0.42	0.735
Eaves	n/a	n/a
Shelf Angle	0.41	0.713
Wood Frame Construction		
Balcony	n/a	n/a
Floor[b]	0.336	0.582
Slab to Ground	n/a	n/a
Fenestration Perimeter Transition[c]	0.15	0.26

Parapet	0.032	0.056
Eaves	n/a	n/a
Shelf Angle	0.186	0.322

a. Psi-values are derived from the ASHRAE Research Project 1365 and BC Hydro Building Envelope Thermal Bridging Guide Version 1.2-September 2018, and are based on poor performing details.

b. This value is for an intermediate floor. Ground to Slab thermal bridging is applicable for all buildings.

c. Fenestration Perimeter Transition is the thermal bridge between any fenestration frame and the typical wall, roof or floor assembly it abuts or is mounted within. For each unique window or door installation type, provide a minimum of one typical-installation detail showing either the head, jamb or sill detail of the window or door frame and the abutting wall, roof or floor construction, including all structural and insulation layers, blocking, flashing, and cladding.

Section R403.3 Ducts.

Section R403.3 - Revise Section R403.3 to read as follows:

R403.3 Ducts. Ducts and air handlers shall be installed in accordance with Sections R403.3.1 through R403.3.8. The duct system in new buildings and additions shall be located in a conditioned space in accordance with Section R403.3.7.

Section R403.3.1 Insulation (Prescriptive).

Section R403.3.1 - Revise the first sentence of Section R403.3.1 to read as follows:

In alterations, supply and return ducts in attics shall be insulated to an R-value of not less than R-8 for ducts 3 inches (76 mm) in diameter and larger and not less than R-6 for ducts smaller than 3 inches (76 mm) in diameter.

Section R403.3.2 Sealing (Mandatory).

Section R403.3.2 - Revise the first paragraph of Section R403.3.2 to read as follows:

Ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with the New York City Mechanical Code.

Section R403.3.3 Duct testing (Mandatory).

Section R403.3.3 - Revise Exception 1 of Section R403.3.3 to read as follows:

1. A duct air-leakage test shall not be required where the ducts and air handlers are located entirely within a conditioned space in accordance with Section R403.3.7.

Section R403.3.8 Duct system sizing (Mandatory).

Section R403.3.8 - Add a new Section R403.3.8 to read as follows:

R403.3.8 Duct system sizing (Mandatory). Ducts shall be sized in accordance with ACCA Manual D based on calculations made in accordance with Section R403.7 and Section R403.8.

Section R403.4 Mechanical system piping insulation (Mandatory).

Section R403.4 - Revise Section R403.4 to read as follows:

R403.4 Mechanical system piping insulation (Mandatory). Piping serving as part of a heating or cooling system and capable of carrying fluids greater than 105°F (41°C) or less than 60°F (15°C) shall be thermally insulated in accordance with Table R403.4. The thickness and conductivity of the insulation must result in an R-value of no less than R-3.

Section R403.4 - Add a new Table R403.4 to read as follows:

TABLE R403.4

MINIMUM PIPE INSULATION THICKNESS (in inches) [a, c]

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (inches)				
	Conductivity Btu in./(h • ft^2 • °F)	Mean Rating Temperature, °F [b]	< 1	1 to < 1 ½	1 ½ to < 4	4 to < 8	< 8
> 350	0.32 - 0.34	250	4.5	5.0	5.0	5.0	5.0
251 - 350	0.29 - 0.32	200	3.0	4.0	4.5	4.5	4.5
201 - 250	0.27 - 0.30	150	2.5	2.5	2.5	3.0	3.0
141 - 200	0.25 - 0.29	125	1.5	1.5	2.0	2.0	2.0
105 - 140	0.21 - 0.28	100	1.0	1.0	1.5	1.5	1.5
40 - 60	0.21 - 0.27	75	0.5	0.5	1.0	1.0	1.0
< 40	0.20 - 0.26	50	0.5	1.0	1.0	1.0	1.5

For SI: 1 inch = 25.4 mm, °C = [(°F) - 32]/1.8.

a. For piping smaller than 1 ½ inches and located in partitions within conditioned spaces, reduction of these thicknesses by 1 inch shall be permitted (before thickness adjustment required in footnote b) but not to a thickness less than 1 inch.

b. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows:

$$T = r\left[(1 + t/r)^{K/k} - 1\right]$$

where:

T = minimum insulation thickness,

r = actual outside radius of pipe,

t = insulation thickness listed in the table for applicable fluid temperature and pipe size,

K = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature (Btu • in/h • ft^2 • °F), and

k = the upper value of the conductivity range listed in the table for the applicable fluid temperature.

c. For direct-buried heating and hot water system piping, reduction of these thicknesses by 1 1/2 inches (38 mm) shall be permitted (before thickness adjustment required in footnote b) but not to thicknesses less than 1 inch.

Section R403.5 Service hot water systems.

Section R403.5 - Revise Section R403.5 to read as follows:

R403.5 Service hot water systems. Energy conservation measures for service hot water systems shall be in accordance with Sections R403.5.1 through R403.5.5.

Section R403.5.4 Drain water heat recovery units.

Section R403.5.4 - Revise Section R403.5.4 to read as follows:

R403.5.4 Drain water heat recovery units. Drain water heat recovery units shall have a minimum efficiency of 40 percent if installed for equal flow or a minimum efficiency of 52 percent if installed for unequal flow. Vertical drain water heat recovery units shall comply with CSA B55.2 and shall be tested and labeled in accordance with CSA B55.1. Sloped drain water heat recovery units may be used when approved by the department. Potable water-side pressure loss of drain water heat recovery units shall be less than 3 psi (20.7 kPa) for individual units connected to one or two showers. Potable water-side pressure loss of drain water heat recovery units shall be less than 2 psi (13.8 kPa) for individual units connected to three or more showers.

Section R403.5.5 Supply of heated water.

Section R403.5.5 - Add a new Section R403.5.5 to read as follows:

R403.5.5 Supply of heated water. In new buildings, heated water supply piping shall be in accordance with one of the following:

1. Maximum allowable pipe length method. The maximum allowable pipe length from the nearest source of heated water to the termination of the fixture supply pipe shall be in accordance with the maximum pipe length in Table R403.5.5. Where the length contains more than one size of pipe, the largest size shall be used for determining the maximum allowable length of the piping in Table R403.5.5.

2. Maximum allowable pipe volume method. The water volume in the piping shall be calculated in accordance with Table R403.5.5. The maximum volume of hot or tempered water in the piping to public lavatory faucets shall be 2 ounces. For fixtures other than public lavatory faucets, the maximum volume shall be 64 ounces for hot or tempered water from a water heater or boiler; and 24 ounces for hot or tempered water from a circulation loop pipe or an electrically heat-traced pipe.

3. Drain water heat recovery units. New buildings shall include a drain water heat recovery unit that captures heat from at least one shower per dwelling unit, and such drain water heat recovery unit must have a minimum efficiency of 40 percent if installed for equal flow or a minimum efficiency of 52 percent if installed for unequal flow.

4. Recirculation Systems. Projects shall include a recirculation system with no more than 0.5 gallon (1.9 liter) storage. The storage limit shall be measured from the point where the branch feeding the fixture branches off the recirculation loop to the fixture. Recirculation systems must be based on an occupant-controlled switch or an occupancy sensor, installed in each bathroom which is located beyond a 0.5 gallon stored-volume range from the water heater.

Table R403.5.5 - Add a new Table R403.5.5 to read as follows:

TABLE R403.5.5
PIPE VOLUME AND MAXIMUM PIPING LENGTHS [b]

NOMINAL PIPE OR TUBE SIZE (inch)	VOLUME (Liquid Ounces Per Foot Length)	MAXIMUM PIPE OR TUBE LENGTH		
		System without circulation loop heat-traced line (feet)	System with a circulation loop heat-traced line	Lavatory faucets public (metering and nonmetering (feet)
1/4[a]	0.33	50	16	6
5/16[a]	0.5	50	16	4
3/8[a]	0.75	50	16	3
1/2	1.5	43	16	2
5/8	2	32	12	1
3/4	3	21	8	0.5
7/8	4	16	6	0.5
1	5	13	5	0.5
1 1/4	8	8	3	0.5
1 1/2	11	6	2	0.5
2 or larger	18	4	1	0.5

a. The flow rate for 1/4-inch size pipe or tube is limited to 0.5 gallons per minute; for 5/16-inch size, it is limited to 1 gpm; for 3/8-inch size, it is limited to 1.5 gpm.

b. The volume shall be the sum of the internal volumes of pipe, fittings, valves, meters and manifolds between the source of hot water and the termination of the fixture supply pipe. The volume contained within fixture shutoff valves, flexible water supply connectors to a fixture fitting, or within a fixture fitting shall not be included in the water volume determination. Where hot or tempered water is supplied by a circulation loop pipe or a heat-traced pipe, the volume shall include the portion of the fitting on the branch pipe that supplies water to the fixture.

Section R403.6 Mechanical ventilation (Mandatory).

Section R403.6 - Revise the first sentence of Section R403.6 to read as follows:

The building shall be provided with ventilation that complies with the requirements of the New York City

Mechanical Code, as applicable, or with other approved means of ventilation.

Section R403.6.2 Balanced ventilation and HRV/ERV systems (Mandatory).

Section R403.6.2 - Add new Sections R403.6.2, R403.6.2.1, R403.6.2.2, R403.6.2.3, and new Tables R403.6.2 (1) and R403.6.2(2), to read as follows:

R403.6.2 Balanced ventilation and HRV/ERV systems (Mandatory). In new buildings, every dwelling unit shall be served by a heat recovery ventilator (HRV) or energy recovery ventilator (ERV) installed per manufacturer's instructions. The HRV/ERV must be listed and sized adequately for the specific application, which will include the building's conditioned area, and number of occupants.

Exception: A balanced ventilation system designed and installed according to the requirements of Sections R403.6.2.1 through R403.6.2.3, using the return side of the building's heating and/or cooling system air handler to supply outdoor air, shall be permitted to comply with this section. When the outdoor air supply is ducted to the heating and/or cooling system air handler, the mixed air temperature shall not be less than that permitted by the heating equipment manufacturer's installation instructions. Heating and/or cooling system air handlers used to distribute outdoor air shall be field-verified to not exceed an efficacy of 45 W/CFM if using furnaces for heating and 58 W/CFM if using other forms of heating. In the balanced system design, an equivalent exhaust air flow rate shall be provided simultaneously by one or more exhaust fans, located remotely from the source of supply air. The balanced system's exhaust and supply fans shall be interlocked for operation, sized to provide equivalent air flow at a rate greater than or equal to that determined by Table R403.6.2(1) and shall have their fan capacities adjusted for intermittent run time per Table R403.6.2(2). Continuous operation of the balanced ventilation system shall not be permitted.

R403.6.2.1 Whole-house mechanical ventilation (balanced ventilation option) system design. The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such as system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation.

R403.6.2.2 System controls. The whole-house ventilation system shall be provided with controls that enable manual override.

R403.6.2.3 Mechanical ventilation rate. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4 hour segment and the ventilation rate prescribed in Table R403.6.2(1) is multiplied by the factor determined in accordance with Table R403.6.2(2).

TABLE R403.6.2(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIREMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
	Airflow in CFM				

< 1,500	30	45	60	75	90
1,501 - 3,000	45	60	75	90	105
3,001 - 4,500	60	75	90	105	120
4,501 - 6,000	75	90	105	120	135
6,001 - 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

TABLE R403.6.2(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS [a,b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

Section R403.6.3 Verification.

Section R403.6.3 - Add a new Section R403.6.3 to read as follows:

R403.6.3 Verification. Installed performance of the mechanical ventilation system shall be tested and verified by an approved agency and measured using a flow hood, flow grid, or other airflow measuring device in accordance with Air Conditioning Contractors of America (ACCA) HVAC Quality Installation Verification Protocols - ANSI/ACCA 9QIvp-2016.

Section R403.8 Systems serving multiple dwelling units (Mandatory).

Section R403.8 - Revise Section R403.8 to read as follows:

R403.8 Systems serving multiple dwelling units (Mandatory). Systems serving multiple dwelling units shall comply with Sections C403 and C404 in lieu of Section R403.

Section R403.9 Snow melt and ice system controls (Mandatory).

Section R403.9 - Revise Section R403.9 to read as follows:

R403.9 Snow melt and ice system controls (Mandatory). Snow- and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of and configured to shut off the system when the pavement temperature is greater than 50°F (10°C) and precipitation is not falling, and an automatic or manual control that will allow shutoff when the outdoor temperature is greater than 40° F (4.8°C).

Section R403.12 Residential pools and permanent residential spas.

Section R403.12 - Revise Section R403.12 to read as follows:

R403.12 Residential pools and permanent residential spas. Residential swimming pools and permanent residential spas that are accessory to one- and two-family dwellings and townhouses three stories or less in height above grade plane and that are available only to the household and its guests shall be in accordance with APSP-15a.

SECTION R404

ELECTRICAL POWER AND LIGHTING SYSTEMS

Section R404.1 Lighting equipment (Mandatory).

Section R404.1 - Revise Section R404.1 to read as follows:

R404.1 Lighting equipment (Mandatory). Not less than 90 percent of the permanently installed lighting fixtures shall use lamps with an efficacy of at least 65 lumens per watt, or have a total luminaire efficacy of at least 45 lumens per watt.

Section R404.2 Electrical energy consumption (Mandatory).

Section R404.2 - Add a new Section R404.2 to read as follows:

R404.2 Electrical energy consumption (Mandatory). In all buildings having individual dwelling units, provisions shall be made to determine the electrical energy consumed by each unit by separately metering individual dwelling units.

Section R404.3 Electrical vehicle service equipment capable (Mandatory).

Section R404.3 - Add a new Section R404.3 to read as follows:

R404.3 Electrical vehicle service equipment capable (Mandatory). One or two-family dwellings and townhouses with parking area provided on the building site shall provide a 208/240V 40-amp outlet for each dwelling unit or panel capacity and conduit for the future installation of such an outlet. Outlet or conduit termination shall be adjacent to the parking area. For residential occupancies where there is a common parking area, provide either:

1. 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

2. 208/240V 40-amp outlets for 5 percent of the total parking spaces, but not less than one outlet.

SECTION R405

SIMULATED PERFORMANCE ALTERNATIVE

(PERFORMANCE)

Section R405.3 Performance-based compliance.

Section R405.3 - Revise the Exception to Section R405.3 to read as follows:

Exception: The energy use based on source energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost. The source energy multiplier for electricity shall be 2.55. The source energy multiplier for fuels other than electricity shall be 1.05.

TABLE R405.5.2(1) Specifications for the Standard Reference and Proposed Designs

Table R405.5.2(1) - Revise the row titled "Heating Systems[d, e]" of Table R405.5.2(1) to read as follows:

Heating systems[d, e]	For other than electric heating without a heat pump: as proposed. Where the proposed design utilizes electric heating without a heat pump, the standard reference design shall be an air source heat pump meeting the requirements of Section C403 of this Code. Capacity: sized in accordance with Section R403.7.	As proposed

Table R405.5.2(1) - Revise footnote h to Table R405.5.2(1) to read as follows:

h. For residences with conditioned basements, R-2 residences, and for townhouses, the following formula shall be used to determine glazing area:

$$AF = As \times FA \times F$$

where:

AF	Total glazing area.
As	Standard reference design total glazing area.
FA	(Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).
F	(above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater, and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below-grade boundary wall is any thermal boundary wall in soil contact.

Common wall area is the area of walls shared with an adjoining dwelling unit. L and CFA are in the same units.

SECTION R406

ENERGY RATING INDEX

COMPLIANCE ALTERNATIVE

Section R406.2 Mandatory requirements.

Section R406.2 Mandatory requirements - Delete Section R406.2 in its entirety and add a new Section R406.2 to read as follows:

R406.2 Mandatory requirements. Compliance with this section requires that the provisions identified in Sections R401 through R404 indicated as "Mandatory" and Section R403.5.3 be met. The building thermal envelope shall be greater than or equal to levels of efficiency and Solar Heat Gain Coefficients in Table 402.1.1 or 402.1.3 of the 2011 New York City Energy Conservation Code.

Section R406.3 Energy Rating Index.

Section R406.3 Energy Rating Index - Revise the first sentence of Section R406.3 to read as follows:

The Energy Rating Index (ERI) shall be determined in accordance with RESNET/ICC 301, and the ERI Reference Design Ventilation rate shall be in accordance with Equation 4-1.

Table R406.4 Maximum Energy Rating Index

Table R406.4 - Revise the Table R406.4 to read as follows:

TABLE R406.4

MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX [a]
4	50
5	61
6	61

a. Where on-site renewable energy is included for compliance using the ERI analysis of Section R406.4, the building shall meet the mandatory requirements of Section R406.2, and the building thermal envelope shall be greater than or equal to the levels of efficiency and SHGC in Table R402.1.2 or Table R402.1.4 of the 2016 New York City Energy Conservation Code.

CHAPTER R5

EXISTING BUILDINGS

SECTION R501

GENERAL

Section R501.4 Compliance.

Section R501.4 - Delete Section R501.4 in its entirety and add a new Section R501.4 to read as follows:

R501.4 Compliance. Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall comply with (i) all applicable provisions of this code, (ii) the provisions for alterations, repairs, additions and changes of occupancy or relocation, respectively, in the New York City Construction Codes, (iii) the New York City Fire Code, and (iv) the New York City Electrical Code.

SECTION R502

ADDITIONS

Section R502.1.1.1 Building envelope.

Section R502.1.1.1 - Revise the first sentence of Section R502.1.1.1 to read as follows:

New building envelope assemblies that are part of the addition shall comply with Sections R402.1, R402.2, R402.3.1 through R402.3.5, and R402.4.

SECTION R503

ALTERATIONS

Section R503.1.1 Building envelope.

Section R503.1.1 - Delete Exception 7 of Section R503.1.1.

Section R503.1.4 Lighting

Section R503.1.4 - Revise the Exception to Section R503.1.4 to read as follows:

Exception: Alterations that replace less than 20 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.

CHAPTER R6

REFERENCED STANDARDS

Chapter R6 - Delete Chapter R6 in its entirety and add a new chapter R6 to read as follows:

CHAPTER R6

REFERENCED STANDARDS

This chapter lists the standards that are referenced in various sections of the commercial provisions of this code. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section ECC 105. Refer to the rules of the department for any subsequent additions, modifications or deletions that may have been made to the referenced standards set forth herein in accordance with Section 28-103.19 of the Administrative Code.

AAMA	American Architectural Manufacturers Association 1827 Walden Office Square Suite 550 Schaumburg, IL 60173-4268
AAMA/WDMA/CSA 101/I.S.2/A C440-17: North American Fenestration Standard/Specifications for Windows, Doors and Unit Skylights R402.4.3	

ACCA	Air Conditioning Contractors of America 2800 Shirlington Road, Suite 300 Arlington, VA 22206
ANSI/ACCA 9QIvp-2016: HVAC Quality Installation Verification Protocols R403.6.3	
Manual D-16: Residential Duct Systems R403.3.8	

Manual J-11: Residential Load Calculation Eighth Edition
R403.7

Manual S-14: Residential Equipment Selection
R403.7

ANSI

American National Standards Institute 25 West 43rd Street, 4th Floor New York, NY 10036

ANSI/ACCA 9QIvp-2016: HVAC Quality Installation Verification Protocols
R403.6.3

ANSI/ASHRAE/IESNA 90.1-2016: Energy Standard for Buildings Except Low-rise Residential Buildings
CH1 (Intro Statement), 101.1.1, R202

ANSI/ASHRAE/IES 90.1-2016 (AS AMENDED) with revisions as set forth in Appendix CA of this code
101.1.1, 101.5.1.1, 105.1, R202, R402.6.1

ANSI/APSP/ICC 14-2014: American National Standard for Portable Electric Spa Energy Efficiency
R403.11

ANSI/APSP/ICC 15a-2011: American National Standard for Residential Swimming Pool and Spa Energy Efficiency-includes Addenda A Approved January 9, 2013
R403.12

ANSI/DASMA 105-2016: Test Method for Thermal Transmittance and Air Infiltration of Garage Doors and Rolling Doors
R303.1.3

ANSI Z 65-1996: Method for Measuring Floor Area in Office Buildings
R402.4.1.2, R402.4.1.3

APSP

The Association of Pool & Spa Professionals 2111 Eisenhower Avenue, Suite 500 Alexandria, VA 22314

ANSI/APSP/ICC 14-2014: American National Standard for Portable Electric Spa Energy Efficiency
R403.11

ANSI/APSP/ICC 15a-2011: American National Standard for Residential Swimming Pool and Spa Energy Efficiency-includes Addenda A Approved January 9, 2013
R403.12

ASHRAE

ASHRAE 1791 Tullie Circle NE Atlanta, GA 30329

ANSI/ASHRAE/IESNA 90.1-2016: Energy Standard for Buildings Except Low-rise Residential Buildings
CH1 (Intro Statement), 101.1.1, R202

ANSI/ASHRAE/IES 90.1-2016 (AS AMENDED) with revisions as set forth in Appendix CA of this code
101.1.1, 101.5.1.1, 105.1, R202, R402.6.1

ASHRAE-2017: ASHRAE Handbook of Fundamentals
R402.1.5

ASHRAE-2001: 2001 ASHRAE Handbook of Fundamentals
Table R405.5.2(1)

ASHRAE 193-2010(RA 2014): Method of Test for Determining the Airtightness of HVAC Equipment
R403.3.2.1

ASHRAE Research Project 1365-2011: Thermal Performance of Building Envelope Details for Mid-and High-Rise Buildings
Table R402.6

ASTM

ASTM International 100 Barr Harbor Drive, P.O. Box C700 West Conshohocken, PA 19428-2959

C1363-11: Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
R303.1.4.1

E283-04(2012): Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
R202, R402.4.5

E779-10: Standard Test Method for Determining Air Leakage Rate by Fan Pressurization
R402.4.1.2, R402.4.1.3

E1827-11: Standard Test Methods for Determining Airtightness of Building Using an Orifice Blower Door
R402.4.1.2

E2178-13: Standard Test Method for Air Permeance of Building Method
R202

BC HYDRO

BC Hydro Power Smart 333 Dunsmuir Street Vancouver, BC V6B 5R3

Building Envelope Thermal Bridging Guide Version 1.2 - 18
Table R402.6

BOMA

Building Owners and Managers Association (BOMA) International 1101 15th Street. NW Suite 800 Washington, DC 20005

ANSI/BOMA Z65.1-1996: Standard Method for Measuring Floor Area in Office Buildings
R402.4.1.2, R402.4.1.3

CSA

CSA Group 8501 East Pleasant Valley Road Cleveland, OH 44131-5516

AAMA/WDMA/CSA 101/I.S.2/A440-17: North American Fenestration Standard/Specification for Windows, Doors and Unit Skylights
R402.4.3

CSA B55.1-2015: Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units
R403.5.4

CSA B55.2-2015: Drain Water Heat Recovery Units
R403.5.4

DASMA

Door & Access Systems Manufacturers Association 1300 Sumner Avenue Cleveland, OH 44115-2851

105-2016: Test Method for Thermal Transmittance and Air Infiltration of Garage Doors and Rolling Doors
R303.1.3

DOE

U.S. Department of Energy c/o Superintendent of Documents U.S. Government Printing Office Washington, DC 20402-9325

(Current Edition): State Energy Price and Expenditure Report
R405.3

HVI

Home Ventilating Institute 1000 North Rand Road, Suite 214 Wauconda, IL 60084

916-09: Airflow Test Procedure
Table R403.6.1

ICC

International Code Council, Inc. 500 New Jersey Avenue NW 6th Floor Washington, DC 20001

ANSI/APSP/ICC 14-2014: American National Standard for Portable Electric Spa Energy Efficiency

R403.11

ANSI/APSP/ICC 15a-2011: American National Standard for Residential Swimming Pool and Spa Energy Efficiency-includes Addenda A Approved January 9, 2013

R403.12

ICC 400-17: Standard on the Design and Construction of Log Structures

R402.1, Table R402.4.1.1

IECC®-18: International Energy Conservation Code®

CH1 (Intro Statement), 101.1.1

IECC®06: 2006 International Energy Conservation Code®

R202

ANSI/RESNET/ICC 301-2014: Standard for the Calculation and Labeling of the Energy Performance of Low-rise Residential Buildings using an Energy Rating Index First Published March 7, 2014-Republished January 2016, including Addenda D, E, G and K

R406.3, R406.6.1, R406.6.5

ANSI/RESNET/ICC 380-2016: Standard for Testing Airtightness for Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems and Airflow of Mechanical Ventilation Systems-Republished January 2016, including Addendum A

R402.4.1.2

IEEE

Institute of Electrical and Electronic Engineers, Inc. 3 Park Avenue, 17th Floor New York, NY 10016-5997

515.1-2012: IEEE Standard for the Testing, Design, Installation and Maintenance of Electrical Resistance Trace Heating for Commercial Applications

R403.5.1.2

IES

Illuminating Engineering Society 120 Wall Street, 17th Floor New York, NY 10005-4001

ANSI/ASHRAE/IESNA 90.1-2016: Energy Standard for Buildings Except Low-rise Residential Buildings

CH1 (Intro Statement), 101.1.1, R202

ANSI / ASHRAE / IES 90.1-2016 (AS AMENDED) with revisions as set forth in Appendix CA of this code
101.1.1, 101.5.1.1, 105.1, R202, R402.6.1

NFRC

National Fenestration Rating Council, Inc. 6305 Ivy Lane, Suite 140 Greenbelt, MD 20770

100-2017: Procedure for Determining Fenestration Products U-factors
R303.1.3

200-2017: Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence
R303.1.3

400-2017: Procedure for Determining Fenestration Product Air Leakage
R402.4.3

NYC

New York City Department of Buildings 280 Broadway New York, NY 10007

1968 Building Code
101.2.1

NYCAC-14: New York City Administrative Code
CH1 (Intro Statement), 101.1, 101.2.1, 101.5.2.2, 101.5.2.3, 102.1, 103.1, 103.2.1, 103.3, 103.4, 104.1, 104.1.1, 104.3, 105.1, R202

NYCBC-14: New York City Building Code
101.2.1, 101.2.2, 103.2.1, R202, R303.1.1, R303.2, R402.1.1, R402.2.11

NYCCC-14: New York City Construction Codes
101.2.1, 102.1, 103.1, 104.2.3, R201.3, R201.4, R402.4.2, R501.4

NYCECC-16: New York City Energy Conservation Code
Table R406.4

NYCECC-11: New York City Energy Conservation Code
R406.2

NYCEC-11: New York City Electrical Code
101.2.1, R201.3, R201.4, R501.4

NYCFC-14: New York City Fire Code
101.2.1, R201.3, R201.4, R501.4

NYCMC-14: New York City Mechanical Code
101.2.1, R402.4.4, R403.3.2, R403.6

NYS

New York Department of State One Commerce Plaza, 99 Washington Ave Albany, NY 12231-0001

BCNYS-20: Building Code of New York State
R202

ECCCNYS-20: Energy Conservation Construction Code of New York State
CH1 (Intro Statement), 101.1.1, 101.2.3, 101.3

RESNET

Residential Energy Services Network, Inc. P.O. Box 4561 Oceanside, CA 92052-4561

ANSI/RESNET/ICC 301-2014: Standard for the Calculation and Labeling of the Energy Performance of Low-rise Residential Buildings using an Energy Rating Index First Published March 7, 2014-Republished January 2016, including Addenda D, E, G and K
R406.3, R406.6.1, R406.6.5

ANSI/RESNET/ICC 380-2016: Standard for Testing Airtightness for Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems-Republished January 2016, including Addendum A
R402.4.1.2

UL

UL LLC 333 Pfingsten Road Northbrook, IL 60062

127-11: Standard for Factory Built Fireplaces-with Revisions through May 2015
R402.4.2

515-11: Electrical Resistance Heat Tracing for Commercial and Industrial Applications Including Revisions through July 2015
R403.5.1.2

US-FTC

United States-Federal Trade Commission 600 Pennsylvania Avenue NW Washington, DC 20580

CFR Title 16 (2015): R-value Rule
R303.1.4

WDMA

Window and Door Manufacturers Association 2025 M Street NW, Suite 800 Washington, DC 20036-3309

AAMA/WDMA/CSA 101/I.S.2/A440-17: North American Fenestration Standard/Specification for Windows, Doors and Unit Skylights

R402.4.3

APPENDIX RA

SOLAR-READY PROVISIONS - DETACHED ONE- AND TWO-FAMILY DWELLINGS AND TOWNHOUSES

Appendix RA Solar-Ready Provisions - Detached One- and Two-Family Dwellings and Townhouses.

Appendix RA - Delete Appendix RA in its entirety.

§ 28-1001.2.3 New York city amendments to the 2016 edition of Energy Standard for Buildings Except Low-Rise Residential Buildings ("ASHRAE 90.1-2016"), as amended by 19 NYCRR section 1240.3. Add a new Appendix CA to be inserted after chapter C6 to read as follows:

APPENDIX CA

MODIFIED ENERGY STANDARD FOR BUILDINGS EXCEPT FOR LOW-RISE RESIDENTIAL BUILDINGS

SECTION CA101

SCOPE

CA101.1 Scope. This Appendix provides the modifications to the nationally recognized standard ASHRAE 90.1-2016, as amended by 19 NYCRR Section 1240.3, governing commercial energy efficiency. Where a referenced publication has been modified for the City of New York by the New York City Construction Codes including the New York City Energy Conservation Code, every reference to such publication shall be deemed to include all such modifications.

SECTION CA102

ENERGY STANDARD FOR COMMERCIAL BUILDINGS

CA102.1 General. Refer to the rules of the department for any subsequent additions, modifications or deletions that may have been made to this standard in accordance with Section 28-103.19 of the

Administrative Code.

Section 3 - Definitions, Abbreviations, and Acronyms

Section 3.2 - Revise the definition “authority having jurisdiction” after the definition of “attic and other roofs,” to read as follow:

authority having jurisdiction: the commissioner or the commissioner’s designee.

Section 3.2 - Add a definition “baseline building source energy” after the definition of “baseline building performance,” to read as follow:

baseline building source energy: the annual source energy use in units of Btu for a building design intended for use as a baseline for rating above-standard design or when using the performance rating method as an alternative path for minimum standard compliance in accordance with Section 4.2.1.1.

Section 3.2 - Revise the footnote 1, supporting the definition of “building envelope trade-off schedules and loads,” to read as follows:

[1]Schedules and internal loads by building area type are located at <http://sspc901.ashraepcs.org/documents.php>

Section 3.2 - Revise the definition “building official” after the definition of “building material,” to read as follows:

building official: The Commissioner of Buildings of the City of New York or his or her duly authorized representative. See Section 28-101.5 of the Administrative Code.

Section 3.2 - Revise the definition of “labeled” to read as follows:

labeled: See Section 28-101.5 of the Administrative Code.

Section 3.2 - Revise the definition of “on-site renewable energy” after the definition of “occupant sensor” to read as follows:

on-site renewable energy: energy derived from solar radiation, wind, waves, tides, landfill gas, biogas, biomass or the internal heat of the earth. The energy system providing on-site renewable energy shall be located on the project site.

Section 3.2 - Add a definition of “proposed building source energy” after the definition of “proposed building performance,” to read as follows:

proposed building source energy: the annual source energy use in units of Btu for a proposed design.

Section 3.2 - Revise the definition of “simulation program” after the definition of “sidelighting effective aperature,” to read as follows:

simulation program: a computer program, including the simulation engine and the corresponding user interface that is capable of simulating the energy performance of building systems.

Section 3.2 - Add a definition of "site energy" after the definition of "simulation program," to read as follows:

site energy: the amount of fuel that is consumed on-site to operate a building.

Section 3.2 - Add a definition of "source energy" after the definition of "solar heat gain coefficient (SHGC)," to read as follows:

source energy: the total amount of primary fuel that is required to operate a building incorporating transmission, delivery, and production losses. Source Energy is calculated by multiplying site energy of each fuel type by the conversion factors in Table 4.2.1.2.

Section 3.2 - Add a definition of "spandrel panel" after the definition of "space-conditioning category," to read as follows:

spandrel panel: an opaque assembly within a fenestration framing system in a wall that is part of the building thermal envelope. Such panels are considered to be a portion of the opaque thermal envelope assembly.

Section 3.2 - Add a definition of "thermal bridge" after the definition of "thermal block," to read as follows:

thermal bridge: thermal bridges are elements that interrupt areas of uniform thermal resistance in the building envelope.

clear field thermal bridge: an area-based thermal transmittance associated with elements of a building envelope assembly which repeat at regular intervals. Examples of clear field thermal bridges include metal or wood stud, brick ties and cladding attachments such as z-girts.

linear thermal bridge: a length-based thermal transmittance associated with horizontal, vertical, or diagonal elements within the building envelope and with length measured along the exterior surface of the building envelope. Examples of linear thermal bridges include balconies or floor assemblies which penetrate walls in the building envelope, fenestration perimeter interfaces, parapets, and shelf angles. 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.

point thermal bridge: an element-based thermal transmittance associated with a discrete element that penetrates the building envelope. Examples of point thermal bridges include a beam penetrating a wall, a column penetrating a roof or floor, and an anchor or connection used to attach an element to the building and not otherwise addressed as a clear field thermal bridge or linear thermal bridge. 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.

Section 4 - Administration and Enforcement

Section 4.2.1.1 New Buildings

Delete Section 4.2.1.1 in its entirety, and replace with a new Section 4.2.1.1 to read as follows:

4.2.1.1 New Buildings

New buildings shall comply with either the provisions of

a. Section 5, "Building Envelope"; Section 6, "Heating, Ventilating, and Air Conditioning"; Section 7, "Service Water Heating"; Section 8, "Power"; Section 9, "Lighting"; Section 10, "Other Equipment"; and Appendix I "Required Additional Efficiency Packages," or

b. Section 11, "Energy Cost Budget Method," or

c. Appendix G, "Performance Rating Method," using one of the following:

1. Performance Cost Index Method

When using Appendix G, the Performance Cost Index (PCI) shall be less than or equal to the Performance Cost Index Target (PCIt) when calculated in accordance with the following:

$$PCI_t = [BBUEC + (BPF_{cost} \times BBREC)]/BBP$$

where

PCI = Performance Cost Index calculated in accordance with Section G1.2.

BBUEC = Baseline Building Unregulated Energy Cost, the portion of the annual energy cost of a baseline building design that is due to unregulated energy use.

BBREC = Baseline Building Regulated Energy Cost, the portion of the annual energy cost of a baseline building design that is due to regulated energy use.

$BPF_{cos\ t}$ = Building Performance Factor from Table 4.2.1.1. For building area types not listed in Table 4.2.1.1 use "All others." Where a building has multiple building area types, the required BPF_{cost} shall be equal to the area-weighted average of the building area types.

BBP = Baseline Building Performance.

Regulated energy cost shall be calculated by multiplying the total energy cost by the ratio of regulated energy use to total energy use for each fuel type. Unregulated energy cost shall be calculated by subtracting regulated energy cost from total energy cost.

2. **Performance Source Energy Index Method**

When using Appendix G, the Performance Source Energy Index (PSEI) shall be less than or equal to the Performance Source Energy Index Target ($PSEI_t$) when calculated in accordance with the following:

$$PSEI_t = [BBUSE + (BPF_{source} \times BBRSE)]/BBSE$$

where

PSEI = Performance Source Energy Index calculated in accordance with Section G1.2.

BBUSE = Baseline building unregulated source energy use in units of Btu, the portion of the annual site energy of a baseline building design that is due to unregulated energy use multiplied by the site to source conversion ratios in Table 4.2.1.2 for each fuel type.

BBRSE = Baseline building regulated source energy use in units of Btu, the portion of the annual site energy of a baseline building design that is due to regulated energy use multiplied by the site to source conversion ratios in Table 4.2.1.2 for each fuel type.

BPF_{source} = Building Performance Factor from Table 4.2.1.3. For building area types not listed in Table 4.2.1.3 use "All others." Where a building has multiple building area types, the required BPF_{source} shall be equal to the area-weighted average of the building area types.

BBSE = Baseline Building source energy.

Table 4.2.1.1 - Building Performance Factor (Cost)

Delete Table 4.2.1.1 in its entirety, and replace with a new Table 4.2.1.1 to read as follows:

Table 4.2.1.1 Building Performance Factor (Cost) (BPF_{cost})

Building Area Type	Climate Zone		
	4A	5A	6A
Multifamily	0.67	0.67	0.64
Healthcare/ hospital	0.54	0.54	0.51
Hotel/motel	0.62	0.56	0.56
Office	0.54	0.54	0.55
Restaurant	0.56	0.55	0.55
Retail	0.45	0.42	0.44
School	0.45	0.46	0.46
Warehouse	0.42	0.42	0.46

All others	0.53	0.52	0.52

Table 4.2.1.2 - Site to Source Energy Conversion Ratios

Add a new Table 4.2.1.2 to read as follows:

Table 4.2.1.2 Site to Source Energy Conversion Ratios

Energy Type	New York Ratio
Electricity (Grid Purchase)	2.55
Electricity (On-site Renewable Energy Installation)	1.00
Natural Gas	1.05
Fuel Oil	1.01
Propane & Liquid Propane	1.01
Steam	1.20
Hot Water	1.20
Chilled Water, Coal, Wood, Other	1.00

Table 4.2.1.3 - Building Performance Factor (Source)

Add a new Table 4.2.1.3 to read as follows:

Table 4.2.1.3 Building Performance Factor (Source) (BPF_{source})

Building Area Type	Climate Zone		
	4A	5A	6A
Multifamily	0.68	0.68	0.65
Healthcare/ hospital	0.56	0.56	0.54
Hotel/motel	0.62	0.56	0.54
Office	0.55	0.55	0.56
Restaurant	0.63	0.64	0.63
Retail	0.45	0.42	0.43
School	0.45	0.45	0.45
Warehouse	0.44	0.46	0.49
All others	0.55	0.54	0.54

Section 4.2.1.3 Alterations of Existing Buildings

Section 4.2.1.3 - Delete Section 4.2.1.3 in its entirety and replace with a new Section 4.2.1.3 to read as follows:

4.2.1.3 Alterations of Existing Buildings

Alterations of existing buildings shall comply with the provisions of Sections 5, 6, 7, 8, 9, and 10, or Section 11 or Normative Appendix G, provided, however, that nothing in this standard shall require compliance with any provision of this standard if such compliance will result in the increase of energy consumption of the building.

Exception to 4.2.1.3

Historic buildings need not comply with these requirements.

Section 5 - Building Envelope

5.1.3 Envelope Alterations

Section 5.1.3 - Delete Exception 8.

Section 5.2.3 - Additional Requirements to Comply with Section 11 and Appendix G

Add a new Section 5.2.3 to read as follows:

5.2.3 Additional Requirements to Comply with Section 11 and Appendix G

For projects following the Energy Cost Budget Method (Section 11), or the Performance Rating Method (Appendix G), which are 25,000 square feet and greater, the building envelope shall comply with either:

a. Section 5.5, “Prescriptive Building Envelope Option,” or

b. An envelope performance factor shall be calculated in accordance with Appendix C of this standard, and buildings shall comply with one of the following:

1. For multifamily, hotel/motel and dormitory building area types, the margin by which the proposed envelope performance factor exceeds the base envelope performance factor shall not be greater than 15%. For compliance with this requirement, the base envelope performance factor shall be calculated using metal framing operable windows. In buildings with window area accounting for 40% or more of the gross wall area, the SHGC of the vertical fenestration on east and west oriented façade may be reduced by the following multiplier to account for the permanent site shading from existing buildings or infrastructure.

$M_{West} = 0.18 + 0.33/WWR$

$M_{East} = 0.35 + 0.26/WWR$

Where:

M_{West} = SHGC multiplier for the West façade

M_{East} = SHGC multiplier for the East façade

WWR = the ratio of the proposed vertical fenestration area to the gross wall area in consistent units.

The multiplier may be applied to the rated SHGC of the vertical fenestration which has at least 50% of the area located directly opposite of the shading surfaces and no higher from the street level than the difference between the shading surface height and the shading surface distance from the façade. Orientation must be determined following Section 5.5.4.5, Fenestration Orientation.

2. For all other building area types, the margin by which the proposed envelope performance factor exceeds the base envelope performance factor shall be not greater than 7%. For compliance with this requirement, the base envelope performance factor shall be calculated using metal framing fixed windows.

3. For mixed-use buildings the margin shall be calculated as the gross wall area-weighted average of 1 and 2 above.

Section 5.4.3.1.3 - Testing, Acceptable Materials, and Assemblies

Delete Section 5.4.3.1.3 in its entirety and replace with a new Section 5.4.3.1.3 to read as follows:

5.4.3.1.3 Testing, Acceptable Materials, and Assemblies

The building shall comply with whole-building pressurization testing in accordance with Section 5.4.3.1.3 (a) or with the continuous air barrier requirements in Section 5.4.3.1.3(b) or 5.4.3.1.3(c).

Exceptions to 5.4.3.1.3 :

1. New buildings and additions 10,000 square feet and greater, but less than 50,000 square feet, and less than or equal to 75 feet in height, must show compliance through testing in accordance with Section 5.4.3.1.3(a) and department rules.

2. New buildings and additions 10,000 square feet and greater, but less than 50,000 square feet, and greater than 75 feet in height, shall test or inspect each type of unique air barrier joint or seam in the building envelope for continuity and defects, as per an Air Barrier Continuity Plan developed by a registered design professional. Alternatively, such buildings and additions may show compliance through testing in accordance with Section 5.4.3.1.3(a) and department rules.

3. New buildings and additions 50,000 square feet and greater shall test or inspect each type of unique air barrier joint or seam in the building envelope for continuity and defects, as per an Air

Barrier Continuity Plan developed by a registered design professional. Alternatively, such buildings and additions may show compliance through testing in accordance with Section 5.4.3.1.3(a) and department rules.

a. Whole-building pressurization testing shall be conducted in accordance with ASTM E779, ASTM E1827, or other approved standards, by an independent third party. The measured air leakage rate of the building envelope shall not exceed 0.40 cfm/ft^2 under a pressure differential of 0.3 in. of water, with this air leakage rate normalized by the sum of the above and below-grade building envelope areas of the conditioned and semiheated space. R-2 buildings may alternatively show compliance through testing in accordance with Section R402.4.1.3 of the New York City Energy Conservation Code.

Exception to 5.4.3.1.3(a)

1. For buildings having over 50,000 ft^2 of gross conditioned floor area, air leakage testing shall be permitted to be conducted on less than the whole building, provided the following portions of the building are tested and their measured air leakage is area-weighted by the surface areas of the building envelope:

   a. The entire floor area of all stories that have any spaces directly under a roof.

   b. The entire floor area of all stories that have a building entrance or loading dock.

   c. Representative above-grade wall sections of the building totaling at least 25% of the wall area enclosing the remaining conditioned space; floor area tested per (a) and (b) shall not be included in the 25%.

b. Materials that have an air permeance not exceeding 0.004 cfm/ft^2 under a pressure differential of 0.3 in. of water (1.57 psf) when tested in accordance with ASTM E2178. The following materials meet these requirements:

1. Plywood-minimum 3/8 in.
2. Oriented strand board-minimum 3/8 in.
3. Extruded polystyrene insulation board-minimum 1/2 in.
4. Foil-faced urethane insulation board-minimum 1/2 in.
5. Exterior gypsum sheathing or interior gypsum board-minimum 1/2 in.
6. Cement board-minimum 1/2 in.
7. Built-up roofing membrane
8. Modified bituminous roof membrane
9. Single-ply roof membrane

10. A Portland cement/sand parge, stucco, or gypsum plaster-minimum 1/2 in. thick

11. Cast-in-place and precast concrete

12. Sheet metal

13. Closed-cell 2 lb/ft^3 nominal density spray polyurethane foam-minimum 1 in.

c. Assemblies of materials and components (sealants, tapes, etc.) that have an average air leakage not to exceed 0.04 cfm/ft^2 under a pressure differential of 0.3 in. of water (1.57 psf) when tested in accordance with ASTM E2357, ASTM E1677, ASTM E1680, or ASTM E283. The following assemblies meet these requirements:

1. Concrete masonry walls that are

(a) fully grouted, or

(b) painted to fill the pores.

Section 5.4.3.4 Vestibules

Section 5.4.3.4 - Revise Exception 7 to read as follows:

7. Doors that open directly from a space that is less than 3,000 ft^2 in area and is separate from the building entrance, in buildings less than 75 feet in height, and doors that open directly from a space that is less than 1,000 square feet in area, in buildings 75 feet and greater in height.

Section 5.4.3.4 - Delete Exception 9 in its entirety.

Section 5.4.4 Thermal Bridges

Section 5.4.4 - Add a new Section 5.4.4 and a new Table 5.4.4 to read as follows:

5.4.4 Thermal bridges

Applications for construction document approval shall include the following documentation of thermal bridges:

5.4.4.1 Clear field thermal bridges

Where otherwise not included in pre-calculated assembly U-factors, C-factors, or F-factors outlined in Appendix A of this standard, clear field thermal bridges in a wall, roof, or floor assembly shall be noted as such in the drawings.

5.4.4.2 Point thermal bridges

Point thermal bridges greater than or equal in area to 12 in^2 and not associated with HVAC or electrical systems shall be noted as thermal bridges in the drawings.

5.4.4.3 Linear thermal bridges

Construction documents shall include the following documentation in tabular format for linear thermal bridges listed in Table 5.4.4:

1. Linear thermal bridge type.

2. Aggregate length of each type of linear thermal bridge.

3. Relevant detail in the construction documents showing a cross-section through the thermal bridge.

4. Ψ-value for each thermal bridge from Table 5.4.4.

Exception to 5.4.4.3

Where linear thermal bridges have been tested or modeled using methods approved by the department, alternate values may be used.

Table 5.4.4
Average Thermal Transmittance for Unmitigated Linear Thermal Bridges

Type of Thermal Bridge	Ψ-value[a] [Btu/hr • ft • °F]
Balcony	0.50
Floor Slab	0.44
Fenestration Perimeter Transition[b]	0.32
Parapet	0.42
Shelf Angle	0.41

a. Psi-values are derived from the BC Hydro Building Envelope Thermal Bridging Guide Version 1.2- September 2018, and are based on poor performing details.

b. Fenestration Perimeter Transition is the thermal bridge between any fenestration frame and the typical wall, roof or floor assembly it abuts or is mounted within.

Section 5.5.1

Section 5.5.1 - Revise Section 5.5.1 to read as follows:

5.5.1

For a conditioned space, the exterior building envelope shall comply with either the nonresidential or residential requirements in Tables 5.5-4 through 5.5-6 for the appropriate climate.

Delete Tables 5.5-0 through 5.5-3, Table 5.5-7, and Table 5.5-8 in their entirety.

Delete Table 5.5-4 and replace with a new Table 5.5-4 to read as follows:

Table 5.5-4 Building Envelope Requirements for Climate Zone 4 (A,B,C)*

Opaque Elem	Nonresidential			Residential			Semiheated		
	Assembly Maximum	Insulation Min. R-Value		Assembly Maximum	Insulation Min. R-Value		Assembly Maximum	Insulation Min. R-Value	
Roofs									
Insulation en above deck	U-0.030	R-33 c.i.		U-0.030	R-33 c.i.		U-0.093	R-10 c.i.	
Metal buildin	U-0.035	R-19 + R-11 Ls or R-25 + R-8 Ls		U-0.035	R-19 + R-11 Ls or R-25 + R-8 Ls		U-0.082	R-19	
Attic and oth	U-0.020	R-53		U-0.020	R-53		U-0.034	R-30	
Walls, above Grade									
Mass	U-0.099	R-11.2 c.i.		U-0.086	R-13.25 c.i.		U-0.580	NR	
Metal buildin	U-0.048	R-13 + R-14.9 c.i.		U-0.048	R-13 + R-14.9 c.i.		U-0.162	R-13	
Steel-framed	U-0.061	R-13 + R-8.5 c.i.		U-0.061	R-13 + R-8.5 c.i		U-0.124	R-13	
Wood-frame other	U-0.061	R-13 + R-4.5 c.i. or R-19 + R-1.5 c.i.		U-0.061	R-13 + R-4.5 c.i. or R-19 + R-1.5 c.i.		U-0.089	R-13	
Wall, below Grade									
Below-grade	C-0.119	R-7.5 c.i.		C-0.092	R-10 c.i.		C-1.140	NR	
Floors									
Mass	U-0.057	R-14.6 c.i.		U-0.051	R-16.7 c.i.		U-0.107	R-6.3 c.i.	
Steel joist	U-0.033	R-38		U-0.033	R-38		U-0.052	R-19	
Wood-frame other	U-0.033	R-30		U-0.033	R-30		U-0.051	R-19	
Slab-on-Grade Floors									
Unheated	F-0.520	R-15 for 24 in.		F-0.520	R-15 for 24 in.		F-0.730	NR	
Heated	F-0.63	R-20 for 48 in. + R-5 full slab		F-0.63	R-20 for 48 in. + R-5 full slab		F-0.900	R-10 for 24 in.	
Opaque Doors									
Swinging	U-0.370			U-0.370			U-0.370		
Nonswinging	U-0.310			U-0.310			U-0.360		
Fenestration	**Assembly Max. U**	**Assembly Max. SHGC**	**Assembly Min. VT/SHGC**	**Assembly Max. U**	**Assembly Max. SHGC**	**Assembly Min. VT/SHGC**	**Assembly Max. U**	**Assembly Max. SHGC**	**Assembly Min. VT/SHGC**
Vertical Fene 0% to 40% o		(for all frame types)			(for all frame types)			(for all frame types)	
Nonmetal fra	0.28	0.36	1.10	0.28	0.36	1.10	0.51	NR	NR
Metal framin below 95 ft[b]	0.30			0.30			0.73		
Metal framin above 95 ft[b]	0.36			0.36			0.73		
Metal framin operable, bel ft[b]	0.40			0.40			0.81		
Metal framin operable, abo	0.42			0.42			0.81		
Curtainwall f	0.36			0.36			0.73		
Metal framin Entrance doo	0.68			0.68			0.77		

Skylight, 0% to 3% of Roof									
All types	0.48	0.38	NR	0.48	0.38	NR	1.15	NR	NR

*The following definitions apply: c.i. = continuous insulation (see Section 3.2), FC = filled cavity (see Section A2.3.2.5), Ls = liner syst compliance method for metal building roofs, a thermal spacer block is required (see Section A2.3.2). b. Where any portion of the fenest requirements for above 95 feet.

Section 5.5.3 Opaque Areas

Section 5.5.3 - Add two new Exceptions 3 and 4 to to the Exceptions to Section 5.5.3 to read as follows:

3. When the total area of penetrations from through-the-wall equipment or equipment listed in Table 6.8.1-4 exceeds 1% of the opaque above-grade wall area, the mechanical equipment penetration area shall be calculated as a separate wall assembly with a default U-factor of 0.5, and compliance shall be shown with method b. Where mechanical equipment has been tested in accordance with testing standards, approved by the authority having jurisdiction, the mechanical equipment penetration area may be calculated as a separate wall assembly with the U-factor as determined by such test.

4. For opaque assemblies in curtain wall framing or other fenestration framing systems, compliance shall be shown using the effective u-factor values of Table 5.5.3.

Add a new Table 5.5.3 Effective U-factors for Spandrel Panels and Glass Curtain Walls to read as follows:

Table 5.5.3 Effective U-factors for Spandrel Panels and Glass Curtain Walls [a]

Frame Type	Spandrel Panel	Rated R-value of Insulation between Framing Membe						
		R-4	R-7	R-10	R-15	R-20	R-25	R-30
Aluminum without Thermal Break [b]	Single glass pane, stone, or metal panel	0.242	0.222	0.212	0.203	0.198	0.195	0.193
	Double glass with no low-e coatings	0.233	0.218	0.209	0.202	0.197	0.194	0.192
	Triple or low-e glass	0.226	0.214	0.207	0.200	0.196	0.194	0.192
Aluminum with Thermal Break [c]	Single glass pane, stone, or metal panel	0.211	0.186	0.173	0.162	0.155	0.151	0.149
	Double glass with no low-e coatings	0.200	0.180	0.170	0.160	0.154	0.151	0.148
	Triple or low-e glass	0.191	0.176	0.167	0.159	0.153	0.150	0.148
Structural Glazing [d]	Single glass pane, stone, or metal panel	0.195	0.163	0.147	0.132	0.123	0.118	0.114
	Double glass with no low-e coatings	0.180	0.156	0.142	0.129	0.122	0.117	0.114
	Triple or low-e glass	0.169	0.150	0.138	0.127	0.121	0.116	0.113
No framing or Insulation is continuous [e]	Single glass pane, stone, or metal panel	0.148	0.102	0.078	0.056	0.044	0.036	0.031
	Double glass with no low-e coatings	0.136	0.097	0.075	0.054	0.043	0.035	0.030

	Triple or low-e glass	0.129	0.093	0.073	0.053	0.042	0.035	0.030

a. Opaque assembly U-factors based on designs tested in accordance with ASTM C1363 or NFRC 100 shall be permitted. Interpolation outside of the table shall not be permitted. Spandrel panel assemblies in the table do not include metal backpans.

b. Aluminum frame without a thermal break shall be used for systems where the mullion provides a thermal bridge through the insulation.

c. Aluminum frame with a thermal break shall be used for systems where a urethane or other nonmetallic element separates the metal exposed to the exterior from the metal that is exposed to the interior condition.

d. Structural glazing frame type shall be used for systems that have no exposed mullion on the interior.

e. No framing or continuous insulation shall be used for systems where there is no framing or the insulation is continuous and uninterrupted between framing.

Section 5.5.3.7 Continuous Insulation

Section 5.5.3.7 - Add a new section 5.5.3.7 to read as follows:

5.5.3.7 Continuous Insulation

In new construction, balconies and parapets that interrupt the building thermal envelope shall comply with one of the following:

1. Shall be insulated with continuous insulation having a minimum thermal resistance equivalent to the continuous insulation component required in the adjacent wall assembly as listed in Table 5.5-4. Where more than one wall assembly is interrupted by an adjacent balcony, the higher thermal resistance shall be followed.

2. Shall incorporate a minimum R-3 thermal break where the structural element penetrates the building thermal envelope.

Section 5.6 Building Envelope Trade-Off Option

Section 5.6.1.1 - Add a new sentence at the end of Section 5.6.1.1 to read as follows:

When the total area of penetrations from through-the-wall mechanical equipment or equipment listed in Table 6.8.1-4 exceeds 1% of the opaque above-grade wall area, the mechanical equipment penetration area shall be calculated as a separate wall assembly with a default U-factor of 0.5.

Section 5.6.1.1 - Add a new exception to Section 5.6.1.1 to read as follows:

Exception to 5.6.1.1

Where mechanical equipment has been tested in accordance with testing standards approved by the authority having jurisdiction, the mechanical equipment penetration area may be calculated as a separate wall assembly with the U-factor as determined by such test.

5.7.5 Submittal Documentation of Air Barrier Commissioning

Section 5.7.5 - Add a new Section 5.7.5 to read as follows:

5.7.5 Submittal Documentation of Air Barrier Commissioning

For new buildings or additions that are 10,000 square feet and greater, prior to passing final inspection, the approved agency shall provide evidence of air barrier commissioning and substantial completion in accordance with the provisions of Sections 5.7.5.1 through 5.7.5.3 .

5.7.5.1 Documentation

Construction documents shall include documentation of the continuous air barrier components included in the design and a field inspection checklist that includes all requirements necessary for maintaining air barrier continuity and durability in accordance with Section 5.4.3.1.

5.7.5.2 Field Inspections

Reports from field inspections during project construction showing compliance with continuous air barrier requirements including proper material handling and storage, use of approved materials and material substitutes, proper material and surface preparation, and air barrier continuity shall be provided to the owner and, upon request, to the building official . Air barrier continuity shall be determined by testing or inspecting each type of unique air barrier joint or seam in the building envelope for continuity and defects.

5.7.5.3 Report

A Final Commissioning Report indicating compliance with the continuous air barrier requirements shall be provided to the building owner and, upon request, to the building official.

Section 6 - Heating, Ventilating, and Air Conditioning

Section 6.1.1.3.2

Section 6.1.1.3.2 - Revise Section 6.1.1.3.2. to read as follows:

6.1.1.3.2

New cooling systems installed to serve previously uncooled spaces and new heating systems installed to serve previously unheated spaces shall comply with this section as described in Section 6.2.

Section 6.3.2 Criteria

Section 6.3.2 - Revise item e of Section 6.3.2 to read as follows:

e. Heating (if any) shall be provided by a unitary packaged or split-system heat pump that meets the applicable efficiency requirements shown in Table 6.8.1-2 (heat pumps) or Table 6.8.1-4 (packaged terminal and room air conditioners and heat pumps), a fuel-fired furnace that meets the applicable efficiency requirements shown in Table 6.8.1-5 (furnaces, duct furnaces, and unit heaters), an electric resistance heater, or a baseboard system connected to a boiler that meets the applicable efficiency requirements shown in Table 6.8.1-6 (boilers) and Section 6.4.1.6 (Buildings With High Efficiency Space

Heating Gas Boiler Systems).

Section 6.4.1.6 Buildings With High Efficiency Space Heating Gas Boiler Systems

Section 6.4.1.6 - Add a new Section 6.4.1.6 to read as follows:

6.4.1.6 Buildings With High Efficiency Space Heating Gas Boiler Systems

New buildings where space heating is served by one or more gas hot water boilers with a minimum thermal efficiency (E_t) of 90% when rated in accordance with the test procedures in Table 6.8.1-6 shall comply with this section, unless otherwise approved by the authority having jurisdiction. The hot water distribution system shall be designed so that the coils and other heat exchangers are selected such that at outdoor design conditions, the hot water return temperature entering the boilers is 120°F, or less when the boiler is firing.

Section 6.4.3.4.2 Shutoff Damper Controls

Section 6.4.3.4.2 - Add a new Exception 5 to Section 6.4.3.4.2 to read as follows:

5. Shutoff dampers are not required in ventilation or exhaust systems that are required by the New York City Mechanical Code to operate continuously, 24 hours per day, 7 days per week.

Section 6.4.3.4.5 Enclosed Parking Garage Ventilation

Section 6.4.3.4.5 - Revise Exception 1 to Section 6.4.3.4.5 to read as follows:

1. Garages with a total exhaust capacity less than 5,000 cfm with ventilation systems that do not utilize mechanical cooling or mechanical heating.

Section 6.4.4.1.3 Piping Insulation

Section 6.4.4.1.3 - Delete Exception 3 to Section 6.4.4.1.3, and renumber Exceptions 4 and 5 to Section 6.4.4.1.3 as Exceptions 3 and 4 of such Section, respectively.

Section 6.5.3.6 Fractional Horsepower Fan Motors

Section 6.5.3.6 - Revise Exception 3 to Section 6.5.3.6 to read as follows:

3. Motors covered by Table 10.8-3 or Table 10.8-4.

Section 6.5.6.1 Exhaust Air Energy Recovery

Section 6.5.6.1 - Revise Exception 6 to Section 6.5.6.1 to read as follows:

6. Where the sum of the airflow rates exhausted and relieved within 30 feet of each other is less than 75% of the design ventilation outdoor air flow rate, excluding exhaust air that is any of the following:

a. used for another energy recovery system,

b. not allowed by ASHRAE Standard 170 for use in energy recovery systems with leakage potential,

c. prohibited by the New York City Mechanical Code, or

d. of Class 4 as defined in ASHRAE 62.1.

Section 6.7.2.3 System Balancing

Section 6.7.2.3 - Delete Section 6.7.2.3 in its entirety and replace with a new Section 6.7.2.3 to read as follows:

6.7.2.3 Mechanical, renewable energy, and service water heating systems commissioning and completion requirements

Prior to passing the final mechanical and plumbing inspections, the approved agency shall provide evidence of mechanical systems commissioning and completion in accordance with the provisions of this section.

Construction document notes shall clearly indicate provisions for commissioning and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner or owner's authorized agent and made available to the building official upon request in accordance with Sections 6.7.2.3.4 and 6.7.2.3.5.

Mechanical systems, renewable energy, and service water heating systems shall include but are not limited to, at a minimum, the following heating, ventilating, air conditioning, service water heating, indoor air quality and refrigeration systems (mechanical and/or passive) and associated controls:

a. Heating, cooling, air handling and distribution, ventilation, and exhaust systems, and their related air quality monitoring systems.

b. Air, water, and other energy recovery systems.

c. Manual or automatic controls, whether local or remote, on energy using systems including but not limited to temperature controls, setback sequences, and occupancy based control, including energy management functions of the building management system.

d. Plumbing, including insulation of piping and associated valves, domestic and process water pumping, and mixing systems.

e. Mechanical heating systems and service water heating systems.

f. Refrigeration systems.

g. Renewable energy and energy storage systems.

h. Other systems, equipment and components that are used for heating, cooling or ventilation and that affect energy use.

Exceptions to 6.7.2.3

1. Mechanical systems and service water heating systems in new buildings, additions, or alterations where either the total mechanical equipment capacity being installed or the total mechanical equipment connected load serving the alteration space is less than 480,000 Btu/h (140.7 kW) cooling capacity and 600,000 Btu/h (175.8 kW) combined service water-heating and space-heating capacity.

2. Renewable energy systems being installed with a generating capacity of less than 25 kW.

6.7.2.3.1 Commissioning Plan

A commissioning plan shall be developed by an approved agency and shall include the following items:

a. A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.

b. A listing of the specific equipment, appliances or systems to be tested, their full sequences of operation, and a description of the tests to be performed, including prerequisite activities and reference to specific checklists or worksheets which are necessary or required by the department.

c. Functions to be tested including, but not limited to, calibrations and economizer controls.

d. Conditions under which the test will be performed. Testing shall affirm winter and summer design conditions and full outside air conditions.

e. Measurable criteria for performance.

6.7.2.3.2 Systems Adjusting and Balancing

HVAC systems shall be balanced in accordance with ASHRAE 111, “Testing, Adjusting, and Balancing of Building HVAC Systems” or other accepted engineering standards as approved by the department. Air and water flow rates shall be measured and adjusted to deliver final flow rates within the tolerances provided in the product specifications. Test and balance activities shall include air system and hydronic system balancing.

6.7.2.3.2.1 Air Systems Balancing

Each supply air outlet and zone terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the New York City Mechanical Code. Discharge dampers used for air-system balancing are prohibited on constant-volume fans and variable-volume fans with motors 10 hp and larger. Air systems shall be balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp, fan speed shall be adjusted to meet design flow conditions.

6.7.2.3.2.2 Hydronic Systems Balancing

Individual hydronic heating and cooling coils shall be equipped with means for balancing and measuring flow. Hydronic systems shall be proportionately balanced in a manner to first minimize throttling losses, then the pump impeller shall be trimmed or pump speed shall be adjusted to meet

design flow conditions. Each hydronic system shall have either the capability to measure pressure across the pump, or test ports at each side of each pump.

Exceptions to 6.7.2.3.2.2

The following equipment is not required to be equipped with a means for balancing or measuring flow:

a. Pumps with pump motors of 5 hp or less.

b. Where throttling results in no greater than 5% of the nameplate horsepower draw above that required if the impeller were trimmed.

6.7.2.3.3 Functional Performance Testing

Functional performance testing specified in Sections 6.7.2.3.3.1 through 6.7.2.3.3.3 shall be conducted.

6.7.2.3.3.1 Equipment

Equipment functional performance testing shall demonstrate the installation and operation of components, systems, and system-to-system interfacing relationships in accordance with approved plans and specifications such that operation, function, and maintenance serviceability for each of the commissioned systems is confirmed. Testing shall include all modes and sequence of operation, including under full-load, part-load and the following emergency conditions:

a. All modes as described in the sequence of operation.

b. Redundant or automatic back-up mode.

c. Performance of alarms.

d. Mode of operation upon a loss of power and restoration of power.

Exception to 6.7.2.3.3.1

Unitary or packaged HVAC equipment listed in Tables 6.8.1-1, 6.8.1-2, or 6.8.1-4 that do not require supply air economizers shall only be required to demonstrate functioning under full-load and part-load conditions.

6.7.2.3.3.2 Controls

HVAC and service water-heating control systems shall be tested to document that control devices, components, equipment and systems are calibrated and adjusted and operate in accordance with approved plans and specifications. Sequences of operation shall be functionally tested to document they operate in accordance with approved plans and specifications.

6.7.2.3.3.3 Economizers

Air economizers shall undergo a functional test to determine that they operate in accordance with

manufacturer's specifications.

6.7.2.3.4 Preliminary Commissioning Report

A preliminary report of commissioning test procedures and results shall be completed and certified by the approved agency and provided to the building owner or owner's authorized agent. The report shall be organized with mechanical and service hot water findings in separate sections to allow independent review. The report shall be identified as "Preliminary Commissioning Report" and shall include the completed Commissioning Compliance Checklist, and shall identify:

a. Itemization of deficiencies found during testing required by this section that have not been corrected at the time of report preparation.

b. Deferred tests that cannot be performed at the time of report preparation because of climatic conditions.

c. Climatic conditions required for performance of the deferred tests.

d. Results of functional performance tests.

e. Functional performance test procedures used during the commissioning process, including measurable criteria for test acceptance.

6.7.2.3.4.1 Acceptance of Report

Buildings, or portions thereof, shall not be considered acceptable for a final inspection pursuant to Article 116 of Chapter 1 of Title 28 of the Administrative Code until the building official has received a letter of transmittal from the building owner acknowledging that the building owner or owner's authorized agent has received the Preliminary Commissioning Report.

6.7.2.3.4.2 Copy of Report

The building official shall be permitted to require that a copy of the Preliminary Commissioning Report be made available for review by the building official.

6.7.2.3.5 Documentation Requirements

The construction documents shall specify that the documents described in Sections 6.7.2.3.5.1 through 6.7.2.3.5.3 be provided to the building owner or owner's authorized agent within 90 days of the date of receipt of the certificate of occupancy. The construction documents shall also specify that the Final Commissioning Report be provided to the building owner or owner's authorized agent in accordance with the requirements of Section 6.7.2.3.5.4.

6.7.2.3.5.1 Drawings

Construction documents shall include the location and performance data on each piece of equipment.

6.7.2.3.5.2 Manuals

An operating and maintenance manual shall be provided and include all of the following:

a. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance.

b. Manufacturer's operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.

c. Name and address of at least one service agency.

d. HVAC and service hot water controls system maintenance and calibration information, including wiring diagrams, schematics and control sequence descriptions. Desired or field-determined set points shall be permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.

6.7.2.3.5.3 System Balancing Report

A written report describing the activities and measurements completed in accordance with Section 6.7.2.3.2.

6.7.2.3.5.4 Final Commissioning Report

Within 30 months for new buildings 500,000 gross square feet or greater, excluding R-2 occupancies, or within 18 months for R-2 occupancies and all other buildings, of the issuance of the certificate of occupancy or letter of completion, an approved agency shall prepare a report of test procedures and results, including test procedures and results performed after occupancy, identified as the "Final Commissioning Report," provide such report to the building owner, and submit a certification to the department with applicable fees in accordance with department rules. The owner of a building 500,000 gross square feet or greater may apply for an extension of time to the building official based on good cause, in accordance with department rules. Such report shall include the following:

a. Results of functional performance tests.

b. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.

c. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability.

Exception to 6.7.2.3.5.4

Deferred tests that cannot be performed at the time of report preparation due to climatic conditions.

Section 6.7.2.4 System Commissioning

Section 6.7.2.4 - Delete Section 6.7.2.4 in its entirety.

Table 6.8.1-4 Electrically Operated Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps, Single-Package Vertical Air Conditioners, Single-Package Vertical Heat Pumps, Room Air Conditioners, and Room Air-Conditioner Heat Pumps-Minimum Efficiency Requirements

Revise Table 6.8.1-4 to read as follows:

Table 6.8.1-4

Electrically Operated Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps, Single-Package Vertical Air Conditioners, Single-Package Vertical Heat Pumps, Room Air Conditioners, and Room Air-Conditioner Heat Pumps-Minimum Efficiency Requirements

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure [a]
PTAC (cooling mode) standard size	All capacities	95°F db outdoor air	14.0 - (0.300 × Cap/1000)[c] EER	AHRI 310/380
PTAC (cooling mode) nonstandard size[b]	All capacities	95°F db outdoor air	10.9 - (0.213 × Cap/1000)[c] EER	
PTHP (cooling mode) standard size	All capacities	95°F db outdoor air	14.0 - (0.300 × Cap/1000)[c] EER	
PTHP (cooling mode) nonstandard size[b]	All capacities	95°F db outdoor air	10.8 - (0.213 × Cap/1000)[c] EER	
PTHP (heating mode) standard size	All capacities	_____	3.7 - (0.052 × Cap/1000)[c] COP_H	
PTHP (heating mode) nonstandard size[b]	All capacities	_____	2.9 - (0.026 × Cap/1000)[c] COP_H	
SPVAC (cooling mode)	< 65,000 Btu/h	95°F db/75°F wb outdoor air	11.0 EER	AHRI 390
	≥ 65,000 Btu/h and < 135,000 Btu/h		10.0 EER	
	≥ 135,000 Btu/h and < 240,000 Btu/h		10.0 EER	
SPVHP (cooling mode)	< 65,000 Btu/h	95°F db/75°F wb outdoor air	11.0 EER	AHRI 390
	≥ 65,000 Btu/h and < 135,000 Btu/h		10.0 EER	
	≥ 135,000 Btu/h and < 240,000 Btu/h		10.0 EER	
SPVHP (heating mode)	< 65,000 Btu/h	47°F db/43°F wb outdoor air	3.3 COP_H	AHRI 390
	≥ 65,000 Btu/h and < 135,000 Btu/h		3.0 COP_H	
	≥ 135,000 Btu/h and < 240,000 Btu/h		3.0 COP_H	

SPVAC (cooling mode), nonweatherized space constrained	≤ 30,000 Btu/h	95°F db/75°F wb outdoor air	9.2 EER	AHRI 390
	> 30,000 Btu/h and ≤36,000 Btu/h		9.0 EER	
SPVHP (cooling mode) , nonweatherized space constrained	≤ 30,000 Btu/h	95°F db/75°F wb outdoor air	9.2 EER	AHRI 390
	> 30,000 Btu/h and ≤ 36,000 Btu/h		9.0 EER	
SPVHP (heating mode) , nonweatherized space constrained	≤ 30,000 Btu/h	47°F db/43°F wb outdoor air	3.0 COP_H	AHRI 390
	> 30,000 Btu/h and ≤ 36,000 Btu/h		3.0 COP_H	
Room air conditioners, without reverse cycle with louvered sides	< 6,000 Btu/h		11.0 CEER	10 CFR Part 430, Subpart B, Appendix F
	≥ 6,000 Btu/h and < 8,000 Btu/h		11.0 CEER	
	≥ 8,000 Btu/h and < 14,000 Btu/h		10.9 CEER	
	≥ 14,000 Btu/h and < 20,000 Btu/h		10.7 CEER	
	≥ 20,000 Btu/h and < 28,000 Btu/h		9.4 CEER	
	≥ 28,000 Btu/h		9.0 CEER	
Room air conditioners, without reverse cycle without louvered sides	< 6,000 Btu/h		10.0 CEER	10 CFR Part 430, Subpart B, Appendix F
	≥ 6,000 Btu/h and < 8,000 Btu/h		10.0 CEER	
	≥ 8,000 Btu/h and < 11,000 Btu/h		9.6 CEER	
	≥ 11,000 Btu/h and < 14,000 Btu/h		9.5 CEER	
	≥ 14,000 Btu/h and < 20,000 Btu/h		9.3 CEER	
	≥ 20,000 Btu/h		9.4 CEER	
Room air conditioners, with reverse cycle, with louvered sides	< 20,000 Btu/h		9.8 CEER	

	≥ 20,000 Btu/h		9.3 CEER	10 CFR Part 430, Subpart B, Appendix F
Room air conditioners, with reverse cycle, without louvered sides	< 14,000 Btu/h		9.3 CEER	
	≥ 14,000 Btu/h		8.7 CEER	10 CFR Part 430, Subpart B, Appendix F
Room air conditioner, casement only	All capacities		9.5 CEER	10 CFR Part 430, Subpart B, Appendix F
Room air conditioner, casement slider	All capacities		10.4 CEER	

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure. b. Nonstan factory labeled as follows: "MANUFACTURED FOR NONSTANDARD SIZE APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW STAN Nonstandard size efficiencies apply only to units being installed in existing sleeves having an external wall opening of less than 16 in. high or less than a cross-sectional area less than 670 in^2. c. "Cap" means the rated cooling capacity of the product in Btu/h. If the unit's capacity is less than 7000 Btu/h calculation. If the unit's capacity is greater than 15,000 Btu/h, use 15,000 Btu/h in the calculation.

Table 6.8.1-5 Warm-Air Furnaces and Combination Warm-Air Furnaces/Air-Conditioning Units, Warm-Air Duct Furnaces, and Unit Heaters - Minimum Efficiency Requirements

Revise Table 6.8.1-5 to read as follows:

Table 6.8.1-5 Warm-Air Furnaces and Combination Warm-Air Furnaces/Air-Conditioning Units, Warm-Air Duct Furnaces, and Unit Heaters - Minimum Efficiency Requirements

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure [a]
Warm-air furnace, gas fired	<225,000 Btu/h	Maximum capacity[c]	80% AFUE or 80% E_t [b,d]	DOE 10 CFR Part 430 or Section 2.39, Thermal Efficiency, ANSI Z21.47
	≥225,000 Btu/h		80% E_t[d]	Section 2.39, Thermal Efficiency, ANSI Z21.47
Warm-air furnace, oil fired	<225,000 Btu/h	Maximum capacity[c]	83% AFUE or 80% E_t[b,d]	DOE 10 CFR Part 430 or Section 42, Combustion, UL 727
	≥225,000 Btu/h		81% E_t[d]	Section 42, Combustion, UL 727
Warm-air duct furnaces, gas fired	All capacities	Maximum capacity[c]	80% E_c[e]	Section 2.10, Efficiency, ANSI Z83.8
Warm-air unit heaters, gas fired	All capacities	Maximum capacity[c]	80% E_c[e,f]	Section 2.10, Efficiency, ANSI Z83.8
Warm-air unit heaters, oil fired	All capacities	Maximum capacity[c]	80% E_c[e,f]	Section 40, Combustion, UL 731

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure. b. Combinatio Federal Regulations 10 CFR 430 (three-phase power or cooling capacity greater than or equal to 65,000 Btu/h) may comply with either rating. c. Complia d. E_t = thermal efficiency. Units must also include an interrupted or intermittent ignition device (IID), have jacket losses not exceeding 0.75% of the input damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space. e. E_c = combustion effi discussion. f. As of August 8, 2008, according to the Energy Policy Act of 2005, units must also include an interrupted or intermittent ignition device (IID

Table 6.8.1-9 Electrically Operated Variable-Refrigerant-Flow Air Conditioners - Minimum Efficiency Requirements

Revise Table 6.8.1-9 to read as follows:

Table 6.8.1-9
Electrically Operated Variable-Refrigerant-Flow Air Conditioners - Minimum Efficiency Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air conditioners, air cooled	< 65,000 Btu/h	All	VRF multisplit system	13.0 SEER	AHRI 1230
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric resistance (or none)	VRF multisplit system	11.2 EER 15.5 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h	Electric resistance (or none)	VRF multisplit system	11.0 EER 14.9 IEER	
	≥ 240,000 Btu/h	Electric resistance (or none)	VRF multisplit system	10.0 EER 13.9 IEER	

Table 6.8.1-10 Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps-Minimum Efficiency Requirements

Revise Table 6.8.1-10 to read as follows:

Table 6.8.1-10

Electrically Operated Variable-Refrigerant-Flow and Applied Heat Pumps-Minimum Efficiency Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
VRF air cooled (cooling mode)	< 65,000 Btu/h	All	VRF multisplit system	13.0 SEER	AHRI 1230
	≥ 65,000 Btu/h and < 135,000 Btu/h	Electric resistance (or none)		11.0 EER 14.6 IEER	
			VRF multisplit system with heat recovery	10.8 EER 14.4 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h		VRF multisplit system	10.6 EER 13.9 IEER	
			VRF multisplit system with heat recovery	10.4 EER 13.7 IEER	

	≥ 240,000 Btu/h		VRF multisplit system	9.5 EER 12.7 IEER	
			VRF multisplit system with heat recovery	9.3 EER 12.5 IEER	
VRF water source (cooling mode)	< 65,000 Btu/h	All	VRF multisplit systems 86°F entering water	12.0 EER 16.0 IEER	AHRI 1230
			VRF multisplit systems with heat recovery 86°F entering water	11.8 EER 15.8 IEER	
	≥ 65,000 Btu/h and < 135,000		VRF multisplit systems 86°F entering water	12.0 EER 16.0 IEER	
			VRF multisplit systems with heat recovery 86°F entering water	11.8 EER 15.8 IEER	
	≥ 135,000 Btu/h and < 240,000 Btu/h		VRF multisplit systems 86°F entering water	10.0 EER 14.0 IEER	
			VRF multisplit systems with heat recovery 86°F entering water	9.8 EER 13.8 IEER	
	≥ 240,000 Btu/h		VRF multisplit systems 86°F entering water	10.0 EER 12.0 IEER	
			VRF multisplit systems with heat recovery 86°F entering water	9.8 EER 11.8 IEER	
VRF groundwater source (cooling mode)	< 135,000 Btu/h	All	VRF multisplit system 59°F entering water	16.2 EER	AHRI 1230
			VRF multisplit system with heat recovery 59°F entering water	16.0 EER	
	≥ 135,000 Btu/h		VRF multisplit system 59°F entering water	13.8 EER	
	≥ 135,000 Btu/h		VRF multisplit system with heat recovery 59°F entering water	13.6 EER	
VRF groundwater source (cooling mode)	< 135,000 Btu/h	All	VRF multisplit system 77°F entering water	13.4 EER	AHRI 1230
			VRF multisplit system with heat recovery 77°F entering water	13.2 EER	
	≥ 135,000 Btu/h		VRF multisplit system 77°F entering water	11.0 EER	
			VRF multisplit system with heat recovery 77°F entering water	10.8 EER	
VRF air cooled (heating mode)	< 65,000 Btu/h (cooling capacity)		VRF multisplit system	7.7 HSPF	AHRI 1230
	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)		VRF multisplit system 47°F db/43°F wb outdoor air	3.3 COP_H	

			17°F db/15°F wb outdoor air	2.25 COP_H	
	≥ 135,000 Btu/h (cooling capacity)		VRF multisplit system 47°F db/43°F wb outdoor air	3.2 COP_H	
			17°F db/15°F wb outdoor air	2.05 COP_H	
VRF water source (heating mode)	< 65,000 Btu/h (cooling capacity)		VRF multisplit system 68°F entering water	4.3 COP_H	AHRI 1230
	≥ 65 Btu/h and < 135,000 Btu/h (cooling capacity)		VRF multisplit system 68°F entering water	4.3 COP_H	
	≥ 135,000 Btu/h and < 240,000 Btu/h (cooling capacity)		VRF multisplit system 68°F entering water	4.0 COP_H	
	≥ 240,000 Btu/h (cooling capacity)		VRF multisplit system 68°F entering water	3.9 COP_H	
VRF groundwater source (heating mode)	< 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 50°F entering water	3.6 COP_H	AHRI 1230
	≥ 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 50°F entering water	3.3 COP_H	
VRF ground source (heating mode)	< 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 32°F entering water	3.1 COP_H	AHRI 1230
	≥ 135,000 Btu/h (cooling capacity)	-	VRF multisplit system 32°F entering water	2.8 COP_H	

Section 7 - Service Water Heating

Section 7.2.1 Compliance

Section 7.2.1 - Revise Section 7.2.1 to read as follows:

7.2.1 Compliance

Compliance shall be achieved by meeting the requirements of Section 7.1, “General”; Section 7.4, “Mandatory Provisions”; Section 7.5, “Prescriptive Path”; Section 7.7, “Submittals”; Section 6.7.2.3, “Mechanical, renewable energy, and service water heating systems commissioning and completion requirements”; and Section 7.8, “Product Information.”

Section 8 - Power

Section 8.4.5 Measurement of electrical consumption of tenant spaces in covered buildings

Section 8.4.5 - Add a new Section 8.4.5 to read as follows:

8.4.5 Measurement of electrical consumption of tenant spaces in covered buildings

The terms meter, sub-meter, covered building, tenant space and covered tenant space shall have the same meanings as defined in Section 28-311.2 of the Administrative Code. Each covered tenant space in a new building shall be equipped with a separate meter or sub-meter to measure the electrical consumption of such space when let or sublet. Where the covered tenant space is a floor with multiple tenancies, each tenancy with an area less than that as defined in Section 28-311.2 of the Administrative Code of the city of New York shall (i) be equipped with a separate meter or sub-meter, (ii) share a meter or sub-meter with other tenant spaces on the floor, or (iii) share a meter or sub-meter covering the entire floor. As new covered tenant spaces are created, they shall be equipped with meters or sub-meters as provided in this section.

Exception to 8.4.5

Covered tenant space for which the electrical consumption within such space is measured by a meter dedicated exclusively to that space.

Section 8.4.6 Dwelling unit metering

Section 8.4.6 - Add a new Section 8.4.6 to read as follows:

8.4.6 Dwelling unit metering

Each dwelling unit located in a Group R-2 building shall have a separate electrical meter.

Section 9 - Lighting

Section 9.1.2 Lighting Alterations

Section 9.1.2 - Revise the first sentence of Section 9.1.2 to read as follows:

For the alteration of any lighting system in an interior space, that space shall comply with the lighting power density (LPD) allowances of Section 9.2.2.3 and the control requirements of Section 9.4.1.1, as applicable to that space.

Section 9.1.2- Revise the heading of the Exceptions to Section 9.1.2 to read as follows:

Exceptions to 9.1.2

Section 9.1.2 - Revise the first Exception to Section 9.1.2 to read as follows:

1. Alterations that involve 10% or less of the connected lighting load in a space or area need not comply with these requirements, provided that such alterations do not increase the installed lighting power.

Section 9.2.2.3 Interior Lighting Power

Section 9.2.2.3 - Add a new sentence at the end of Section 9.2.2.3 before the Exception to read as follows:

Buildings with unfinished spaces shall use the Space-by-Space Method.

Section 9.4.1.1 Interior Lighting Controls

Section 9.4.1.1 - Revise the first paragraph of Item e of Section 9.4.1.1 to read as follows:

e. Automatic daylight responsive controls for sidelighting: In any space where the combined input power of all general lighting completely or partially within the primary sidelighted areas is 100 W or greater, the general lighting in the primary sidelighted areas shall be controlled by photocontrols.

Section 9.4.1.1 - Revise the first sentence of the second paragraph of Item e of Section 9.4.1.1 to read as follows:

In any space where the combined input power of all general lighting completely or partially within the primary sidelighted area and secondary sidelighted area is 200 W or greater, the general lighting in the primary sidelighted area and secondary sidelighted area shall be controlled by photocontrols.

Section 9.4.1.1 - Revise the first sentence of Item f Section 9.4.1.1 to read as follows:

f. Automatic daylight responsive controls for toplighting: In any space where the combined input power for all general lighting completely or partially within daylight area under skylights and daylight area under roof monitors is 100 W or greater, general lighting in the daylight area shall be controlled by photocontrols.

Section 9.4.1.1 - Delete Items g and h of Section 9.4.1.1 in their entirety and replace with new Items g and h of such Section to read as follows:

g. Automatic partial OFF (full OFF complies): The general lighting power in the space shall be automatically reduced by at least 50% within 15 minutes of all occupants leaving the space. The controls in open plan offices, cafeteria dining areas, and fast food dining areas, 300 ft^2 and greater in area, shall be configured so that general lighting power in each control zone is reduced by not less than 80% of the full zone general lighting power in a reasonably uniform illumination pattern within 15 minutes of all occupants leaving that control zone. Control functions that switch control zone lights completely off when the zone is vacant meet this requirement.

Exception to 9.4.1.1(g)

This requirement does not have to be complied with in spaces that meet all four of the following requirements:

1. The space has an installed LPD of no more than 0.80 W/ft^2.

2. The space is lighted by HID lamp.

3. The general lighting power in the space is automatically reduced by at least 30% within 15 minutes of all occupants leaving the space.

4. Lighting load does not exceed 0.02 W/ft^2 multiplied by the gross lighted area of the building.

h. Automatic full OFF: All lighting, including lighting connected to emergency circuits, shall be automatically shut off within 15 minutes of all occupants leaving the space. A control device meeting this requirement shall control no more than 5000 ft^2, provided that for open plan office spaces or dining spaces a

control device meeting this requirement shall control not greater than 600 ft^2.

Exception to 9.4.1.1(h)

The following lighting is not required to be automatically shut off:

1. General lighting and task lighting in shop, laboratory, and preschool classrooms.

2. General lighting and task lighting in spaces where automatic shutoff would endanger the safety or security of room or building occupants.

3. Lighting required for 24/7 operation.

4. Lighting load does not exceed 0.02 W/ft^2 multiplied by the gross lighted area of the building.

Section 9.4.1.2 Parking Garage Lighting Control

Section 9.4.1.2 - Revise the first sentence of Item b of Section 9.4.1.2 to read as follows:

b. Lighting power of each luminaire shall be automatically reduced by a minimum of 30% when there is no activity detected within a lighting zone for 15 minutes.

Section 9.4.1.3 Special Applications

Section 9.4.1.3 - Revise Sub-Item 1 of Item b of Section 9.4.1.3 to read as follows:

1. All lighting and all switched receptacles in guestrooms and suites in hotels, motels, boarding houses, or similar buildings shall be automatically controlled such that the power to the lighting and switched receptacles in each enclosed space will be turned off within 15 minutes after all occupants leave that space.

Exception to 9.4.1.3(b)(1)

Enclosed spaces where the lighting and switched receptacles are controlled by captive key systems and bathrooms are exempt.

Table 9.4.2-2 Individual Lighting Power Allowances for Building Exteriors

Table 9.4.2-2 - Delete Table 9.4.2-2 in its entirety and replace with a new Table 9.4.2.-2 as follows:

Table 9.4.2-2 Individual Lighting Power Allowances for Building Exteriors					
	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4
Base Site Allowance (Base allowance may be used in tradable or nontradable surfaces.)					
	No allowance	350 W	400 W	500 W	900 W

Tradable Surfaces (LPD allowances for uncovered parking areas, building grounds, building entrances, exits and loading doo overhangs, and outdoor sales areas may be traded.)					
Uncovered Parking Areas					
Parking areas and dr	No allowance	0.03 W/ft^2	0.04 W/ft^2	0.05 W/ft^2	0.05 W/ft^2
Building Grounds					
Walkways/ramps les than 10 ft wide	No allowance	0.5 W/linear foot	0.5 W/linear foot	0.6 W/linear foot	0.7 W/linear foot
Walkways/ramps 10 wide or greater Plaza areas Special feature areas	No allowance	0.10 W/ft^2	0.10 W/ft^2	0.11 W/ft^2	0.14 W/ft^2
Dining areas	No allowance	0.65 W/ft^2	0.65 W/ft^2	0.75 W/ft^2	0.95 W/ft^2
Stairways	No allowance	0.6 W/ft^2	0.7 W/ft^2	0.7 W/ft^2	0.7 W/ft^2
Pedestrian tunnels	No allowance	0.12 W/ft^2	0.12 W/ft^2	0.14 W/ft^2	0.21 W/ft^2
Landscaping	No allowance	0.03 W/ft^2	0.04 W/ft^2	0.04 W/ft^2	0.04 W/ft^2
Building Entrances, Exits, and Loading Docks					
Pedestrian and vehic entrances and exits	No allowance	12.6 W/lin ft of opening	12.6 W/lin ft of opening	20 W/lin ft of opening	20 W/lin ft of opening
Entry canopies	No allowance	0.20 W/ft^2	0.25 W/ft^2	0.4 W/ft^2	0.4 W/ft^2
Loading docks	No allowance	0.35 W/ft^2	0.35 W/ft^2	0.35 W/ft^2	0.35 W/ft^2
Sales Canopies					
Free standing and attached	No allowance	0.4 W/ft^2	0.4 W/ft^2	0.6 W/ft^2	0.7 W/ft^2
Outdoor Sales					
Open areas (includin vehicle sales lots)	No allowance	0.2 W/ft^2	0.2 W/ft^2	0.35 W/ft^2	0.5 W/ft^2
Street frontage for vehicle sales lots in addition to "open are allowance	No allowance	No allowance	7 W/linear foot	7 W/linear foot	21 W/linear foot
Nontradable Surfaces (LPD allowances for the following applications can be used only for the specific application and canno surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the " section of this table.)					
Building façades (Th allowance for each illuminated façade orientation shall be calculated by multiplying the allowable value by th entire façade area or façade length for tha orientation.)	No allowance	No allowance	0.1 W/ft^2 of façade area or 2.5 W/linear foot of façade length	0.15 W/ft^2 of façade area or 3.75 W/linear foot of façade length	0.2 W/ft^2 of façade area or 5.0 W/linear foot of façade length
Automated teller machines and night depositories	No allowance	135 W per location plus 45 W per additional ATM per location	135 W per location plus 45 W per additional ATM per location	135 W per location plus 45 W per additional ATM per location	135 W per location plus 45 W per additional ATM per location

Uncovered entrances and gatehouse inspection stations at guarded facilities	No allowance	0.5 W/ft^2	0.5 W/ft^2	0.5 W/ft^2	0.5 W/ft^2
Uncovered loading areas for law enforcement, fire, ambulance, and othe emergency service vehicles	No allowance	0.35 W/ft^2	0.35 W/ft^2	0.35 W/ft^2	0.35 W/ft^2
Drive-through windows/doors	No allowance	200 W per drive-through	200 W per drive-through	200 W per drive-through	200 W per drive-through
Parking near 24-hour retail entrances	No allowance	400 W per main entry	400 W per main entry	400 W per main entry	400 W per main entry
Roadway/parking en trail head, and toilet facility, or other locations approved b the authority having jurisdiction.	A single luminaire of 25 W or less	No additional allowance	No additional allowance	No additional allowance	No additional allowance

Section 9.4.4 Dwelling units

Section 9.4.4 - Delete Section 9.4.4 in its entirety and replace with a new Section 9.4.4 to read as follows:

9.4.4 Dwelling Units

Not less than 90% of the permanently installed lighting fixtures shall use lamps with an efficacy of at least 65 lm/W or have a total luminaire efficacy of at least 45 lm/W.

Section 9.4.5 Exit signs

Section 9.4.5 - Add a new Section 9.4.5 to read as follows:

9.4.5 Exit signs

Internally illuminated exit signs shall not exceed 5 W per face.

Table 9.5.1 Lighting Power Density Allowances Using the Building Area Method

Table 9.5.1 - Delete Table 9.5.1 in its entirety and replace with a new Table 9.5.1 to read as follows:

Table 9.5.1 Lighting Power Density Allowances Using the Building Area Method	
Building Area Type [a]	LPD, W/ft^2 [a]
Automotive facility	0.64
Convention center	0.70
Courthouse	0.74

Dining: Bar lounge/leisure	0.69
Dining: Cafeteria/fast food	0.66
Dining: Family	0.61
Dormitory[b]	0.52
Exercise center	0.65
Fire station	0.50
Gymnasium	0.67
Health-care clinic	0.68
Hospital	0.86
Hotel/motel[b]	0.70
Library	0.78
Manufacturing facility	0.60
Motion picture theater	0.62
Multifamily[b]	0.49
Museum	0.68
Office	0.69
Parking garage	0.12
Penitentiary	0.67
Performing arts theater	0.85
Police station	0.68
Post office	0.62
Religious facility	0.72
Retail	0.91
School/university	0.67
Sports arena	0.76
Town hall	0.72
Transportation	0.51
Warehouse	0.41
Workshop	0.83

a. In cases where both a general building area type and a specific building area type are listed, the specific building area type shall apply.

b. Neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.

Section 9.6.1 Space-by-Space Method of Calculating Interior Lighting Power Allowance

Section 9.6.1 - Add a new sentence at the end of Item c of Section 9.6.1 to read as follows:

Where a building has unfinished spaces, the lighting power allowance for the unfinished spaces shall be the total connected lighting power for those spaces, or 0.2 watts per square foot, whichever is less.

Table 9.6.1 Lighting Power Density Allowances Using the Space-by-Space Method and Minimum Control Requirements Using Either Method

Delete Table 9.6.1 in its entirety and add replace with a new Table 9.6.1 to read as follows:

Table 9.6.1 Lighting Power Density Allowances Using the Space-by-Space Method and Minimum Control Requirements Using Either Method

Informative Note: This table is divided into two secti this first section covers space types that can be comm found in multiple building types. The second part of t table covers space types that are typically found in a single building type.			The control functions below shall be implemented in accordance with the descriptions found in the referenced paragraphs within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.								
			Local Control (See Section 9.4.1.1 [a])	Restricted to Manual ON (See Section 9.4.1.1 [b])	Restricted to Partial Automatic ON (See Section 9.4.1.1[c])	Bilevel Lighting Control (See Section 9.4.1.1[d])	Automatic Daylight Responsive Controls for Sidelighting (See Section 9.4.1.1[e][6])	Automatic Daylight Responsive Controls for Toplighting (See Section 9.4.1.1[f][6])	Automatic Partial OFF (See Section 9.4.1.1[g] [Full Off complies])	Automatic Full OFF (See Section 9.4.1.1[h])	Scheduled Shutoff (See Section 9.4.1.1[i])
Common Space Types[1]	LPD Allowances, W/ft[2]	RCR Threshold	a	b	c	d	e	f	g	h	i
Atrium											
< 20 ft in height	0.03/ft total height	NA	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
≥ 20 ft and ≤ 40 f in height	0.03/ft total height	NA	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
> 40 ft in height	0.40 + 0.02/ft total height	NA	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Audience Seating Area											
Auditorium	0.63	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Convention cente	0.65	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Gymnasium	0.43	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Motion picture theater	0.64	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Penitentiary	0.28	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
Performing arts theater	2.03	8	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Religious facility	1.53	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Sports arena	0.42	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
All other audienc seating areas	0.40	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2

Banking Activity Area	0.79	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Breakroom (See Lounge/Breakroom)											
Classroom/Lecture hall/Training Room[9,10]											
Penitentiary	1.06	4	REQ	ADD1	ADD1	REQ	REQ	REQ		REQ	
All other classrooms/lectur halls/training roo	0.74	4	REQ	REQ		REQ	REQ	REQ		REQ	
Conference/Meet g. Multipurpose Room[9,10]	0.93	6	REQ	REQ		REQ	REQ	REQ		REQ	
Confinement Cel	0.52	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Copy/Print Room	0.50	6	REQ	ADD1	ADD1	REQ	REQ	REQ		REQ	
Corridor[2]											
Facility for the visually impaired (and not used primarily by the staff)[3]	0.81	width ≤ 8 ft	REQ				REQ	REQ	REQ	ADD2	ADD2
Hospital	0.81	width ≤ 8 ft	REQ				REQ	REQ	ADD2	ADD2	ADD2
Manufacturing facility	0.28	width ≤ 8 ft	REQ				REQ	REQ		ADD2	ADD2
All other corridor	0.58	width ≤ 8 ft	REQ				REQ	REQ	REQ	ADD2	ADD2
Courtroom	1.06	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Computer Room	1.16	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Dining Area											
Penitentiary	0.72	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Facility for the visually impaired (and not used primarily by staff	1.48	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Bar lounge or leisure dining	0.62	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Cafeteria or fast food dining < 3(ft^2	0.53	4	REQ	ADD1	ADD1	REQ	REQ	REQ		REQ	
Cafeteria or fast food dining ≥ 3(ft^2	0.53	4	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ		
Family dining	0.54	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
All other dining areas	0.53	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Electrical/Mecha al Room[7]	0.39	6	REQ				REQ	REQ			
Emergency Vehic Garage	0.41	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
Food Preparation Area	0.92	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Guest Room	0.75	6	See Section 9.4.1.3(b).								
Laboratory											
In or as a classro	1.04	6	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2

All other laboratories	1.45	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Laundry/Washing Area	0.43	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Loading Dock, Interior	0.51	6	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
Lobby											
Facility for the visually impaired (and not used primarily by staff	2.03	4	REQ				REQ	REQ	REQ	ADD2	ADD2
Elevator	0.52	6	REQ				REQ	REQ		ADD2	ADD2
Hotel	0.68	4	REQ				REQ	REQ		ADD2	ADD2
Motion picture theater	0.38	4	REQ				REQ	REQ		ADD2	ADD2
Performing arts theater	0.82	6	REQ				REQ	REQ	REQ	ADD2	ADD2
All other lobbies	0.90	4	REQ				REQ	REQ	REQ	ADD2	ADD2
Locker Room	0.45	6	REQ	ADD1	ADD1	REQ	REQ	REQ		REQ	
Lounge/Breakroom[9,10]											
Healthcare facilit	0.53	6	REQ	REQ		REQ	REQ	REQ		REQ	
All other lounges/breakroos	0.44	4	REQ	REQ		REQ	REQ	REQ		REQ	
Office											
Enclosed and ≤ 2 ft^2[9,10]	0.85	8	REQ	REQ		REQ	REQ	REQ		REQ	
Enclosed and > 2 ft^2	0.85	8	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Open plan< 300	0.78	4	REQ	ADD1	ADD1	REQ	REQ	REQ		REQ	
Open plan ≥ 300 ft^2[11]	0.78	4	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ		
Parking Area, Interior	0.11	4	See Section 9.4.1.2								
Pharmacy Area	1.23	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Restroom											
Facility for the visually impaired (and not used primarily by the staff)[3]	0.81	8	REQ	ADD1	ADD1		REQ	REQ		REQ	
All other restroon	0.75	8	REQ	ADD1	ADD1		REQ	REQ		REQ	
Sales Area[4]	1.06	6	REQ	ADD1	ADD1	REQ		REQ		ADD2	ADD2
Seating Area, General	0.38	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
Stairway	The space containing the stairway shall determine the LPD and control requirements for the stairway.										
Stairwell	0.50	10				REQ	REQ	REQ	REQ	ADD2	ADD2
Storage Room											
< 50 ft^2	0.43	6	REQ							ADD2	ADD2
≥ 50 ft^2 and ≤100 ft^2	0.43	6	REQ	ADD1	ADD1		REQ	REQ		REQ	

All other storage rooms	0.43	6	REQ	ADD1	ADD1		REQ	REQ	REQ	ADD2	ADD2
Vehicular Maintenance Are	0.53	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Workshop	1.09	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2

TABLE 9.6.1 Lighting Power Density Allowances Using the Space-by-Space Method and Minimum Control Requirements Using Either Method (Continued)

Informative Note: This table is divided into two sections. The first section covers space types that can be commonly found in multiple building types. The second part of this table covers space types that are typically found in a single building.

The control functions below shall be implemented in accordance with the descriptions found in the referenced paragraphs within Section 9.4.1.1. For each space type: (1) All REQs shall be implemented. (2) At least one ADD1 (when present) shall be implemented. (3) At least one ADD2 (when present) shall be implemented.

Building Type Specific/Space Types[1]	LPD W/ft^2	RCR Threshold	a Local Control (See Section 9.4.1.1[a])	b Restricted to Manual ON (See Section 9.4.1.1[b])	c Restricted to Partial Automatic ON (See Section 9.4.1.1[c])	d Bilevel Lighting Control (See Section 9.4.1.1[d])	e Automatic Daylight Responsive Controls for Sidelighting (See Section 9.4.1.1[e][6])	f Automatic Daylight Responsive Controls for Toplighting (See Section 9.4.1.1[f][6])	g Automatic Partial OFF (See Section 9.4.1.1[g][Full Off complies])	h Automatic Full OFF (See Section 9.4.1.1[h])	i Scheduled Shutoff (See Section 9.4.1.1[i])
Facility for the Visually Impaired[3]											
Chapel (used primarily by residents)	0.89	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Recreation room/common liv room (and not use primarily by staff)	1.53	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Automotive (See "Vehicular Maintenance Area")											
Convention Cente Exhibit Space	0.69	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Dormitory-Living Quarters	0.46	8	REQ								
Fire Station-Sleep Quarters	0.19	6	REQ								
Gymnasium/Fitness Center											
Exercise area	0.50	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Playing area	0.75	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Healthcare Facility											
Exam/treatment ro	1.16	8	REQ			REQ	REQ	REQ		ADD2	ADD2
Imaging room	0.98	6	REQ			REQ				ADD2	ADD2
Medical supply ro	0.54	6	(See "Storage Room" under "Common Space Types" for control requirements)								
Nursery	0.94	6	REQ			REQ	REQ	REQ		ADD2	ADD2
Nurse's station	0.75	6	REQ			REQ	REQ	REQ		ADD2	ADD2
Operating room	1.87	6	REQ			REQ				ADD2	ADD2

Patient room	0.45	6	REQ			REQ	REQ	REQ		ADD2	ADD2
Physical therapy room	0.84	6	REQ			REQ	REQ	REQ		ADD2	ADD2
Recovery room	0.89	6	REQ			REQ	REQ	REQ		ADD2	ADD2
Library											
Reading area	0.77	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Stacks	1.20	4	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2
Manufacturing Facility											
Detailed manufacturing are	0.86	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Equipment room	0.61	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Extra high bay are (> 50 ft floor-to-ceiling height)	0.73	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
High bay area (25 50 ft floor-to-ceili height)	0.58	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Low bay area (< 2 floor-to-ceiling height)	0.61	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Museum											
General exhibition area	0.61	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Restoration room	0.77	6	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Performing Arts Theater-Dressing Room	0.35	6	REQ	ADD1	ADD1	REQ	REQ	REQ		REQ	
Post Office-Sortin Area	0.66	4	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2
Religious Facility											
Fellowship hall	0.54	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Worship/pulpit/ch area	0.98	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Retail Facilities											
Dressing/fitting ro	0.49	8	REQ	ADD1	ADD1	REQ		REQ		REQ	
Mall concourse	0.79	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Sports Arena-Playing Area[8]											
Class I facility	2.26	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Class II facility	1.45	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Class III facility	1.08	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Class IV facility	0.72	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Transportation Facility											
Baggage/carousel area	0.40	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
Airport concourse	0.31	4	REQ	ADD1	ADD1		REQ	REQ		ADD2	ADD2
Terminal ticket counter	0.48	4	REQ	ADD1	ADD1	REQ	REQ	REQ		ADD2	ADD2
Warehouse-Storage Area											

Medium to bulky, palletized items	0.27	4	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2
Smaller, hand-carry items[5]	0.65	6	REQ	ADD1	ADD1	REQ	REQ	REQ	REQ	ADD2	ADD2

1. In cases where both a common space type and a building area specific space type are listed, the building area specific space type shall apply.
2. In corridors, the extra lighting power density allowance is permitted when the width of the corridor is less than 8 ft and is not based on the RCR.
3. A "Facility for the Visually Impaired" is a facility that can be documented as being designed to comply with the light levels in ANSI/IES RP-28 and is licensed or will be licensed by local/state authorities for either senior long-term care, adult daycare, senior support and/or people with special visual needs.
4. For accent lighting, see Section 9.6.2(b).
5. Sometimes referred to as a "Picking Area."
6. Automatic daylight responsive controls are mandatory only if the requirements of the specified sections are present.
7. An additional 0.52 W/ft^2 shall be allowed, provided that the additional lighting is controlled separately from the base allowance of 0.43 W/ft^2. The additional 0.52 W/ft^2 allowance shall not be used for any other purpose.
8. Class of play as defined by IES RP-6.
9. Occupant sensor shall not have an override switch that converts from manual-on to automatic-on functionality.
10. The occupant sensor may have a grace period of up to 30 seconds to turn on the lighting automatically after the sensor has turned off the lighting if occupancy is detected.
11. The controls shall be configured such that any daylight responsive control will activate open plan office space general lighting or control zone general lighting only when occupancy for the same area is detected.

Section 9.7.3 System Commissioning

Section 9.7.3 - Add a new Section 9.7.3 to read as follows:

9.7.3 System Commissioning

Lighting systems shall be tested to ensure that automatic control elements are calibrated, adjusted, and in proper working condition in accordance with this section.

9.7.3.1 Functional Testing of Lighting Controls

Prior to passing final inspection, the approved agency shall provide evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the construction documents and manufacturer's instructions. Functional testing shall be in accordance with Sections 9.7.3.1.1 through 9.7.3.1.3 for the applicable control type.

9.7.3.1.1 Occupant Sensor Controls

Where occupant sensor controls are provided, the following procedures shall be performed:

a. Certify that the occupant sensor has been located and aimed in accordance with manufacturer recommendations.

b. For projects with seven or fewer occupant sensors, each sensor shall be tested.

c. For projects with more than seven occupant sensors, testing shall be done for each unique combination of sensor type and space geometry. Where multiples of each unique combination of sensor type and space geometry are provided, not less than 10% and in no case fewer than one, of each combination shall be tested unless the building official or design professional requires a higher percentage to be tested. Where 30% or more of the

tested controls fail, all remaining identical combinations shall be tested.

For occupant sensor controls to be tested, verify the following:

1. Where occupant sensor controls include status indicators, verify correct operation.

2. The controlled lights turn off or down to the permitted level within the required time.

3. For auto-on occupant sensor controls, the lights turn on to the permitted level when an occupant enters the space.

4. For manual-on occupant sensor controls, the lights turn on only when manually activated.

5. The lights are not incorrectly turned on by movement in adjacent areas or by HVAC operation.

9.7.3.1.2 Time-switch Controls

Where time-switch controls are provided, the following procedures shall be performed:

a. Confirm that the time-switch control is programmed with accurate weekday, weekend and holiday schedules.

b. Provide documentation to the owner of time-switch controls programming including weekday, weekend, holiday schedules, and set-up and preference program settings.

c. Verify the correct time and date in the time switch.

d. Verify that any battery back-up is installed and energized.

e. Verify that the override time limit is set to not more than 2 hours.

f. Simulate occupied condition. Verify and document the following:

1. All lights can be turned on and off by their respective area control switch.

2. The switch only operates lighting in the enclosed space in which the switch is located.

g. Simulate unoccupied condition. Verify and document the following:

1. Nonexempt lighting turns off.

2. Manual override switch allows only the lights in the enclosed space where the override switch is located to turn on or remain on until the next scheduled shutoff occurs.

h. Additional testing as specified by the registered design professional.

9.7.3.1.3 Daylight Responsive Controls

Where daylight responsive controls are provided, the following shall be verified:

a. Control devices have been properly located, field calibrated and set for accurate setpoints and threshold light levels.

b. Daylight controlled lighting loads adjust to light level setpoints in response to available daylight.

c. The calibration adjustment equipment is located for ready access only by authorized personnel.

9.7.3.2 Documentation Requirements

The construction documents shall specify that the documents described in this section be provided to the building owner or owner's authorized agent within 90 days of the date of receipt of the certificate of occupancy.

9.7.3.2.1 Drawings

Construction documents shall include the location and catalogue number of each piece of equipment.

9.7.3.2.2 Manuals

An operating and maintenance manual shall be provided and include the following:

a. Name and address of not less than one service agency for installed equipment.

b. A narrative of how each system is intended to operate, including recommended setpoints.

c. Submittal data indicating all selected options for each piece of lighting equipment and lighting controls.

d. Operation and maintenance manuals for each piece of lighting equipment. Required routine maintenance actions, cleaning and recommended relamping shall be clearly identified.

e. A schedule for inspecting and recalibrating all lighting controls.

9.7.3.2.3 Report

A report of test results shall be provided and include the following:

a. Results of functional performance tests.

b. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.

Section 10.4.3.5 Power Conversion System

Section 10.4.3.5 - Add a new Section 10.4.3.5 to read as follows:

10.4.3.5 Power Conversion System

New traction elevators with a rise of 75 feet or more in new buildings shall have a power conversion system that complies with Sections 10.4.3.5.1 through 10.4.3.5.3.

10.4.3.5.1 Motor

Induction motors with a Class IE2 efficiency ratings, as defined by IEC EN 60034-30, or alternative technologies, such as permanent magnet synchronous motors that have equal or better efficiency, shall be used.

10.4.3.5.2 Transmission

Transmissions shall not reduce the efficiency of the combined motor/transmission below that shown for the Class IE2 motor for elevators with capacities below 4,000 lbs. Gearless machines shall be assumed to have a 100% transmission efficiency.

10.4.3.5.3 Drive

Potential energy released during motion shall be recovered with a regenerative drive that supplies electrical energy to the building electrical system.

Section 10.4.4.1 Regeneration Drive

Section 10.4.4 - Add a new Section 10.4.4.1 to read as follows:

10.4.4.1 Regenerative Drive

An escalator designed either for one-way down operation only or for reversible operation shall 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 exceeds 750 pounds.

Section 10.4.6 Commercial Kitchen Equipment

Section 10.4.6 - Add a new Section 10.4.6 to read as follows:

10.4.6 Commercial Kitchen Equipment

Commercial kitchen equipment shall comply with the minimum efficiency requirements of Tables 10.4.6-1 through 10.4.6-5.

Table 10.4.6-1 - Add a new Table 10.4.6-1 to read as follows:

Table 10.4.6-1
Minimum Efficiency Requirements: Commercial Fryers

	Heavy-Load Cooking Energy Efficiency	Idle Energy Rate	Test Procedure
Standard Open Deep-Fat Gas Fryers	≥ 50%	≤ 9,000 Btu/hr	ASTM Standard F1361-17
Large Vat Open Deep-Fat Gas Fryers	≥ 50%	≤ 12,000 Btu/hr	
Standard Open Deep-Fat Electric Fryers	≥ 83%	≤ 800 watts	ASTM Standard F2144-17
Large Vat Open Deep-Fat Electric Fryers	≥ 80%	≤ 1,100 watts	

Table 10.4.6-2 - Add a new Table 10.4.6-2 to read as follows:

Table 10.4.6-2

Minimum Efficiency Requirements: Commercial Hot Food Holding Cabinets

Product Interior Volume (Cubic Feet)	Maximum Idle Energy Consumption Rate (Watts)	Test Procedure
0 < V < 13	≤ 21.5 V	ASTM Standard F2140-11
13 ≤ V < 28	≤ 2.0 V + 254.0	
28 ≤ V	≤ 3.8 V + 203.5	

Table 10.4.6-3 - Add a new Table 10.4.6-3 to read as follows:

Table 10.4.6-3

Minimum Efficiency Requirements: Commercial Steam Cookers

Fuel Type	Pan Capacity	Cooking Energy Efficiency[a]	Idle Rate	Test Procedure
Electric Steam	3-pan	50%	400 watts	ASTM Standard F1484-18
	4-pan	50%	530 watts	
	5-pan	50%	670 watts	
	6-pan and larger	50%	800 watts	
Gas Steam	3-pan	38%	6,250 Btu/h	
	4-pan	38%	8,350 Btu/h	
	5-pan	38%	10,400 Btu/h	
	6-pan and larger	38%	12,500 Btu/h	

a. Cooking Energy Efficiency is based on heavy load (potato) cooking capacity

a) Table 10.4.6-4 - Add a new Table 10.4.6-4 to read as follows:

Table 10.4.6-4
Minimum Efficiency Requirements: Commercial Dishwashers

Machine Type	High Temperature Efficiency Requirements		Low Temperature Efficiency Requirements		Test Procedure
	Idle Energy Rate [a]	Water Consumption [b]	Idle Energy Rate [a]	Water Consumption [b]	
Under Counter	≤ 0.50 kW	≤ 0.86 GPR	≤ 0.50 kW	≤ 1.19 GPR	ASTM F1696-18
Stationary Single Tank Door	≤ 0.70 kW	≤ 0.89 GPR	≤ 0.60 kW	≤ 1.18 GPR	
Pot, Pan , and Utensil	≤ 1.20 kW	≤ 0.58 GPSF	≤ 1.00 kW	≤ 0.58 GPSF	
Single Tank Conveyor	≤ 1.50 kW	≤ 0.70 GPR	≤ 1.50 kW	≤ 0.79 GPR	ASTM F1920-15
Multiple Tank Conveyor	≤ 2.25 kW	≤ 0.54 GPR	≤ 2.00 kW	≤ 0.54 GPR	
Single Tank Flight Type	Reported	GPH ≤ 2.975x + 55.00	Reported	GPH ≤ 2.975x + 55.00	
Multiple Tank Flight Type	Reported	GPH ≤ 4.96x + 17.00	Reported	GPH ≤ 4.96x + 17.00	

a. Idle results shall be measured with the door closed and represent the total idle energy consumed by the machine including all tank heater(s) and controls. Booster heater (internal or external) energy consumption should not be part of this measurement unless it cannot be separately monitored per US EPA Energy Star Commercial Dishwasher Specification Version 2.0.

b. GPR = gallons per rack; GPSF = gallons per square foot of rack; GPH = gallons per hour; x = sf of conveyer belt (i.e., W*L/min (maximum conveyor speed).

Table 10.4.6-5 - Add a new Table 10.4.6-5 to read as follows:

Table 10.4.6-5
Minimum Efficiency Requirements: Commercial Ovens

Fuel Type	Classification	Idle Rate	Cooking-Energy Efficiency, %	Test Procedure
Convection Ovens				
Gas	Full-Size	≤ 12,000 Btu/h	≥ 46	ASTM F1496 - 13
Electric	Half-Size	≤ 1.0 Btu/h	≥ 71	
	Full-Size	≤ 1.60 Btu/h		
Combination Ovens				
Gas	Steam Mode	≤ 200P[a]+6,511 Btu/h	≥ 41	ASTM F2861 - 17
	Convection Mode	≤ 150P[a]+5,425 Btu/h	≥ 56	
Electric	Steam Mode	≤ 0.133P[a]+0.6400 kW	≥ 55	
	Convection Mode	≤ 0.080P[a]+0.4989 kW	≥ 76	
Rack Ovens				
Gas	Single	≤ 25,000 Btu/h	≥ 48	ASTM F2093 - 18

	Double	≤ 30,000 Btu/h	≥ 52	

a. P = Pan Capacity: The number of steam table pans the combination oven is able to accommodate as per the ASTM F1495 - 05 standard specification.

a. **Section 11.2 Compliance**

Section 11.2 - Revise Items a, b, and c of Section 11.2, and add a new Item d to such Section, to read as follows:

a. All requirements of Sections 5.4, 6.4, 7.4, 8.4, 9.4, 10.4, and Section 6.7 are met;

b. the design energy cost, as calculated in Section 11.5, does not exceed the energy cost budget as calculated by the simulation program described in Section 11.4;

c. the energy efficiency level of components specified in the building design meet or exceed the efficiency levels used to calculate the design energy cost; and

d. In new buildings 25,000 square feet and greater, the building envelope shall comply with either:

1. Section 5.5, “Prescriptive Building Envelope Option,” or

2. An envelope performance factor shall be calculated in accordance with Appendix C of this standard, and buildings shall comply with one of the following:

i. For multifamily, hotel/motel and dormitory building area types, the margin by which the proposed envelope performance factor exceeds the base envelope performance factor shall not be greater than 15%. For compliance with this requirement, the base envelope performance factor shall be calculated using metal framing operable windows. In buildings with window area accounting for 40% or more of the gross wall area, the SHGC of the vertical fenestration on east and west oriented façade may be reduced by the following multiplier to account for the permanent site shading from existing buildings or infrastructure.

$M_{West} = 0.18 + 0.33/WWR$

$M_{East} = 0.35 + 0.26/WWR$

Where:

M_{West} = SHGC multiplier for the West façade

M_{East} = SHGC multiplier for the East façade

WWR = the ratio of proposed vertical fenestration area to the gross wall area in consistent units

The multiplier may be applied to the rated SHGC of the vertical fenestration which has at least 50% of the area located directly opposite of the shading surfaces and no higher from the street level than the difference between the shading surface height and the shading surface distance

from the façade. Orientation must be determined following Section 5.5.4.5, Fenestration Orientation.

ii. For all other building area types, the margin by which the proposed envelope performance factor exceeds the base envelope performance factor shall be not greater than 7%. For compliance with this requirement, the base envelope performance factor shall be calculated using metal framing fixed windows.

iii. For mixed-use buildings, the margin shall be calculated as the gross wall area-weighted average of items (i) and (ii) above.

Section 11.4.1 Simulation Program

Section 11.4.1 - Revise the paragraph before the Informative Note in Section 11.4.1 to read as follows:

The simulation program shall be a computer-based program for the analysis of energy consumption in buildings (a program such as, but not limited to, DOE-2 or BLAST). For components that cannot be modeled by the simulation program, the exceptional calculation methods requirements in Section 11.4.5 shall be used.

Section 11.4.1.1

Section 11.4.1.1 - Revise Item a of Section 11.4.1.1 to read as follows:

a. A minimum of 8760 hours per year.

Section 11.4.3.2 Annual Energy Costs

Section 11.4.3.2 - Add a new sentence at the end of Section 11.4.3.2 to read as follows:

Where the proposed design includes electricity generated from sources other than on-site renewable energy, the baseline design shall include the same generation system, excluding its site-recovered energy.

Section 11.4.5 Exceptional Calculation Methods

Section 11.4.5 - Revise the first sentence in Section 11.4.5 to read as follows:

When the simulation program does not model a design, material, or device, the authority having jurisdiction may approve an exceptional calculation method to be used to demonstrate compliance with Section 11.

Section 11.5.2 HVAC Systems

Section 11.5.2 - Revise Item c in Section 11.5.2 to read as follows:

c. **Supply Fan Energy in Certain Package Equipment**

Where efficiency ratings include supply fan energy, the efficiency rating shall be adjusted to remove the supply fan energy. For Budget System Types 3, 4, 6, 9, and 11, calculate the minimum $COP_{nfcooling}$ and $COP_{nfheating}$ using the equation for the applicable performance rating as indicated in Tables 6.8.1-1

through 6.8.1-4. Where multiple HVAC zones are combined into a single thermal block in accordance with Table 11.5.1, the efficiencies for the budget System Types 6, 8, and 10 taken from Tables 6.8.1-1 through 6.8.1-4, shall be based on 9,000 Btu/hr equipment capacity for residential spaces; otherwise, it shall be based on the capacity of the thermal block divided by the number of HVAC zones. Budget System Types 3, 6, 9 and 11 efficiencies taken from Table 6.8.1-1 through 6.8.1-4 shall be based on the cooling equipment capacity of a single floor when grouping identical floors in accordance with Table 11.5.1. Where a full- and part-load efficiency rating is provided in Tables 6.8.1-1 through 6.8.1-4, the full-load equation below shall be used:

$$COP_{nfcooling} = 7.84E\text{-}8 \times EER \times Q + 0.338 \times EER$$

$$COP_{nfcooling} = -0.0076 \times SEER^2 + 0.3796 \times SEER$$

$$COP_{nfheating} = 1.48E\text{-}7 \times COP_{47} \times Q + 1.062 \times COP_{47}$$

(applies to heat pump heating efficiency only)

$$COP_{nfheating} = -0.0296 \times HSPF^2 + 0.7134 \times HSPF$$

where $COP_{nfcooling}$ and $COP_{nfheating}$ are the packaged HVAC equipment cooling and heating energy efficiency, respectively, to be used in the budget building design, which excludes supply fan power, and Q is the AHRI-rated cooling capacity in Btu/h. If Q is greater than 760,000 Btu/hr, use 760,000 Btu/h in the calculation.

EER, SEER, COP, and HSPF shall be at AHRI test conditions. Fan energy shall be modeled separately according to Section 11.5.2(h). Supply and return/relief system fans shall be modeled as operating at least whenever the spaces served are occupied, except as specifically noted in Table 11.5.2-1.

Section 11.5.2 - Add a new Exception to Item d of Section 11.5.2 to read as follows:

Exception to (d)

Where the minimum outdoor air intake flow in the proposed design is provided in excess of the amount allowed by Section 6.5.3.7, the baseline building design shall be modeled to reflect the minimum amount allowed by Section 6.5.3.7 and will be less than or equal to the proposed design.

Section 11.7 Documentation Requirements

Section 11.7 - Revise Section 11.7 to read as follows:

11.7 Documentation Requirements

Compliance shall be documented and submitted to the authority having jurisdiction. The information submitted shall include the following:

a. The energy cost budget for the budget building design and the design energy cost for the proposed

design.

b. The simulation program used and the version of the simulation program.

c. An overview of the project that includes the number of stories (above and below grade), the typical floor size, the uses in the building (e.g., office, cafeteria, retail, parking, etc.), the gross area of each use, and whether each use is conditioned space.

d. A list of the energy-related features that are included in the design and on which compliance with the provisions of Section 11 is based. This list shall document all energy features that differ between the models used in the energy cost budget and the design energy cost calculations.

e. A list showing compliance for the proposed design with all of the requirements of Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4 (mandatory provisions).

f. Building elevations and floor plans.

g. A diagram showing the thermal blocks used in the computer simulation.

h. An explanation of any significant modeling assumptions.

i. Backup calculations and material to support data inputs.

j. The input and output reports from the simulation program, including a breakdown of energy usage by at least the following components: lights, internal equipment loads, service water-heating equipment, space-heating equipment, space cooling and heat-rejection equipment, fans, and other HVAC equipment (such as pumps). The output reports shall also show the amount of time any loads are not met by the HVAC system for both the proposed design and budget building design.

k. Purchased energy rates used in the simulations.

l. An explanation of any error messages noted in the simulation program output.

m. For any exceptional calculation methods employed, document the predicted energy savings by energy type, the energy cost savings, a narrative explaining the exceptional calculation method performed and documentation as required in Section 11.4.5.

n. The reduction in design energy cost associated with on-site renewable energy.

Table 11.5.1 Row 4 Column A

Table 11.5.1 Row 4 Column A - Revise the paragraph in Row 4 Column A of Table 11.5.1 to read as follows:

The schedule types listed in Section 11.4.1.1(b) shall be required input. Temperature control set points and schedules shall be in accordance with the rules of the department for the applicable space types, unless as determined by the designer and approved by the authority having jurisdiction. Required schedules shall be identical for the proposed design and budget building design.

Temperature and Humidity Schedules. Temperature and humidity control set points and schedules as well as temperature control throttling range shall be the same for the proposed design and baseline design.

HVAC Fan Schedules. Schedules for HVAC fans that provide outdoor air for ventilation shall run continuously whenever spaces are occupied and shall be cycled ON and OFF to meet heating and cooling loads during unoccupied hours.

Exceptions:

1. Where no heating and/or cooling system is to be installed, and a heating or cooling system is being simulated only to meet the requirements described in this table, heating and/or cooling system fans shall not be simulated as running continuously during occupied hours but shall be cycled ON and OFF to meet heating and cooling loads during all hours.

2. HVAC fans shall remain on during occupied and unoccupied hours in spaces that have health- and safety-mandated minimum ventilation requirements during unoccupied hours.

Table 11.5.1 Row 5 Column A

Table 11.5.1 Row 5 Column A - Revise the first paragraph before the Exceptions in Row 5 Column A of Table 11.5.1 to read as follows:

All components of the building envelope in the proposed design shall be modeled as shown on architectural drawings or as installed for existing building envelopes. Opaque portions of the curtain wall shall use the default U-factors in Table 5.5.3, unless an alternative method is approved by the department.

Table 11.5.1 Row 5 Column A - Revise Exception 1 in Row 5 Column A of Table 11.5.1 to read as follows:

1. Any building envelope assembly that covers less than 5% of the total area of that assembly type (e.g., exterior walls) need not be separately described, provided that its U-factor is similar to an assembly being modeled. If not separately described, the area of a building envelope assembly must be added to the area of the adjacent assembly of that same type. The U-factors of these assemblies shall be averaged with larger adjacent surfaces using an area-weighted average method. When the total area of penetrations from through-the-wall mechanical equipment or equipment listed in Table 6.8.1-4 exceeds 1% of the opaque above-grade wall area, the mechanical equipment penetration area shall be calculated as a separate wall assembly with a default U-factor of 0.5. Where mechanical equipment has been tested in accordance with testing standards approved by the authority having jurisdiction, the mechanical equipment penetration area may be calculated as a separate wall assembly with the U-factor as determined by such test.

Table 11.5.1 Row 6 Column A

Table 11.5.1 Row 6 Column A - Revise Item d in Row 6 Column A of Table 11.5.1 to read as follows:

d. Lighting system power shall include all lighting system components shown or provided for on plans (including lamps, ballasts, task fixtures, and furniture-mounted fixtures). For dwelling units, hotel/motel guest rooms, and dormitory-living quarters in which lighting systems include plug-in light fixtures that are not shown or provided for on design documents, assume identical lighting power for the proposed

design and baseline building design in the simulations.

Table 11.5.1 Row 6 Column A - Revise Item f in Row 6 Column A of Table 11.5.1 to read as follows:

f. Automatic lighting controls included in the proposed design but not required by Section 9.4.1 may be modeled using the following methods for each luminaire control:

1. Daylighting controls shall be modeled directly in the building simulation or be modeled in the building simulation through schedule adjustments determined by a separate analysis approved by the authority having jurisdiction. Modeling and schedule adjustments shall separately account for primary sidelighted areas, secondary sidelighted areas, and toplighted areas.

2. For automatic controls other than daylighting, the proposed design lighting power may be reduced for each luminaire under control by dividing the rated lighting power of the luminaire by the factor (1 +ΣCF), where ΣCF indicates the sum of all applicable control factors (CF) per Section 9.6.3 and Table 9.6.3.

Table 11.5.1 Row 11 Column B

Table 11.5.1 Row 11 Column B - Revise the paragraph before the Exceptions in Row 11 Column B of Table 11.5.1 to read as follows:

The service water-heating system type in the budget building design shall be identical to the proposed design. The service water-heating system performance of the budget building design shall meet the requirements of Sections 7.4 and 7.5.

Table 11.5.1 Row 11 Column B - Add a new paragraph following the Exceptions in Row 11 Column B of Table 11.5.1 to read as follows:

Service water loads and use shall be the same for both the proposed design and baseline building design and typical of the proposed building type.

Section 12 Normative References

12 Normative References - Delete Section 12 in its entirety and replace with a new Section 12 to read as follows:

12 Normative References

Reference	Title
Air Conditioning, Heating and Refrigeration Institute (AHRI) 2111 Wilson Blvd., Suite 500, Arlington, VA 22201	
AHRI 210/240-2008 with Addendum 1 and 2	Unitary Air Conditioning and Air-Source Heat Pump Equipment
AHRI 310/380-2004	Packaged Terminal Air-Conditioners and Heat Pumps

AHRI 340/360-2015 (I-P)	Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment
AHRI 365-2009	Commercial and Industrial Unitary Air-Conditioning Condensing Units
AHRI 390-2003	Performance Rating of Single Packaged Vertical Air-Conditioners and Heat Pumps
ANSI/AHRI 400-2015	Performance Rating of Liquid-to-Liquid Heat Exchangers
AHRI 460-2005	Remote Mechanical Draft Air Cooled Refrigerant Condensers
AHRI 550/590-2015 (I-P) and AHRI 551/591-2015 (SI)	Performance Rating of Water-Chilling and Heat-Pump Water-Heating Packages Using the Vapor Compression Cycle
AHRI 560-2000	Absorption Water Chilling and Water Heating Packages
AHRI Standard 910-2014 (I-P)	Performance Rating of Indoor Pool Dehumidifiers
AHRI Standard 910-2014 (SI)	Performance Rating of Indoor Pool Dehumidifiers
AHRI Standard 920-2015 (I-P)	Performance Rating of DX-Dedicated Outdoor Air System Units
AHRI Standard 921-2015 (SI)	Performance Rating of DX-Dedicated Outdoor Air System Units
AHRI 1160-2009	Performance Rating of Heat Pump Pool Heaters
AHRI 1200-2013	Performance Rating of Commercial Refrigerated Display Merchandisers and Storage Cabinets
AHRI 1230-2010 with Addendum 1	Performance Rating of Variable Refrigerant Flow (VRF) Multi-split Air-Conditioning and Heat Pump Equipment
ANSI/AHRI Standard 1360-2016 (I-P)	Performance Rating of Computer and Data Processing Room Air Conditioners
ANSI/AHRI Standard 1361-2016 (SI)	Performance Rating of Computer and Data Processing Room Air Conditioners
BTS 2000	Testing Standard Method to Determine Efficiency of Commercial Space Heating Boilers
Air Movement and Control Association International (AMCA) 30 West University Drive, Arlington Heights, IL 60004-1806	
AMCA 205-12	Energy Efficiency Classification for Fans
AMCA Standard 500-D-12	Laboratory Methods of Testing Dampers for Rating
American Architectural Manufacturers Association (AAMA) 1827 Walden Office Square, Suite 550, Schaumburg, IL 60173-4268 Canadian Standards Association (CSA) 5060 Spectrum Way, Mississauga, Ontario, Canada L4W 5N6 Window and Door Manufacturers Association (WDMA) 2025 M Street, NW, Washington, DC 20036	
AAMA/WDMA/CSA 101/I.S.2/A440-11	NAFS-North American Fenestration Standard/Specification for Windows, Doors, and Skylights
American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036	
ANSI Z21.10.3-2011	Gas Water Heater, Volume 3, Storage, with Input Ratings above 75,000 Btu/h, Circulating and Instantaneous Water Heaters
ANSI Z21.47-2012/CSA 2.3-2012	Gas-Fired Central Furnaces
ANSI Z83.8-2013/CSA 2.6-2013	Gas Unit Heaters and Duct Furnaces
American Society of Mechanical Engineers (ASME) Three Park Avenue, New York, NY 10016-5990	
ASME A17.1-2013/CSA B44-13	Safety Code for Elevators and Escalators

ASHRAE 1791 Tullie Circle, NE, Atlanta, GA 30329	
ANSI/ASHRAE Standard 55-2013	Thermal Environmental Conditions for Human Occupancy
ANSI/ASHRAE Standard 62.1-2013	Ventilation for Acceptable Indoor Air Quality
ANSI/ASHRAE/IESNA Standard 90.1-2007	Energy Standard for Buildings Except Low-Rise Residential Buildings
ANSI/ASHRAE/IESNA Standard 90.1-2010	Energy Standard for Buildings Except Low-Rise Residential Buildings
ANSI/ASHRAE/IESNA Standard 90.1-2013	Energy Standard for Buildings Except Low-Rise Residential Buildings
ANSI/ASHRAE Standard 111-2008	Testing, Adjusting, and Balancing of Building HVAC Systems
ANSI/ASHRAE Standard 127-2012	Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners
ANSI/ASHRAE Standard 140-2014	Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs
ANSI/ASHRAE Standard 154-2011	Ventilation for Commercial Cooking Operations
ANSI/ASHRAE Standard 169-2013	Climatic Data for Building Design Standards
ANSI/ASHRAE/ASHE Standard 170-2013	Ventilation of Health Care Facilities
ANSI/ASHRAE/ACCA Standard 183-2007 (RA 2014)	Peak Cooling and Heating Load Calculations in Buildings Except Low-Rise Residential Buildings
Association of Home Appliance Manufacturers (AHAM) 1111 19th Street NW, Suite 402, Washington, DC 20036	
ANSI/AHAM HRF-1-2008	Energy and Internal Volume of Refrigerating Appliances (including errata issued November 17, 2009)
ASTM International 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959	
ASTM C90-14	Standard Specification for Loadbearing Concrete Masonry Units
ASTM C177-13	Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmittance Properties by Means of the Guarded-Hot-Plate Apparatus
ASTM C272/C272M-12	Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions
ASTM C518-10	Standard Test Method for Steady-State Thermal Transmittance Properties by Means of the Heat Flow Meter Apparatus
ASTM C835-06 (2013) el	Standard Test Method for Total Hemispherical Emittance of Surfaces up to 1400°C
ASTM C1224-11	Standard Specification for Reflective Insulation for Building Applications
ASTM C1363-11	Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus
ASTM D1003-13	Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
ASTM E283-04 (2012)	Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E779-10	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization

ASTM E972-96 (2013)	Standard Test Method for Solar Photometric Transmittance of Sheet Materials Using Sunlight
ASTM E1677-2011	Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls
ASTM E1680-11	Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
ASTM E1827-2011	Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door
ASTM E1980-11	Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces
ASTM E2178-13	Standard Test Method for Air Permeance of Building Materials
ASTM E2357-11	Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
ASTM F1361-17	Standard Test Method for Performance of Open Deep Fat Fryers
ASTM F1484-18	Standard Test Methods for Performance of Steam Cookers
ASTM F1495-5	Standard Specification for Combination Oven Electric or Gas Fired
ASTM F1496-13	Standard Test Method for Performance of Convection Ovens
ASTM F1696-18	Standard Test Method for Energy Performance of Stationary-Rack, Door-Type Commercial Dishwashing Machines
ASTM F1920-15	Standard Test Method for Performance of Rack Conveyor Commercial Dishwashing Machines
ASTM F2093-18	Standard Test Method for Performance of Rack Ovens
ASTM F2140-11	Standard Test Method for Performance of Hot Food Holding Cabinets
ASTM F2144-17	Standard Test Method for Performance of Large Open Vat Fryers
ASTM F2861-17	Standard Test Method for Enhanced Performance of Combination Oven in Various Modes
BC Hydro Power Smart 333 Dunsmuir Street Vancouver, BC V6B 5R	
BC Hydro Building Envelope Thermal Bridging Guide Version 1.2 - September 2018	BC Hydro Building Envelope Thermal Bridging Guide V. 1.2 - September 2018
Cool Roof Rating Council (CRRC) 1610 Harrison Street, Oakland, CA 94612	
ANSI/CRRC-1 Standard-2012	Cool Roof Rating Council-ANSI/CRRC-1 Standard
Cooling Technology Institute (CTI) 3845 Cypress Creek Parkway, Suite 420, Houston, TX 77068; P.O. Box 681807	
CTI ATC-105 (00)	Acceptance Test Code for Water Cooling Towers
CTI ATC-105S (11)	Acceptance Test Code for Closed-Circuit Cooling Towers
CTI ATC-106 (11)	Acceptance Test Code for Mechanical Draft Evaporative Vapor Condensers
CTI STD-201 RS (15)	Performance Rating of Evaporative Heat Rejection Equipment
Door and Access Systems Manufacturers Association (DASMA) 1300 Sumner Avenue, Cleveland, OH 44115-2851	
ANSI/DASMA 105-2012	Test Method for Thermal Transmittance and Air Infiltration of Garage Doors

	Infiltration of Garage Doors
U.S. Environmental Protection Agency (EPA) 1200 Pennsylvania Avenue, N.W. Washington, DC 20460	
US EPA Energy Star Commercial Dishwasher Specification Version 2- 2012	US EPA Energy Star Commercial Dishwasher Specification Version 2
International Electrotechnical Commission (IEC) IEC Regional Centre for North America 446 Main Street 16th Floor Worcester, MA 01608 U.S.A.	
IEC EN 60034-30-1-2014	Efficiency classes of line operated AC motors
Illuminating Engineering Society (IES) 120 Wall street, Floor 17, New York, NY 10005-4001	
ANSI/IES RP-28-2007	Lighting and the Visual Environment for Senior Living
International Organization for Standardization (ISO) ISO Central Secretariat BIBC II Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland	
ISO 9050 (2003)	Glass in Building-Determination of Light Transmittance, Solar Direct Transmittance, Total Solar Energy Transmittance, Ultraviolet Transmittance and Related Glazing Factors
ANSI/AHRI/ASHRAE/ISO 13256-1:1998 (R2012)	Water-Source Heat Pumps-Testing and Rating for Performance-Part 1: Water-to-Air and Brine-to-Air Heat Pumps
ANSI/AHRI/ASHRAE/ISO 13256-2:1998 (R2012)	Water-Source Heat Pumps-Testing and Rating for Performance-Part 2: Water-to-Water and Brine-to-Water Heat Pumps
ISO 25745-2:2015	Energy Performance of Lifts, Escalators and Moving Walks-Part 2: Energy Calculation and Classification for Lifts (Elevators)
New York City Department of Buildings (NYC DOB) 280 Broadway New York, NY 10007	
NYCAC (2014)	Administrative Code of the city of New York
NYCBC (2014)	New York City Building Code
NYCECC	New York City Energy Conservation Code
NYCMC (2014)	New York City Mechanical Code
National Electrical Manufacturers Association (NEMA) 1300 N. 17th Street, Suite 1847, Rosslyn, VA 22209	
ANSI/NEMA MG 1-2009	Motors and Generators
National Fenestration Rating Council (NFRC) 6305 Ivy Lane, Suite 140, Greenbelt, MD 20770-6323	
ANSI/NFRC 100-2014	Procedure for Determining Fenestration Product U-Factors
ANSI/NFRC 200-2014	Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal Incidence
NFRC 300-2014	Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems
NFRC 301-2014	Test Method for Emittance of Specular Surfaces Using Spectrometric Measurements
ANSI/NFRC 400-2014	Procedure for Determining Fenestration Product Air Leakage
National Fire Protection Association (NFPA) 1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101	
NFPA 70-2014	National Electric Code
NFPA 96-2014	Ventilation Control and Fire Protection of Commercial Cooking Operations
Telecommunications Industry Association (TIA) 2500 Wilson Boulevard, Arlington, VA 22201	

~~Telecommunications Industry Association (TIA) 2500 Wilson Boulevard, Arlington, VA 22201~~	
ANSI/TIA-942-REV A, March 2014	Telecommunication Infrastructure Standard for Data Centers
Underwriters Laboratories, Inc. (UL) 333 Pfingsten Rd., Northbrook, IL 60062	
UL 181A-2013	Closure Systems for Use with Rigid Air Ducts and Air Connectors
UL 181B-2013	Closure Systems for Use with Flexible Air Ducts and Air Connectors
UL 727-06	UL Standard for Safety-Oil Fired Central Furnaces
UL 731-2012	UL Standard for Safety-Oil-Fired Unit Heaters
U.S. Department of Energy (DOE) 1000 Independence Avenue, SW, Washington, DC 20585	
10 CFR Part 430, App N	Uniform Test Method for Measuring the Energy Consumption of Furnaces
10 CFR Part 430, Subpart B, Appendix F- 2015	Uniform Test Method for Measuring the Energy Consumption of Room Air Conditioners
10 CFR 431 Subpart K, App A	Uniform Test Method for Measuring the Energy Consumption of Distribution Transformers
10 CFR Part 431, Subpart B, App B	Uniform Test Method for Measuring Nominal Full-Load Efficiency of Electric Motors
42 USC 6831, et seq., Public Law 102-486	Energy Policy Act of 1992, EPACT 2005, and EISA 2007
U.S. Security and Exchange Commission (SEC) 100 F Street, NE, Washington, DC 2-549	
The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System	The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System, April 7, 2003

Normative Appendix G

Section G1.2.1 Mandatory Provisions

Section G1.2.1 - Revise Item a of Section G1.2.1 to read as follows:

a. All requirements of Sections 5.4, 6.4, 7.4, 8.4, 9.4, 10.4, and Section 6.7 shall be met. These sections contain the mandatory provisions of the standard and are prerequisites for this rating method.

Section G1.2.1 - Add a new Item c to Section G1.2.1 to read as follows:

c. In new buildings 25,000 square feet and greater, the building envelope shall comply with either:

1. Section 5.5, “Prescriptive Building Envelope Option,” or

2. An envelope performance factor shall be calculated in accordance with Appendix C of this standard, and buildings shall comply with one of the following:

i. For multifamily, hotel/motel and dormitory building area types, the margin by which the proposed envelope performance factor exceeds the base envelope performance factor shall not be greater than 15%. For compliance with this requirement, the base envelope performance factor shall be calculated using metal framing operable windows. In buildings with window area accounting for 40% or more of the gross wall area, the SHGC of the

vertical fenestration on east and west oriented façade may be reduced by the following multiplier to account for the permanent site shading from existing buildings or infrastructure.

$M_{West} = 0.18 + 0.33/WWR$

$M_{East} = 0.35 + 0.26/WWR$

Where:

M_{West} = SHGC multiplier for the West façade

M_{East} = SHGC multiplier for the East façade

WWR = the ratio of proposed vertical fenestration area to the gross wall area in consistent units

The multiplier may be applied to the rated SHGC of the vertical fenestration which has at least 50% of the area located directly opposite of the shading surfaces and no higher from the street level than the difference between the shading surface height and the shading surface distance from the façade. Orientation must be determined following Section 5.5.4.5, Fenestration Orientation.

ii. For all other building area types, the margin by which the proposed envelope performance factor exceeds the base envelope performance factor shall be not greater than 7%. For compliance with this requirement, the base envelope performance factor shall be calculated using metal framing fixed windows.

iii. For mixed-use buildings, the margin shall be calculated as the gross wall area-weighted average of i) and ii) above.

Section G1.2.2 Performance Rating Calculation

Section G1.2.2 - Delete Section G1.2.2 in its entirety and replace with a new Section G1.2.2 to read as follows:

G1.2.2 Performance Rating Calculation

The performance of the proposed design is calculated by either the provisions of G1.2.2.1 Performance Cost Index or G1.2.2.2 Performance Source Energy Index.

Section G1.2.2.1 Performance Cost Index

Section G1.2.2.1 - Add a new Section G1.2.2.1 to read as follows:

G1.2.2.1 Performance Cost Index

The performance of the proposed design is calculated in accordance with provisions of this Appendix using the following formula:

Performance Cost Index = Proposed building performance/Baseline building performance

Both the proposed building performance and the baseline building performance shall include all end-use load components within and associated with the building when calculating the Performance Cost Index.

Section G1.2.2.2 Performance Source Energy Index

Section G1.2.2.2 - Add a new Section G1.2.2.2 to read as follows:

G1.2.2.2 Performance Source Energy Index

The performance of the proposed design is calculated in accordance with provisions of this Appendix using the following formula:

Performance Source Energy Index = Proposed building source energy/Baseline building source energy

Both the proposed building source energy and the baseline building source energy shall include all end-use load components within and associated with the building when calculating the Performance Source Energy Index.

Section G1.3 Documentation Requirements

Section G1.3 - Revise Item a of Section G1.3 to read as follows:

a. A brief description of the project, the key energy efficiency improvements compared with the requirements in Sections 5 through 10, the simulation program used, the version of the simulation program, and the results of the energy analysis. This summary shall contain the calculated values for the baseline building unregulated energy cost (BBUEC), baseline building regulated energy cost (BBREC), baseline building unregulated source energy (BBUSE), baseline building regulated source energy (BBRSE),building performance factor (BPF), baseline building performance, the proposed building performance, baseline building source energy, the proposed building source energy, Performance Cost Index (PCI), Performance Source Energy Index (PSEI), Performance Cost Index Target (PCIt), and Performance Source Energy Target (PSEt).

Section G1.3 - Revise Item f of Section G1.3 to read as follows:

f. A table with a summary by end use of the proposed building performance, proposed building source energy, baseline building performance, baseline building source energy with each end use separated into regulated and unregulated components.

Section G1.3 - Revise Item h of Section G1.3 to read as follows:

h. Building elevations and floor plans.

Section G2.4.1 On-Site Renewable Energy and Site-Recovered Energy

Section G2.4.1 - Revise Section G2.4.1 to read as follows:

G2.4.1 On-Site Renewable Energy and Site-Recovered Energy

Site-recovered energy shall not be considered purchased energy and shall be subtracted from the proposed design energy consumption prior to calculating the proposed building performance or proposed building source energy. On-site renewable energy generated by systems included on the building permit that is used by the building shall be subtracted from the proposed design energy consumption prior to calculating the proposed building performance or proposed building source energy. The reduction in proposed building performance or proposed building source energy associated with on-site renewable energy systems shall not exceed 5% of the calculated baseline building performance or baseline building source energy, respectively.

G2.4.2 Annual Energy Costs

Section G2.4.2 - Delete Section G2.4.2 in its entirety and replace with a new G2.4.2 to read as follows:

G2.4.2 Annual Energy Costs

The design energy cost and baseline energy cost shall be determined using rates for purchased energy (such as electricity, gas, oil, propane, steam, and chilled water) that are approved by the authority having jurisdiction. Where on-site renewable energy or site-recovered energy is used, the baseline building design shall be based on the energy source used as the backup energy source, or the baseline system energy source in that category if no backup energy source has been specified, except where the baseline energy source is prescribed in Tables G3.1.1-2 and G3.1.1-3. Where the proposed design includes electricity generated from sources other than on-site renewable energy, the baseline design shall include the same generation system, excluding its site-recovered energy.

G2.5 Exceptional Calculation Methods

Section G2.5 - Revise Item e of Section G2.5 to read as follows:

e. The Performance Cost Index or Performance Source Energy Index calculated with and without the exceptional calculation method.

Table G3.1 Row 1 Column A

Table G3.1 Row 1 Column A - Revise Item c in Row 1 Column A of Table G3.1 to read as follows:

c. When the performance rating method is applied to buildings in which energy-related features have not yet been designed (e.g., a lighting system), those yet-to-be-designed features shall be modeled in the proposed design to comply with but not exceed the requirements of this Standard as described in Table G3.1 parts 6, 10, 11 and 12. Where the space classification for a space is not known, the space shall be categorized as an office space.

Table G3.1 Row 1 Column B

Table G3.1 Row 1 Column B - Add a new paragraph after the second paragraph in Row 1 Column B of Table G3.1 to read as follows:

Where the baseline building systems and equipment are permitted to be different from the proposed design

but are not prescribed in this Appendix, the baseline must be determined based on the following, in the order of priority:

a. Requirements in Sections 5 through 10.

b. Requirements of other efficiency or equipment codes or standards applicable to the designs of the building systems and equipment.

Table G3.1 Row 4 Column A

Table G3.1 Row 4 Column A - Revise the first paragraph in Row 4 Column A of Table G3.1 to read as follows:

Schedules capable of modeling hourly variations in occupancy, lighting power, miscellaneous equipment power, thermostat set points, and HVAC system operation shall be used. Schedules shall be in accordance with the rules of the department for the applicable space types, unless as determined by the designer and approved by the authority having jurisdiction.

Table G3.1 Row 4 Column B

Table G3.1 Row 4 Column B - Add a new Exception 3 in Row 4 Column B of Table G3.1 to read as follows:

3. Fan schedules may be allowed to differ when G3.1.1(c) applies.

Table G3.1 Row 5 Column A

Table G3.1 Row 5 Column A - Revise the paragraph before the Exceptions in Row 5 Column A of Table G3.1 to read as follows:

a. All components of the building envelope in the proposed design shall be modeled as shown on architectural drawings or as built for existing building envelopes. Opaque portions of the curtain wall shall use the default U-factors in Table 5.5.3, unless an alternative method is approved by the department.

Table G3.1 Row 5 Column A - Revise Exception 1 in Row 5 Column A of Table G3.1 to read as follows:

1. All uninsulated assemblies (e.g., projecting balconies, perimeter edges of intermediate floor slabs, concrete floor beams over parking garages, roof parapet) shall be separately modeled using either of the following techniques:

a. Separate model of each of these assemblies within the energy simulation model.

b. Separate calculation of the U-factor for each of these assemblies. The U-factors of these assemblies are then averaged with larger adjacent surfaces using an area- weighted average method. This average U-factor is modeled within the energy simulation model.

Any other building envelope assembly that covers less than 5% of the total area of that assembly type (e.g., exterior walls) need not be separately described, provided that its U-factor is similar to an assembly being modeled. If not separately described, the area of a building envelope assembly shall be

added to the area of an assembly of that same type with the same orientation and thermal properties.

When the total area of penetrations from through-the-wall mechanical equipment or equipment listed in Table 6.8.1-4 exceeds 1% of the opaque above-grade wall area, the mechanical equipment penetration area shall be calculated as a separate wall assembly with a default U-factor of 0.5. Where mechanical equipment has been tested in accordance with testing standards approved by the authority having jurisdiction, the mechanical equipment penetration area may be calculated as a separate wall assembly with the U-factor as determined by such test.

Table G3.1 Row 6 Column A

Table G3.1 Row 6 Column A - Revise Row 6 Column A of Table G3.1 to read as follows:

Lighting power in the proposed design shall be determined as follows:

a. Where a complete lighting system exists, the actual lighting power for each thermal block shall be used in the model.

b. Where a lighting system has been designed and submitted with design documents, lighting power shall be determined in accordance with Sections 9.1.3 and 9.1.4.

c. Where lighting neither exists nor is submitted with design documents, lighting shall comply with but not exceed the requirements of Section 9. Where space types are known, lighting power shall be determined in accordance with the Space-by-Space Method. Where space types are not known, lighting power shall be determined in accordance with the Building Area Method.

d. Lighting system power shall include all lighting system components shown or provided for on the plans (including lamps and ballasts and task and furniture-mounted fixtures).

e. For dwelling units, hotel/motel guest rooms, and other spaces in which lighting systems are connected via receptacles and are not shown or provided for on building plans, lighting power used in the simulation shall be equal to the lighting power allowance in Table 9.6.1 for the appropriate space type or as designed, whichever is greater. For the dwelling units, lighting power used in the simulation shall be equal to 0.60 W/ft^2, (or as designed, whichever is greater).

Exception: Lighting use can be reduced for the portion of the space illuminated by the specified fixtures provided that they maintain the same illuminance level as in the baseline. Such reduction shall be demonstrated by calculations.

f. Exterior lighting power and lighting power for parking garages shall be modeled.

g. For lighting controls, at a minimum, the proposed design shall contain the mandatory automatic lighting controls specified in Section 9.4.1 (e.g., automatic daylight responsive controls, occupancy sensors, programmable controls, etc.). These controls shall be modeled in accordance with (h) and (i).

h. Automatic daylighting responsive controls shall be modeled directly in the proposed design or through schedule adjustments determined by a separate daylighting analysis approved by the rating

authority. Modeling and schedule adjustments shall separately account for primary sidelighted areas, secondary sidelighted areas, and toplighted areas.

i. Other automatic lighting controls included in the proposed design shall be modeled directly in the building simulation by reducing the lighting schedule each hour by the occupancy sensor reduction factors in Table G3.7 for the applicable space type. This reduction shall be taken only for lighting controlled by the occupancy sensors. Credit for other programmable lighting control in buildings less than 5000 ft^2 can be taken by reducing the lighting schedule each hour by 10%.

Table G3.1 Row 6 Column B

Table G3.1 Row 6 Column B - Revise Row 6 Column B of Table G3.1 to read as follows:

Interior lighting power in the baseline building design shall be determined using the values in Table G3.7. However, where lighting neither exists nor is submitted with design documents, and the proposed design lighting power is determined according to the Building Area Method, the baseline building design lighting power shall be determined in accordance with Table G3.8. Where retail display lighting is included in the proposed building design in accordance with Section 9.6.2(b), the baseline building design retail display lighting additional power shall be equal to the limits established by Section 9.6.2(b) or same as proposed, whichever is less.

Lighting shall be modeled having the automatic shutoff controls in buildings greater than 5000 ft^2 and occupancy sensors in employee lunch and break rooms, conference/meeting rooms, and classrooms (not including shop classrooms, laboratory classrooms, and preschool through 12th-grade classrooms). These controls shall be reflected in the baseline building design lighting schedules. No additional automatic lighting controls, e.g., automatic controls for daylight utilization and occupancy sensors in space types not listed above, shall be modeled in the baseline building design.

Exterior lighting in areas that are designed to be illuminated and identified as "Tradable Surfaces" in Table G3.6 shall be modeled with the baseline lighting power shown in Table G3.6. Other exterior lighting shall be modeled the same in the baseline building design as in the proposed design.

Table G3.1 Row 7 Column A

Table G3.1 Row 7 Column A - Revise Item 1 in Row 7 Column A of Table G3.1 to read as follows:

1. The space use classification is the same throughout the thermal block or all of the zones have peak internal loads that differ by less than 10 Btu/hr • ft^2 from the average.

Table G3.1 Row 7 Column A - Add a new Exception 4 in Row 7 Column A of Table G3.1 to read as follows:

4. All of the zones have schedules that differ by 40 or less equivalent load hours per week.

Table G3.1 Row 11 Column A

Table G3.1 Row 11 Column A - Add a new Item f in Row 11 Column A of Table G3.1 to read as follows:

f. Piping losses shall not be modeled.

Table G3.1 Row 11 Column B

Table G3.1 Row 11 Column B - Delete Item d in Row 11 Column B of Table G3.1 in its entirety.

Table G3.1 Row 11 Column B - Renumber Items e, f and g in Row 11 Column B of Table G3.1 as Items d, e and f of such Row 11 Column B, respectively.

Table G3.1 Row 11 Column B - Renumber Item h in Row 11 Column B of Table G3.1 as Item g in such Row 11 Column B, and revise Exception 1 of such renumbered Item g to read as follows:

1. Service water-heating use can be demonstrated to be reduced by documented water conservation measures that reduce the physical volume of service water required. Examples include low-flow shower heads. Such reduction shall be demonstrated by calculations. The baseline flow rates shall be equal to the maximum allowed by the applicable code and the calculation methodology shall be approved by the authority having jurisdiction.

Table G3.1 Row 11 Column B - Renumber Item i in Row 11 Column B of Table G3.1 as Item h of such Row 11 Column B.

Table G3.1 Row 11 Column B - Add a new Item i in Row 11 Column B of Table G3.1 to read as follows:

i. Piping losses shall not be modeled.

Table G3.1.1-1 Baseline Building Vertical Fenestration Percentage of Gross Above-Grade Wall Area

Table G3.1.1-1 - Delete Footnote a below Table G3.1.1-1 in its entirety.

G3.1.1 Baseline HVAC System Type and Description

Section G3.1.1 - Revise Item b of Section G3.1.1 to read as follows:

b. Use additional system types for nonpredominant conditions (i.e., residential/nonresidential) if those conditions apply to more than 20,000 ft^2 of conditioned floor area.

Section G3.1.1 - Revise Item c of Section G3.1.1 to read as follows:

c. If the baseline HVAC system type is 5, 6, 7, 8, 9, 10, 11, 12, or 13 use separate single-zone systems conforming with the requirements of system 3 or system 4 for any HVAC zones that have occupancy or internal gains or schedules that differ significantly from the rest of the HVAC zones served by the system. Total Peak internal gains that differ by 10 $Btu/h \cdot ft^2$ or more from the average of other spaces served by the system, or schedules that differ by more than 40 equivalent full-load hours per week from other HVAC zones served by the system, are considered to differ significantly. Examples where this exception may be applicable include but are not limited to natatoriums and continually occupied security areas. This exception does not apply to computer rooms.

Section G3.1.2.1 Equipment Efficiencies

Section G3.1.2.1 - Revise Section G3.1.2.1 to read as follows:

G3.1.2.1 Equipment Efficiencies

All HVAC equipment in the baseline building design shall be modeled at the minimum efficiency levels, both part load and full load, in accordance with Tables G3.5.1 through G3.5.6. Where multiple HVAC zones or residential spaces are combined into a single thermal block in accordance with Table G3.1, the efficiencies (for baseline HVAC System Types 1, 2, 3, 4, 9 and 10) taken from Tables G3.5.1, G3.5.2, G3.5.3, G3.5.4, and G3.5.5 shall be based on the equipment capacity of the thermal block divided by the number of HVAC zones or residential spaces. HVAC System Types 5 or 6 efficiencies taken from Table G3.5.1 shall be based on the cooling equipment capacity of a single floor when grouping identical floors in accordance with Section G3.1.1(a)(4). Fan energy shall be modeled separately according to Section G3.1.2.9. $COP_{nfcooling}$ and $COP_{nfheating}$ are the packaged HVAC equipment cooling and heating energy efficiency, respectively, to be used in the baseline building design, which excludes supply fan power.

Section G3.1.2.2 Equipment Capacities

Section G3.1.2.2 - Add a new sentence at the end of Section G3.1.2.2 to read as follows:

Plant capacities shall be based on coincident loads.

Table G3.1.2.9 Baseline Fan Brake Horsepower

Table G3.1.2.9 - Revise Table G3.1.2.9 to read as follows:

Table G3.1.2.9 Baseline Fan Brake Horsepower

Baseline Fan Motor Brake Horsepower		
Constant-Volume Systems 3,4, 12 and 13	**Variable-Volume Systems 5 to 8**	**Variable-Volume System 11**
$CFM_s \times 0.00094 + A$	$CFM_s \times 0.0013 + A$	$CFM_s \times 0.00062 + A$
Notes: 1. Where A is calculated according to Section 6.5.3.1.1 using the pressure-drop adjustment from the proposed design and the design flow rate of the baseline building system. 2. Do not include pressure-drop adjustments for evaporative coolers or heat recovery devices that are not required in the baseline building system by Section G3.1.2.10.		

Section G3.1.3.2 Type and Number of Boilers (Systems 1, 5, and 7)

Section G3.1.3.2 - Revise the lead title of Section G3.1.3.2 to read as follows:

G3.1.3.2 Type and Number of Boilers (Systems 1, 5, 7, 11 and 12)

Section G3.1.3.3 Hot-Water Supply Temperature (Systems 1, 5, 7, and 12)

Section G3.1.3.3 - Revise the lead title of Section G3.1.3.3 to read as follows:

G3.1.3.3 Hot-Water Supply Temperature (Systems 1, 5, 7, 11 and 12)

Section G3.1.3.6 Piping Losses (Systems 1, 5, 7, 8, and 11)

Section G3.1.3.6 - Revise the lead title of Section G3.1.3.6 to read as follows:

G3.1.3.6 Piping Losses (Systems 1, 5, 7, 8, 11, 12, and 13)

Section G3.1.3.10 Chilled-Water Pumps (Systems 7, 8, and 11)

Section G3.1.3.10 - Revise the lead title of Section G3.1.3.10 to read as follows:

G3.1.3.10 Chilled-Water Pumps (Systems 7, 8, 11, 12, and 13)

Section G3.1.3.11 Heat Rejection (Systems 7, 8, 9, 12, and 13)

Section G3.1.3.11 - Revise the lead title of Section G3.1.3.11 to read as follows:

G3.1.3.11 Heat Rejection (Systems 7, 8, 11, 12, and 13)

Section G3.1.3.12 Supply Air Temperature Reset (Systems 5 through 8)

Section G3.1.3.12 - Revise the lead title of Section G3.1.3.12 to read as follows:

G3.1.3.12 Supply Air Temperature Reset (Systems 5 through 8 and 11)

Table G3.5.1 Performance Rating Method Air Conditioners

Table G3.5.1 - Revise Table G3.5.1 to read as follows:

Table G3.5.1 Performance Rating Method Air Conditioners					
Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
Air conditioners, air-co	<65,000 Btu/h	All	Single-package	3.0 $COP_{nfcooling}$	ARI 210/240
	≥65,000 Btu/h and <135,000 Btu/h		Split-system and single-package	3.5 $COP_{nfcooling}$	ARI 340/360
	≥135,000 Btu/h and <240,000 Btu/h			3.4 $COP_{nfcooling}$	
	≥240,000 Btu/h and <760,000 Btu/h			3.5 $COP_{nfcooling}$	
	≥760,000 Btu/h			3.6 $COP_{nfcooling}$	

Table G3.5.2 Performance Rating Method Electrically Operated Unitary and Applied Heat Pumps - Minimum Efficiency Requirements

Table G3.5.2 - Revise Table G3.5.2 to read as follows:

Table G3.5.2 Performance Rating Method Electrically Operated Unitary and Applied Heat Pumps- Minimum Efficiency Requirements					
Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
Air-cooled (cooling mo	<65,000 Btu/h	All	Single package	3.0 $COP_{nfcooling}$	ARI 210/240
	≥65,000 Btu/h and <135,000 Btu/h		Split-system and single-package	3.4 $COP_{nfcooling}$	ARI 340/360
	≥135,000 Btu/h and <240,000 Btu/h			3.2 $COP_{nfcooling}$	
	≥240,000 Btu/h			3.1 $COP_{nfcooling}$	
Air-cooled (heating mo	<65,000 Btu/h (cooling capacity)		Single-package	3.4 $COP_{nfheating}$	ARI 210/240
	≥65,000 Btu/h and <135,000 Btu/h (cooling capacity)		47°F db/43°F wb outdoor air	3.4 $COP_{nfheating}$	ARI 340/360
			17°F db/15°F wb outdoor air	2.3 $COP_{nfheating}$	
	≥135,000 Btu/h (cooling capacity)		47°F db/43°F wb outdoor air	3.4 $COP_{nfheating}$	
			17°F db/15°F wb outdoor air	2.1 $COP_{nfheating}$	

Table G3.5.4 Performance Rating Method Electrically Operated Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps

Table G3.5.4 - Revise Table G3.5.4 to read as follows:

Table G3.5.4 Performance Rating Method Electrically Operated Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps				
Equipment Type	Size Category	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
PTAC (cooling mode)	All capacities	95°F db outdoor air	3.2 $COP_{nfcooling}$	ARI 310/380
PTHP (cooling mode)	All capacities	95°F db outdoor air	3.1 $COP_{nfcooling}$	ARI 310/380
PTHP (heating mode)	All capacities		3.1 $COP_{nfheating}$	ARI 310/380

Table G3.6 Lighting Power Densities for Building Exteriors

Table G3.6 - Delete Table G3.6 in its entirety and replace with a new Table G3.6 to read as follows:

Table G3.6 Lighting Power Densities for Building Exteriors

Tradable Surfaces (Lighting power densities for uncovered parking areas, building grounds, building entrances and exits, canopies and overhangs and outdoor sales areas may be traded.)	Uncovered Parking Areas	
	Parking lots and drives	0.15 W/ft^2
	Building Grounds	
	Walkways less than 10 ft wide	1.0 W/linear foot
	Walkways 10 ft wide or greater Plaza areas Spe feature areas	0.2 W/ft^2
	Stairways	1.0 W/ft^2
	Building Entrances and Exits	
	Main entries	30 W/linear foot of door width
	Other doors	20 W/linear foot of door width
	Canopies and Overhangs	
	Canopies (free standing and attached and overha	1.25 W/ft^2
	Outdoor Sales	
	Open areas (including vehicle sales lots)	0.5 W/ft^2
	Street frontage for vehicle sales lots in addition area allowance	20 W/linear foot

Table G3.7 Performance Rating Method Lighting Power Density Allowances and Occupancy Sensor Reductions Using the Space-by-Space Method

Table G3.7 - Add a new row in Table G3.7 after “Computer Room” to read as follows:

Common Space Types[a]	Lighting Power Density, W/ft^2	Occupancy Sensor Reduction[b]
Dwelling Unit	1.07	None

Appendix I

Add a new Appendix I, following Appendix H, to read as follows:

This is a normative appendix and is part of this standard.

Normative Appendix I

Required Additional Efficiency Packages

I1 GENERAL

I1.1 Requirements

New buildings shall comply with at least one of the following sections:

1. More efficient HVAC equipment in accordance with Section I2.

2. Reduced lighting power density in accordance with Section I3.

3. Enhanced digital lighting controls in accordance with Section I4.

4. Dedicated outdoor air systems with energy recovery ventilation in accordance with Section I5.

5. High-efficiency service water heating in accordance with Section I6.

6. Enhanced envelope performance in accordance with Section I7.

7. Reduced air infiltration in accordance with Section I8.

I.1.2 Tenant Spaces

Tenant spaces shall comply with I2, I3, I4, I5 or I6. Alternatively, tenant spaces shall be in compliance with Section I7 or I8 where the entire building is in compliance.

Exception:

Previously occupied tenant spaces that comply with this code using Section 4.2.1.3.

I2 MORE EFFICIENT HVAC EQUIPMENT

Equipment shall exceed the minimum efficiency requirements listed in Tables 6.8.1-1 through 6.8.1-7, and Tables 6.8.1-9 through 6.8.1-16 by 10%, in addition to the requirements of Section 6. Where multiple performance requirements are provided, the equipment shall exceed all requirements by 10%. Equipment not listed in Tables 6.8.1-1 through 6.8.1-7, and Tables 6.8.1-9 through 6.8.1-16 shall be limited to 10% of the total building system capacity.

I3 REDUCED LIGHTING POWER DENSITY

The total interior lighting power (watts) of the building shall be determined by using 90% of the lighting power values specified in Table 9.5.1 times the floor area for the building types, or by using 90% of the interior lighting power allowance calculated by the Space-by-Space Method in Section 9.6.

I4 ENHANCED DIGITAL LIGHTING CONTROLS

Interior lighting in the building shall have the following enhanced lighting controls that shall be located, scheduled and operated in accordance with Section 9.4.1.1(i).

1. Luminaires shall be configured for continuous dimming.

2. Luminaires shall be addressed individually. Where individual addressability is not available for the luminaire class type, a controlled group of not more than four luminaires shall be allowed.

3. Not more than eight luminaires shall be controlled together in a daylight area.

4. Fixtures shall be controlled through a digital control system that includes the following functions:

   4.1. Control reconfiguration based on digital addressability.

   4.2. Load shedding.

   4.3. Individual user control shall be capable of being reconfigured through the digital control system.

   4.4. Occupancy sensors shall be capable of being reconfigured through the digital control system.

5. Construction documents shall include submittal of a Sequence of Operations, including a specification outlining each of the functions in Item 4 of this section.

6. Functional testing of lighting controls shall comply with Section 9.4.3.

I5 DEDICATED OUTDOOR AIR SYSTEM

Buildings containing equipment or systems regulated by Section 6.5.2.2, 6.5.3.2.1, 6.5.3.2.2, 6.5.3.2.3, 6.5.3.3, 6.5.3.4, 6.5.3.5, 6.5.3.6, 6.5.4.1, 6.5.4.2, 6.5.4.3, 6.5.4.4, 6.5.5.2, 6.5.5.3, or 6.5.5.4 shall be equipped with an independent ventilation system designed to provide not less than the minimum 100% outdoor air to each individual occupied space, as specified by the New York City Mechanical Code. The ventilation system shall be equipped with an energy recovery system meeting the requirements of Section 6.5.6.1 (Note: Option I5 may not be selected where energy recovery ventilation is prohibited by the New York City Mechanical Code or otherwise prohibited). The HVAC system shall include supply-air temperature controls that automatically reset the supply-air temperature in response to representative building loads, or to outdoor air temperatures. The controls shall reset the supply-air temperature not less than 25% of the difference between the design supply-air temperature and the design room-air temperature.

I6 REDUCED ENERGY USE IN SERVICE WATER HEATING

Buildings shall be of the following types to use this compliance method:

1. Group R-1: Boarding houses, hotels or motels.

2. Group I-2: Hospitals, psychiatric hospitals and nursing homes.

3. Group A-2: Restaurants and banquet halls or buildings containing food preparation areas.

4. Group F: Laundries.

5. Group R-2.

6. Group A-3: Health clubs and spas.

l6.1 Load Fraction

The building service water-heating system shall have one or more of the following that are sized to provide not less than 60% of the building's annual hot water requirements, or sized to provide 100% of the building's annual hot water requirements if the building shall otherwise comply with Section 6.5.6.2:

1. Waste heat recovery from service hot water, heat-recovery chillers, building equipment, or process equipment.

2. On-site renewable energy water-heating systems.

I7 ENHANCED ENVELOPE PERFORMANCE

The thermal performance of the envelope as designed shall demonstrate a minimum 15% improvement compared to the prescriptive U-,C-, F-factor requirements of Section 5.5.

I8 REDUCED AIR INFILTRATION

Air infiltration shall be verified by whole-building pressurization testing conducted in accordance with ASTM E779 or ASTM E1827 by an independent third party. The measured air-leakage rate of the building envelope shall not exceed 0.25 cfm/ft^2 under a pressure differential of 0.3 inches water column (75 Pa), with the calculated surface area being the sum of the above- and below-grade building envelope. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the building owner.

Exception:

For buildings having over 250,000 square feet of conditioned floor area, air leakage testing need not be conducted on the whole building where testing is conducted on representative above-grade sections of the building. Tested areas shall total not less than 25% of the conditioned floor area and shall be tested in accordance with this section.

§ 4. This local law takes effect on May 12, 2020, and applies to applications filed on and after such effective date except that the commissioner of buildings may promulgate rules or take other actions for the implementation of such provisions prior to such effective date.