

Energy Conservation Construction Code of New York State

New York State
Department of State

Division of Code Enforcement and Administration



George E. Pataki - Governor

Energy Conservation Construction Code of New York State

New York State
of State
Administration

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DIVISION OF CODE ENFORCEMENT AND ADMINISTRATION



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Marginal Markings

New York modifications to code language are indicated by NY tape (¶) in the margin, and New York text is underlined. Deletion of code language by New York is indicated by an arrow (⇒) in the margin.

“Reserved” indicates that a section or portion of the International Code™ has been deleted, but its number or position has been retained.

Letter Designations in Front of Section Numbers

The content of sections in this code which begin with a letter designation are maintained by another code development committee in accordance with the following: [B] = International Building Code Development Committee; [F] = International Fire Code Development Committee; [M] = International Mechanical Code Development Committee; [P] = International Plumbing Code Development Committee; [RBE] = International Residential Code Building and Energy Development Committee; [RMP] = International Residential Code Mechanical/Plumbing Development Committee; and [E] = International Energy Conservation Code Development Committee.

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CHAPTER 1

ADMINISTRATION, ENFORCEMENT AND GENERAL REQUIREMENTS

SECTION 101 SCOPE AND GENERAL REQUIREMENTS

⇒ **101.1 Title.** These provisions shall be known as the *Energy Conservation Construction Code of New York State*, and shall be cited as such and will be referred to herein as "this code."

101.2 Scope. The provisions of this code shall apply to the design of building envelopes for adequate thermal resistance and low air leakage and the design and selection of mechanical, electrical, service water-heating and illumination systems and equipment which will enable effective use of energy in all new and renovated public and private building construction in New York State. It is intended that these provisions provide flexibility to permit the use of innovative approaches and techniques to achieve effective utilization of energy. This code is not intended to abridge safety, health or environmental requirements under other applicable local, state or federal laws and regulations.

101.3 Compliance. Compliance with this code shall be determined in accordance with Sections 101.3.1 through 101.3.3.

101.3.1 Residential buildings. For residential buildings, a systems approach for the entire building and its energy-using subsystems which utilizes renewable sources (Chapter 4), an approach based on performance of individual components of the building envelope (Chapter 5), an approach based on performance of the total building envelope (Chapter 5), an approach based on acceptable practice for each envelope component (Chapter 5), an approach by prescriptive specification for individual components of the building envelope (Chapter 5), or an approach based on simplified, prescriptive specification (Chapter 6) where the conditions set forth in Section 101.3.1.1 or 101.3.1.2 are satisfied. Compliance can be determined through the use of computer software developed by the United States Department of Energy (DOE) that has an allowance for HVAC tradeoffs, worksheets/compliance material based on this software and other building energy modeling or home energy rating (HERS) software approved by the Secretary of State. When using software or worksheets to show compliance, the general provisions of Chapter 5, Sections 502, 503, 504 and 505, shall be met.

⇒ **101.3.1.1 Detached one- and two-family dwellings.** When the glazing area does not exceed 15 percent of the gross area of exterior walls.

101.3.1.2 Type R-2, R-4 or townhouse buildings. When the glazing area does not exceed 25 percent of the gross area of exterior walls.

101.3.1.3 Electric resistance heat. Single and multi-family buildings that use electric resistance heat as the primary heat source shall use either Table 502.2.4(10),

Table 602.1(2) or DOE software for envelope compliance.

101.3.2 Commercial buildings. For commercial buildings, a prescriptive, system, or energy cost budget approach (Chapter 7) or as specified by acceptable practice (Chapter 8). Compliance can be determined through the use of computer software developed by the DOE that has an allowance for HVAC tradeoffs, worksheets/compliance material based on this software, and other building energy modeling software approved by the Secretary of State. When using software or worksheets to show compliance, the general provisions of Chapter 7 or 8 shall be met.

101.3.3 City of New York. When within the jurisdiction of New York City, counties of New York, Kings, Queens, Bronx and Richmond, the following shall apply:

1. For determination of occupancy classification and use within this code, a comparable occupancy classification may be made to the Building Code of the City of New York.
2. Where reference is made within this code to plumbing, mechanical, building, fire, electrical codes, etc., the respective Building and Electrical Codes of the City of New York shall apply.

101.4 Scope. This code establishes minimum prescriptive and performance-related regulations for the design of energy-efficient buildings and structures or portions thereof that provide facilities or shelter for public assembly, educational, business, mercantile, institutional, storage and residential occupancies, as well as those portions of factory and industrial occupancies designed primarily for human occupancy. This code thereby addresses the design of energy-efficient building envelopes and the selection and installation of energy-efficient mechanical, service water-heating, electrical distribution and illumination systems and equipment for the effective use of energy in these buildings and structures.

101.4.1 Exempt buildings. Buildings and structures indicated in Sections 101.4.1.1 through 101.4.1.3 shall be exempt from the provisions of this code. Commercial buildings provided with service water heating and/or electric lighting shall meet the applicable provisions of Chapter 7 or 8 regardless of this exempt status.

101.4.1.1 Low energy usage buildings. Buildings and structures, or portions thereof separated by building envelope assemblies from the remainder of the building, that have a peak design rate of nonrenewable energy usage less than 3.4 Btu/h per square foot (10.7 W/m²) or 1.0 watt per square foot (10.7 W/m²) of floor area for all purposes.

101.4.1.2 Renewable energy usage in buildings. The building design envelope provisions of this code shall not be required if the building design energy usage for heating

and/or cooling can be demonstrated to be completely supplied from renewable energy sources.

101.4.2 Applicability. The provisions of this code shall apply to all matters affecting or relating to structures and premises. Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

101.4.2.1 Existing installations. Except as otherwise provided for in this chapter, a provision in this code shall not require the removal, alteration or abandonment of, nor prevent the continued utilization and maintenance of, an existing building envelope, mechanical, service water-heating, electrical distribution or illumination system lawfully in existence at the time of the adoption of this code.

101.4.2.2 Additions. Additions shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing system to comply with all of the requirements of this code. Additions shall not cause any one of the existing systems to become unsafe, hazardous or overloaded.

101.4.2.3 Historic buildings. The provisions of this code relating to alteration, repair, enlargement, restoration, relocation or moving of buildings or structures shall not be mandatory for existing buildings or structures that have been specifically determined as historically significant by the State or local governing body, or listed in the National Register of Historic Places, or that have been determined to be eligible for listing on the National Register by the State Preservation Officer.

101.4.2.4 Substantial alterations to existing buildings. This code shall apply only to that portion of a building subsystem that is replaced, provided that 50 percent or more, measured in units appropriate to that subsystem, of such building subsystem is replaced within any consecutive 12-month period.

Exceptions:

1. Installation of storm windows over existing glazing.
2. Replacement of glazing in existing sash and frame, provided the U-factor and solar heat gain coefficient (SHGC) will be equal to or lower than before the glass replacement.
3. Replacement of a roof membrane where either the roof sheathing or roof insulation is not exposed, or if there is existing roof insulation below the roof deck.
4. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided that an existing vestibule that separates a conditioned space from the exterior shall not be removed.
5. Replacement of existing fenestration, provided that the area of the replacement fenestration does not exceed 50 percent of the total fenestration area

of an existing building and that the U-factor and solar heat gain coefficient (SHGC) will be equal to or lower than before the fenestration replacement.

6. For a subsystem that is being modified or repaired but not replaced, provided that such modifications will not result in an increase in energy usage.
7. For the relocation of existing equipment or appliance.
8. Replacement of less than 50 percent of the luminaries in a building, provided that such alterations do not increase the installed interior lighting power.
9. Repairs and/or replacements that are not substantial alterations.

101.4.2.5 Nonresidential farm buildings. The requirements of this code shall not apply to nonresidential farm buildings, including barns, sheds, poultry houses and other buildings and equipment on the premises used directly and solely for agricultural purposes.

101.4.3 Mixed occupancy. When a building houses more than one occupancy, each portion of the building shall conform to the requirements for the occupancy housed therein. Where minor accessory uses do not occupy more than 10 percent of the area of any floor of a building, the major use shall be considered the building occupancy. Buildings, other than detached one- and two-family dwellings, with a height of four or more stories above grade shall be considered commercial buildings for purposes of this code, regardless of the number of floors that are classified as residential occupancy.

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

**SECTION 102
MATERIALS, SYSTEMS AND EQUIPMENT**

102.1 General. Materials, equipment and systems shall be identified in a manner that will allow a determination of their compliance with the applicable provisions of this code.

102.2 Materials, equipment and systems installation. All insulation materials, caulking and weatherstripping, fenestration assemblies, mechanical equipment and systems components, and water-heating equipment and systems components shall be installed in accordance with the manufacturer's installation instructions.

102.3 Maintenance information. Required regular maintenance actions shall be clearly stated and incorporated on a readily accessible label. Such label shall include the title or publication number, the operation and maintenance manual for that particular model and type of product. Maintenance instructions shall be furnished for equipment that requires preventive maintenance for efficient operation.

102.4 Insulation installation. Roof/ceiling, floor, wall cavity and duct distribution systems insulation shall be installed in a manner that permits inspection of the manufacturer's R-value identification mark.

102.4.1 Protection of exposed foundation insulation. Insulation applied to the exterior of foundation walls and

around the perimeter of slab-on-grade floors shall have a rigid, opaque and weather-resistant protective covering to prevent the degradation of the insulation's thermal performance. The protective covering shall cover the exposed area of the exterior insulation and extend a minimum of 6 inches (153 mm) below grade.

102.5 Identification. Materials, equipment and systems shall be identified in accordance with Sections 102.5.1, 102.5.2 and 102.5.3.

102.5.1 Building envelope insulation. A thermal resistance (*R*) identification mark shall be applied by the manufacturer to each piece of building envelope insulation 12 inches (305 mm) or greater in width.

Alternatively, the insulation installer shall provide a signed and dated certification for the insulation installed in each element of the building envelope, listing the type of insulation installations in roof/ceilings, the manufacturer and the *R*-value. For blown-in or sprayed insulation, the installer shall also provide the initial installed thickness, the settled thickness, the coverage area and the number of bags installed. Where blown-in or sprayed insulation is installed in walls, floors and cathedral ceilings, the installer shall provide a certification of the installed density and *R*-value. The installer shall post the certification in a conspicuous place on the job site.

102.5.1.1 Roof/ceiling insulation. The thickness of roof/ceiling insulation that is either blown in or sprayed shall be identified by thickness markers that are labeled in inches or millimeters installed at least one for every 300 square feet (28 m²) throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness and minimum settled thickness with numbers a minimum of 1 inch (25 mm) in height. Each marker shall face the attic access. The thickness of installed insulation shall meet or exceed the minimum initial installed thickness shown by the marker.

102.5.2 Fenestration product rating, certification and labeling. *U*-factors of fenestration products (windows, doors and skylights) shall be determined in accordance with NFRC 100 by an accredited, independent laboratory, and labeled and certified by the manufacturer. The solar heat gain coefficient (SHGC) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and labeled and certified by the manufacturer. Where a shading coefficient for a fenestration product is used, it shall be determined by converting the product's SHGC, as determined in accordance with NFRC 200, to a shading coefficient, by dividing the SHGC by 0.87. Such certified and labeled *U*-factors and SHGCs shall be accepted for purposes of determining compliance with the building envelope requirements of this code.

When a manufacturer has not determined product *U*-factor in accordance with NFRC 100 for a particular product line, compliance with the building envelope requirements of this code shall be determined by assigning such products a default *U*-factor in accordance with Tables

102.5.2(1) and 102.5.2(2). When an SHGC or shading coefficient is used for code compliance and a manufacturer has not determined product SHGC in accordance with NFRC 200 for a particular product line, compliance with the building envelope requirements of this code shall be determined by assigning such products a default SHGC in accordance with Table 102.5.2(3). Product features must be verifiable for the product to qualify for the default value associated with those features. Where the existence of a particular feature cannot be determined with reasonable certainty, the product shall not receive credit for that feature. Where a composite of materials from two different product types is used, the product shall be assigned the higher *U*-factor.

**TABLE 102.5.2(1)
U-FACTOR DEFAULT TABLE FOR WINDOWS,
GLAZED DOORS AND SKYLIGHTS**

FRAME MATERIAL AND PRODUCT TYPE ^a	SINGLE GLAZED	DOUBLE GLAZED
Metal without thermal break		
Operable (including sliding and swinging glass doors)	1.27	0.87
Fixed	1.13	0.69
Garden window	2.60	1.81
Curtain wall	1.22	0.79
Skylight	1.98	1.31
Site-assembled sloped/overhead glazing	1.36	0.82
Metal with thermal break		
Operable (including sliding and swinging glass doors)	1.08	0.65
Fixed	1.07	0.63
Curtain wall	1.11	0.68
Skylight	1.89	1.11
Site-assembled sloped/overhead glazing	1.25	0.70
Reinforced vinyl/metal clad wood		
Operable (including sliding and swinging glass doors)	0.90	0.57
Fixed	0.98	0.56
Skylight	1.75	1.05
Wood/vinyl/fiberglass		
Operable (including sliding and swinging glass doors)	0.89	0.55
Fixed	0.98	0.56
Garden window	2.31	1.61
Skylight	1.47	0.84

a. Glass block assemblies with mortar but without reinforcing or framing shall have a *U*-factor of 0.60.

**TABLE 102.5.2(2)
U-FACTOR DEFAULT TABLE FOR NONGLAZED DOORS**

DOOR TYPE	WITH FOAM CORE	WITHOUT FOAM CORE
Steel doors (1.75 inches thick)	0.35	0.60
	WITHOUT STORM DOOR	WITH STORM DOOR
Wood doors (1.75 inches thick)		
Panel with 0.438-inch panels	0.54	0.36
Hollow core flush	0.46	0.32
Panel with 1.125-inch panels	0.39	0.28
Solid core flush	0.40	0.26

For SI: 1 inch = 25.4 mm.

**TABLE 102.5.2(3)
SHGC DEFAULT TABLE FOR FENESTRATION**

PRODUCT DESCRIPTION	SINGLE GLAZED				DOUBLE GLAZED			
	Clear	Bronze	Green	Gray	Clear + Clear	Bronze + Clear	Green + Clear	Gray + Clear
Metal frames								
Operable	0.75	0.64	0.62	0.61	0.66	0.55	0.53	0.52
Fixed	0.78	0.67	0.65	0.64	0.68	0.57	0.55	0.54
Nonmetal frames								
Operable	0.63	0.54	0.53	0.52	0.55	0.46	0.45	0.44
Fixed	0.75	0.64	0.62	0.61	0.66	0.54	0.53	0.52

102.5.3 Duct distribution systems insulation. A thermal resistance (*R*) identification mark shall be applied by the manufacturer in maximum intervals of no greater than 10 feet (3048 mm) to insulated flexible duct products showing the thermal performance *R*-value for the duct insulation itself (excluding air films, vapor retarders or other duct components).

102.6 Electrical energy consumption. In all buildings having individual dwelling units, provisions shall be made to determine the electrical energy consumed by each tenant by separately metering individual dwelling units.

102.7 Fireplaces. Fireplaces (solid-fuel type or ANSI Z21.50) shall be installed with tight-fitting noncombustible fireplace doors to control infiltration losses in the construction types listed here:

1. Masonry fireplaces or fireplace units designed to allow an open burn.
2. Whenever a decorative appliance (ANSI Standard Z21.60 gas-log style unit) is installed in a vented solid fuel fireplace.
3. Vented decorative gas fireplace appliances (ANSI Standard Z21.50 unit).

Fireplaces shall be provided with a source of combustion air as required by the fireplace construction provisions of the *Building Code of New York State*, the *Residential Code of New York State* or the *Building Code of the City of New York*, as applicable.

102.8 Transformers. Single-phase and three-phase dry-type and liquid-filled distribution transformers shall be selected based on rating as described in Sections 805.6.1 and 805.6.2.

**SECTION 103
ALTERNATE MATERIALS—METHOD
OF CONSTRUCTION, DESIGN OR
INSULATING SYSTEMS**

103.1 General. The provisions of this code are not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design or insulating systems have been approved by the *State Fire Prevention and Building Code Council* as meeting the intent of the code.

When within the jurisdiction of New York City, such construction, design or insulating system shall meet the intent of Building and Electrical Codes of the City of New York.

**SECTION 104
CONSTRUCTION DOCUMENTS AND INSPECTIONS**

104.1 General. When within the jurisdiction of New York City, refer to the *Building and Electrical Codes of the City of New York* for additional requirements.

104.2 Compliance documentation.

1. When plans or specifications bear the seal and signature of a licensed professional, such licensed professional shall also include a written statement that to the best of his/her knowledge, belief and professional judgment, such plans or specifications are in compliance with this code.
2. A registered design professional shall provide to the code enforcement official a written certification that the required HVAC tests, system balancing, etc., have been performed and that, in the professional opinion of the registered design professional, the system is operating as designed. The registered design professional shall retain copies of the test reports to be provided to the code enforcement official, if requested.

Exception: One- and two-family dwelling units.

3. Whenever plans or specifications are submitted in connection with applications for building permits, such plans or specifications shall show all data and features of the building, the equipment, and the systems in sufficient detail to permit an evaluation of such plans or specifications by the code enforcement official. The plans shall clearly note the chapter(s) and method used for compliance.
4. Documents relating to the proposed construction that contain information necessary to verify compliance with this code, such as calculations, worksheets, compliance forms, vendor literature or other documents, shall be made available when requested by the code enforcement official to permit an evaluation of such documents. Compliance with specific provisions of this code shall be determined through the use of computer software, worksheets, compliance manuals and other similar materials when they have met the intent of this code. Such approved compliance methodologies and materials shall be as set forth in Section 101.3.

104.3 Information on construction documents. Construction documents shall be drawn to scale upon suitable material.

- ⇒ Electronic media documents are permitted to be submitted. Construction documents shall be 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 and the equipment and systems as herein governed, including, but not limited to, design criteria, exterior envelope component materials, *U*-factors of the envelope systems, *U*-factors of fenestration products, *R*-values of insulating materials, size and type of apparatus and equipment, equipment and systems controls and other pertinent data to indicate conformance with the requirements of this code and relevant laws, ordinances, rules and regulations.

**SECTION 105
ADMINISTRATION AND ENFORCEMENT**

105.1 Responsibility. The administration and enforcement of the provisions of this code within any municipality shall be the responsibility of that governmental entity.

105.2 Method. This code shall be administered and enforced in the manner prescribed by applicable local law. Within the counties of New York, Kings, Queens, Bronx and Richmond, this code shall be administered and enforced in accordance with the Building and Electrical Codes of the City of New York.

**SECTION 106
VALIDITY**

106.1 General. If a section, subsection, sentence, clause or phrase of this code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

**SECTION 107
REFERENCED STANDARDS**

107.1 General. The standards, and portions thereof, which are referred to in this code and listed in Chapter 9, shall be considered part of the requirements of this code to the extent of such reference.

107.2 Conflicting requirements. When a section of this code and a section of a referenced standard from Chapter 9 specify different materials, methods of construction or other requirements, the provisions of this code shall apply.

**SECTION 108
PENALTIES**

108.1 General. Any person served with an order, pursuant to the provisions of any local law or ordinance, or to the procedures adopted pursuant to Section 381 of the Executive Law for the administration and enforcement of the *New York State Uniform Fire Prevention and Building Code*, who shall fail to comply with such order within 30 days after such service or within

the time fixed by such order for compliance, whichever is greater, and any owner, builder, architect, engineer, contractor or subcontractor taking part in or assisting in the construction or use of any building, who knowingly violates any applicable provisions of this code or any lawful order of the governmental entity responsible for the administration and enforcement thereof, shall be subject to a fine of not more than \$500 or to imprisonment for not more than 30 days in jail, or both. Except as otherwise provided by law, any such violation shall not be a crime, and the penalty or punishment imposed therefor shall not be deemed for any purpose a penal or criminal penalty or punishment, and shall not impose any disability upon or affect or impair the credibility as a witness, or otherwise, of any person convicted thereof.

**SECTION 109
INTERPRETATION OF CODE REQUIREMENTS**

109.1 General. Upon written request by a building permit applicant and/or a code enforcement official, the Secretary of State may issue an interpretation of the application of any specific requirement of this code to the proposed construction for which an application for a building permit and required plans and specifications have been filed, and concerning which there is a disagreement between the building permit applicant and the code enforcement official as to the application of such specific requirement to the proposed construction.

109.2 Procedure. A request for an interpretation shall be signed by the building permit applicant and the code enforcement official, or by one or the other, individually, and shall include the following information in order to be considered complete:

1. Name, address, and telephone number of the building permit applicant and the code enforcement official;
2. A detailed description of the proposed construction, including a copy of the building permit application and plans and specifications that have been filed by the building permit applicant with the code enforcement official, as well as any other floor plans, elevations, cross-sections, details, specifications, or construction documents necessary to describe adequately the proposed construction;
3. Identification of each requirement of this code for which an interpretation is requested;
4. A concise summary of the disagreement concerning the application of each such requirement for which an interpretation is requested; and
5. A copy of the building permit application denial if one was issued by the code enforcement official.

109.3 Incomplete information. If the request is incomplete or does not otherwise contain sufficient information necessary to issue an interpretation, the Secretary of State may request clarification of the information provided or additional information necessary to issue the requested interpretation.

109.4 Notification. Upon receipt of a complete request for an interpretation signed by only the building permit applicant or the code enforcement official, the Secretary of State shall provide written notification to the party who has not signed the

request for an interpretation that such request for an interpretation has been filed with the Department of State. The party receiving such notification shall have 20 days from the date of such notification in which to provide, in writing, any comments or additional information pertaining to the request for an interpretation, provided that the Commissioner may waive this deadline when warranted by extenuating circumstances.

109.5 Issuing interpretation. The Secretary of State shall either issue the interpretation or provide notification of the intent not to issue an interpretation to the building permit applicant and the code enforcement official within 45 days of any of the following:

1. Receipt of a complete request for an interpretation signed by both the building permit applicant and the code enforcement official.
2. Receipt of comments when the request for an interpretation is signed by only one party, or
3. The expiration of the 20-day comment period when the request for an interpretation is signed by only one party.

109.6 Enforcement. Subsequent enforcement of this code with respect to the construction project for which an interpretation has been requested shall be consistent with the interpretation issued by the Secretary of State.

SECTION 110 VARIANCES AND MODIFICATIONS

110.1 General. Any standard or requirement of the code may be varied or modified, in whole or part, with regard to specific construction upon application made by or on behalf of an owner, where strict compliance with such standard or requirement would entail practical difficulty or cause any unnecessary hardship in relation to such construction, provided that any such variance or modification shall provide for alternative energy conservation standards or requirements to achieve to the extent practicable the purposes of this code.

110.2 Procedure. The petition shall consist of the application prescribed by the Department of State and all information provided by the petitioner in support of it. The petition shall be made to the Secretary of State through the Codes Division or one of its regional offices, together with copies in such number as the department may require.

CHAPTER 2 DEFINITIONS

SECTION 201 GENERAL

201.1 Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings indicated in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the *Building Code of New York State*, *Residential Code of New York State*, *Fire Code of New York State*, *Mechanical Code of New York State*, *Plumbing Code of New York State*, *Fuel Gas Code of New York State* or the *Property Maintenance Code of New York State*, such terms shall have meanings ascribed to them as in those codes.

201.4 Terms not defined. Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.

SECTION 202 GENERAL DEFINITIONS

ACCESSIBLE (AS APPLIED TO EQUIPMENT). Admitting close approach because not guarded by locked doors, elevation or other effective means (see "Readily accessible").

ADDITION. Any extension or increase to a building or subsystem.

ALTERATION. The replacement, modification or renovation of a subsystem.

AIR TRANSPORT FACTOR. The ratio of the rate of useful sensible heat removal from the conditioned space to the energy input to the supply and return fan motor(s), expressed in consistent units and under the designated operating conditions.

ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE). The ratio of annual output energy to annual input energy which includes any nonheating season pilot input loss, and for gas or oil-fired furnaces or boilers, does not include electrical energy.

APPROVED. Approved by the code enforcement official or other authority having jurisdiction as the result of investigation and tests conducted by said official or authority, or by reason of accepted principles or tests by nationally recognized organizations.

AUTOMATIC. Self-acting, operating by its own mechanism when actuated by some impersonal influence, as, for example, a change in current strength, pressure, temperature or mechanical configuration (see "Manual").

BASEMENT WALL. The opaque portion of a wall which encloses one side of a basement and having an average below-grade area greater than or equal to 50 percent of its total wall area, including openings (see "Gross area of exterior walls").

BTU. Abbreviation for British thermal unit, which is the quantity of heat required to raise the temperature of 1 pound (0.454 kg) of water 1°F (0.56°C), (1 Btu = 1,055 J).

BUILDING. Any structure occupied or intended for supporting or sheltering any use or occupancy.

BUILDING ENVELOPE. The elements of a building which enclose conditioned spaces through which thermal energy is capable of being transferred to or from the exterior or to or from spaces exempted by the provisions of Section 101.4.1.

CODE ENFORCEMENT OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

COEFFICIENT OF PERFORMANCE (COP)—COOLING. The ratio of the rate of heat removal to the rate of energy input in consistent units, for a complete cooling system or factory-assembled equipment, as tested under a nationally recognized standard or designated operating conditions.

COEFFICIENT OF PERFORMANCE (COP)—HEAT PUMP—HEATING. The ratio of the rate of heat delivered to the rate of energy input, in consistent units, for a complete heat pump system under designated operating conditions. Supplemental heat shall not be considered when checking compliance with the heat pump equipment (COPs listed in the tables in Sections 503 and 803).

COMFORT ENVELOPE. The area on a psychrometric chart enclosing all those conditions described in Figure 2 in ASHRAE 55 as being comfortable.

COMMERCIAL BUILDING. Non-residential buildings less than four stories in height and buildings other than detached one- and two-family dwellings with a height of four or more stories above grade shall be considered commercial buildings for purposes of this code, regardless of the number of floors that are classified as residential occupancy.

CONDENSER. A heat exchanger designed to liquefy refrigerant vapor by removal of heat.

CONDENSING UNIT. A specific refrigerating machine combination for a given refrigerant, consisting of one or more power-driven compressors, condensers, liquid receivers (when required), and the regularly furnished accessories.

CONDITIONED FLOOR AREA. The horizontal projection of that portion of interior space which is contained within exterior walls and which is conditioned directly or indirectly by an energy-using system.

CONDITIONED SPACE. A heated or cooled space, or both, within a building and, where required, provided with humidification or dehumidification means so as to be capable of maintaining a space condition falling within the comfort envelope set forth in ASHRAE 55.

COOLED SPACE. Space within a building which is provided with a positive cooling supply (see "Positive cooling supply").

CRAWL SPACE WALL. The opaque portion of a wall which encloses a crawl space and is partially or totally below grade.

DEADBAND. The temperature range in which no heating or cooling is used.

DEGREE DAY, COOLING. A unit, based on temperature difference and time, used in estimating cooling energy consumption and specifying nominal cooling load of a building in summer. For any one day, when the mean temperature is more than 65°F (18°C), there are as many degree days as there are degrees Fahrenheit (Celsius) difference in temperature between the mean temperature for the day and 65°F (18°C). Annual cooling degree days (CDD) are the sum of the degree days over a calendar year.

DEGREE DAY, HEATING. A unit, based upon temperature difference and time, used in estimating heating energy consumption and specifying nominal heating load of a building in winter. For any one day, when the mean temperature is less than 65°F (18°C), there are as many degree days as there are degrees Fahrenheit (Celsius) difference in temperature between the mean temperature for the day and 65°F (18°C). Annual heating degree days (HDD) are the sum of the degree days over a calendar year.

DUCT. A tube or conduit utilized for conveying air. The air passages of self-contained systems are not to be construed as air ducts.

DUCT SYSTEM. A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances.

DWELLING UNIT. A single housekeeping unit comprised of one or more rooms providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

ECONOMIZER. A ducting arrangement and automatic control system that allows a cooling supply fan system to supply outdoor air to reduce or eliminate the need for mechanical refrigeration during mild or cold weather.

ELECTRIC RESISTANCE HEAT. Space heating systems that utilize electric resistance elements including baseboard, electric boilers, air-to-air heat pumps, and radiant and forced air units, where the total electric resistance heat capacity exceeds 1.0 W/ft² of the gross conditioned floor area.

ENERGY. The capacity for doing work taking a number of forms which is capable of being transformed from one into another, such as thermal (heat), mechanical (work), electrical and chemical in customary units, measured in joules (J) kilowatt-hours (kW × h) or British thermal units (Btu).

ENERGY ANALYSIS. A method for determining the annual (8,760 hours) energy use of the Proposed design and Standard design based on hour-by-hour estimates of energy use.

ENERGY COST. The total estimated annual cost for purchased energy for the building, including any demand charges, fuel adjustment factors and delivery charges applicable to the building.

ENERGY EFFICIENCY RATIO (EER). The ratio of net equipment cooling capacity in Btu/h (W) to total rate of electric input in watts under designated operating conditions. When

consistent units are used, this ratio becomes equal to COP (see also "Coefficient of performance").

EVAPORATOR. That part of the system in which liquid refrigerant is vaporized to produce refrigeration.

EXTERIOR ENVELOPE. See "Building envelope."

EXTERIOR WALL. An above-grade wall enclosing conditioned space which is vertical or sloped at an angle of sixty (60) degrees (1.1 rad) or greater from the horizontal (see "Roof Assembly"). Includes between floor spandrels, peripheral edges of floors, roof and basement knee walls, dormer walls, gable end walls, walls enclosing a mansard roof, and basement walls with an average below-grade wall area which is less than 50 percent of the total opaque and non-opaque area of that enclosing side.

FENESTRATION. Skylights, roof windows, vertical windows (whether fixed or movable), opaque doors, glazed doors, glass block, and combination opaque/glazed doors.

FURNACE, DUCT. A furnace normally installed in distribution ducts of air-conditioning systems to supply warm air for heating and which depends on a blower not furnished as part of the duct furnace for air circulation.

FURNACE, WARM AIR. A self-contained, indirect-fired or electrically heated furnace that supplies heated air through ducts to spaces that require it.

GLAZING AREA. Total area of the glazed fenestration measured using the rough opening and including sash, curbing or other framing elements that enclose conditioned space. Glazing area includes the area of glazed fenestration assemblies in walls bounding conditioned basements. For doors where the daylight opening area is less than 50 percent of the door area, the glazing area is the daylight opening area. For all other doors, the glazing area is the rough opening area for the door including the door and the frame.

GROSS AREA OF EXTERIOR WALLS. The normal projection of all exterior walls, including the area of all windows and doors installed therein (see "Exterior wall").

GROSS FLOOR AREA. The sum of the areas of several floors of the building, including basements, cellars, mezzanine and intermediate floored tiers and penthouses of headroom height, measured from the exterior faces of exterior walls or from the centerline of walls separating buildings, but excluding:

1. Covered walkways, open roofed-over areas, porches and similar spaces.
2. Pipe trenches, exterior terraces or steps, chimneys, roof overhangs and similar features.

HEAT. The form of energy that is transferred by virtue of a temperature difference or a change in state of a material.

HEAT CAPACITY (HC). The amount of heat necessary to raise the temperature of a given mass by one degree. The heat capacity of a building element is the sum of the heat capacities of each of its components.

HEAT REJECTION EQUIPMENT. Equipment used in comfort cooling systems such as air cooled condensers, open cooling towers, closed-circuit cooling towers, and evaporative condensers.

HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

HEAT TRAP. An arrangement of piping and fittings, such as elbows, or a commercially available heat trap, that prevents thermosyphoning of hot water during standby periods.

HEATED SLAB. Slab-on-grade construction in which the heating elements or hot air distribution system is in contact with or placed within the slab or the subgrade.

HEATED SPACE. Space within a building which is provided with a positive heat supply (see "Positive heating supply"). Finished living space within a basement with registers or heating devices designed to supply heat to a basement space shall automatically define that space as heated space.

HEATING SEASONAL PERFORMANCE FACTOR (HSPF). The total heating output of a heat pump during its normal annual usage period for heating, in Btu, divided by the total electric energy input during the same period, in watt hours, as determined by DOE 10 CFR Part 430, Subpart B, Test Procedures and based on Region 4.

HUMIDISTAT. A regulatory device, actuated by changes in humidity, used for automatic control of relative humidity.

HVAC. Heating, ventilating and air conditioning.

HVAC SYSTEM. The equipment, distribution network, and terminals that provide either collectively or individually the processes of heating, ventilating, or air conditioning to a building.

HVAC SYSTEM COMPONENTS. HVAC system components provide, in one or more factory-assembled packages, means for chilling or heating water, or both, with controlled temperature for delivery to terminal units serving the conditioned spaces of the building. Types of HVAC system components include, but are not limited to, water chiller packages, reciprocating condensing units and water source (hydronic) heat pumps (see "HVAC system equipment").

HVAC SYSTEM EQUIPMENT. HVAC system equipment provides, in one (single package) or more (split system) factory-assembled packages, means for air circulation, air cleaning, air cooling with controlled temperature and dehumidification, and, optionally, either alone or in combination with a heating plant, the functions of heating and humidifying. The cooling function is either electrically or heat operated and the refrigerant condenser is air, water or evaporatively cooled. Where the equipment is provided in more than one package, the separate packages shall be designed by the manufacturer to be used together. The equipment shall be permitted to provide the heating function as a heat pump or by the use of electric or fossil-fuel-fired elements. (The word "equipment" used without a modifying adjective, in accordance with common industry usage, applies either to HVAC system equipment or HVAC system components.)

INFILTRATION. The uncontrolled inward air leakage through cracks and interstices in any building element and around windows and doors of a building caused by the pressure effects of wind or the effect of differences in the indoor and outdoor air density or both.

INSULATING SHEATHING. An insulation board having a minimum thermal resistance of R-2 of the core material.

INTEGRATED PART-LOAD VALUE (IPLV). A single number of merit based on part-load EER or COP expressing part-load efficiency for air-conditioning and heat pump equipment on the basis of weighted operation at various load capacities for the equipment.

LABELED. Devices, equipment, appliances, assemblies or materials to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and by whose label the manufacturer attests to compliance with applicable nationally recognized standards.

LISTED. Equipment, appliances, assemblies or materials included in a list published by a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment, appliances, assemblies or material, and whose listing states either that the equipment, appliances, assemblies, or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

LOW-VOLTAGE LIGHTING. Lighting equipment that is powered through a transformer such as cable conductor, rail conductor, and track lighting.

MANUAL. Capable of being operated by personal intervention (see "Automatic").

MULTIFAMILY DWELLING. A building containing three or more dwelling units.

NON-RESIDENTIAL FARM BUILDINGS. Farm buildings, including barns, sheds, poultry houses and other buildings and equipment on the premises, used directly and solely for agricultural purposes.

OCCUPANCY. The purpose for which a building, or portion thereof, is utilized or occupied.

OPAQUE AREAS. All exposed areas of a building envelope which enclose conditioned space, except openings for windows, skylights, doors and building service systems.

OUTDOOR AIR. Air taken from the outdoors and, therefore, not previously circulated through the system.

OZONE DEPLETION FACTOR. A relative measure of the potency of chemicals in depleting stratospheric ozone. The ozone depletion factor potential depends upon the chlorine and the bromine content and atmospheric lifetime of the chemical. The depletion factor potential is normalized such that the factor for CFC-11 is set equal to unity and the factors for the other chemicals indicate their potential relative to CFC-11.

SERVICE SYSTEMS. All energy-using systems in a building that are operated to provide services for the occupants or processes housed therein, including HVAC, service water heating, illumination, transportation, cooking or food preparation, laundering and similar functions.

SERVICE WATER HEATING. Supply of hot water for purposes other than comfort heating.

SIMULATION TOOL. An approved software program or calculation-based methodology that projects the hour-by-hour loads and annual energy use of a building.

SKYLIGHT. Glazing that is horizontal or sloped at an angle less than sixty (60) degrees (1.1 rad) from the horizontal (see "Glazing area").

SLAB-ON-GRADE FLOOR INSULATION. Insulation around the perimeter of the floor slab or its supporting foundation when the top edge of the floor perimeter slab is above the finished grade or 12 inches (305 mm) or less below the finished grade.

SOLAR ENERGY SOURCE. Source of natural daylighting and of thermal, chemical or electrical energy derived directly from conversion of incident solar radiation.

STANDARD DESIGN. A version of the Proposed design that meets the minimum requirements of this code and is used to determine the maximum annual energy cost requirement for compliance based on total building performance.

STANDARD TRUSS. Any construction that does not permit the roof/ceiling insulation to achieve the required *R*-value over the exterior walls.

SUBSTANTIAL ALTERATION. The replacement of more than 50 percent of any building subsystem within any consecutive 12-month period.

SUNROOM ADDITION. A one-story structure added to an existing dwelling with a glazing area in excess of 40 percent of the gross area of the structure's exterior walls and roof.

SYSTEM OR SUBSYSTEM. A building assembly or building set of units made up of various components that serve a specific function, including but not limited to exterior walls, windows, doors, roofs, ceilings, floors, lighting, piping, ductwork, insulation, HVAC system equipment or components, electrical appliances, and plumbing appliances.

THERMAL CONDUCTANCE. Time rate of heat flow through a body (frequently per unit area) from one of its bounding surfaces to the other for a unit temperature difference between the two surfaces, under steady conditions (Btu/h · ft² · °F) [W/(m² · K)].

THERMAL ISOLATION. A separation of conditioned spaces, between a sunroom addition and a dwelling unit, consisting of existing or new wall(s), doors, and/or windows. New wall(s), doors, and/or windows shall meet the prescriptive envelope component criteria in Table 502.2.5.

THERMAL RESISTANCE (R). The reciprocal of thermal conductance (h · ft² · °F/Btu) [(m² · K)/W].

THERMAL RESISTANCE, OVERALL (R_o). The reciprocal of overall thermal conductance (h · ft² · °F/Btu)[m² · K)/W]. The overall thermal resistance of the gross area or individual component of the exterior building envelope (such as roof/ceiling, exterior wall, floor, crawl space wall, foundation, window, skylight, door, opaque wall, etc.), which includes the area weighted

R-values of the specific component assemblies (such as air film, insulation, drywall, framing, glazing, etc.).

THERMAL TRANSMITTANCE (U). The coefficient of heat transmission (air to air). It is the time rate of heat flow per unit area and unit temperature difference between the warm-side and cold-side air films (Btu/h · ft² · °F) [W/(m² · K)]. The *U*-factor applies to combinations of different materials used in series along the heat flow path, single materials that comprise a building section, cavity air spaces and surface air films on both sides of a building element.

THERMAL TRANSMITTANCE, OVERALL (U_o). The overall (average) heat transmission of a gross area of the exterior building envelope (Btu/h · ft² · °F) [W/(m² · K)]. The *U_o*-factor applies to the combined effect of the time rate of heat flow through the various parallel paths, such as windows, doors and opaque construction areas, comprising the gross area of one or more exterior building components, such as walls, floors or roof/ceilings.

THERMOSTAT. An automatic control device actuated by temperature and designed to be responsive to temperature.

TOWNHOUSE. A building not more than three stories in height consisting of multiple single-family dwelling units constructed in a group of three or more attached units, in which each unit extends from foundation to roof and with open space on at least two sides.

TRANSFORMER. Electrical equipment used to convert electric power from one voltage to another voltage.

Dry-type transformer. A transformer in which the core and coils are in a gaseous or dry compound.

Liquid-immersed transformer. A transformer in which the core and coils are immersed in an insulating liquid.

UNITARY COOLING AND HEATING EQUIPMENT. One or more factory-made assemblies which include an evaporator or cooling coil, a compressor and condenser combination, and which shall be permitted to include a heating function as well. When heating and cooling equipment is provided in more than one assembly, the separate assemblies shall be designed to be used together.

UNITARY HEAT PUMP. One or more factory-made assemblies which include an indoor conditioning coil, compressor(s) and outdoor coil or refrigerant-to-water heat exchanger, including means to provide both heating and cooling functions. When heat pump equipment is provided in more than one assembly, the separate assemblies shall be designed to be used together.

VENTILATION. The process of supplying or removing air by natural or mechanical means to or from any space. Such air shall be permitted to be conditioned or unconditioned.

VENTILATION AIR. That portion of supply air which comes from outside (outdoors) plus any recirculated air that has been treated to maintain the desired quality of air within a designated space (see ASHRAE 62 and definition of "Outdoor air").

WATER HEATER, INSTANTANEOUS. A water heater with an input rating of at least 4,000 Btu/h per gallon (310 W/L) stored water and a storage capacity of less than 10 gallons (38 L).

WATER HEATER, STORAGE. A water heater with an input rating less than 4,000 Btu/h per gallon (310 W/L) of stored water or storage capacity of at least 10 gallons (38 L).

WINDOW PROJECTION FACTOR. A measure of the portion of glazing that is shaded by an eave or overhang.

ZONE. A space or group of spaces within a building with heating or cooling requirements, or both, sufficiently similar so that comfort conditions can be maintained throughout by a single controlling device.

CHAPTER 3 DESIGN CONDITIONS

SECTION 301 DESIGN CRITERIA

301.1 General. The criteria of this chapter establish the design conditions for use with Chapters 4, 5, 6 and 8.

SECTION 302 THERMAL DESIGN PARAMETERS

302.1 Exterior design conditions. The following design parameters in Table 302.1 shall be used for calculations required under this code.

TABLE 302.1: EXTERIOR DESIGN CONDITIONS — New York State

COUNTY	WINTER DESIGN DRY-BULB TEMP.	SUMMER DESIGN DRY-BULB TEMP.	COINCIDENT WET-BULB TEMP.	HEATING DEGREE DAYS	ZONE	COUNTY	WINTER DESIGN DRY-BULB TEMP.	SUMMER DESIGN DRY-BULB TEMP.	COINCIDENT WET-BULB TEMP.	HEATING DEGREE DAYS	ZONE
Albany	-7	86	70	6894	14A	Niagara	2	85	73	6747	14A
Allegany	1	86	71	7484	15	Oneida	-5	86	70	7244	15
Bronx	13	89	73	4910	11B	Onondaga	-3	85	71	6834	14A
Broome	-2	82	69	7273	15	Ontario	1	86	71	6734	14A
Cattaraugus	2	85	73	6747	15	Orange	6	83	73	5750	12B
Cayuga	-3	85	71	6834	14A	Orleans	1	86	71	6734	14A
Chautauqua	2	85	73	6747	14A	Oswego	-3	85	71	6834	14A
Chemung	-2	87	71	6845	15	Otsego	-5	86	70	7244	15
Chenango	-2	82	69	7273	15	Putnam	6	83	73	5750	12B
Clinton	-9	83	69	7837	15	Queens	13	89	73	4910	10B
Columbia	-7	86	70	6894	14A	Rensselaer	-7	86	70	6894	14A
Cortland	-2	82	69	7273	15	Richmond	13	89	73	4910	11B
Delaware	-5	86	70	7244	15	Rockland	13	89	73	4910	12B
Dutchess	2	88	72	6391	13A	St Lawrence	-15	84	71	8255	15
Erie	2	85	73	6747	14A	Saratoga	-5	86	70	7244	14A
Essex	-15	84	71	8255	16	Schenectady	-7	86	70	6894	14A
Franklin	-15	84	71	8255	16	Schoharie	-7	86	70	6894	15
Fulton	-7	86	70	6894	15	Schuyler	-2	87	71	6845	15
Genesee	1	86	71	6734	14A	Seneca	1	86	71	6734	14A
Greene	-7	86	70	6894	14A	Steuben	1	86	71	6734	15
Hamilton	-10	85	71	7635	16	Suffolk	11	83	74	5750	11B
Herkimer	-5	86	70	7244	15	Sullivan	6	83	73	6750	15
Jefferson	-12	83	70	7540	15	Tioga	-2	87	71	6845	15
Kings	13	89	73	4910	10B	Tompkins	-2	82	69	7273	15
Lewis	-12	83	70	7540	15	Ulster	6	83	73	6750	15
Livingston	1	86	71	6734	14A	Warren	-10	85	71	7635	15
Madison	-5	86	70	7244	14A	Washington	-10	85	71	7635	15
Monroe	1	86	71	6734	14A	Wayne	1	86	71	6734	14A
Montgomery	-7	86	70	6894	14A	Westchester	7	84	73	5750	12B
Nassau	13	89	73	4910	11B	Wyoming	1	86	71	6734	14A
New York	13	89	73	4910	10B	Yates	1	86	71	6734	14A

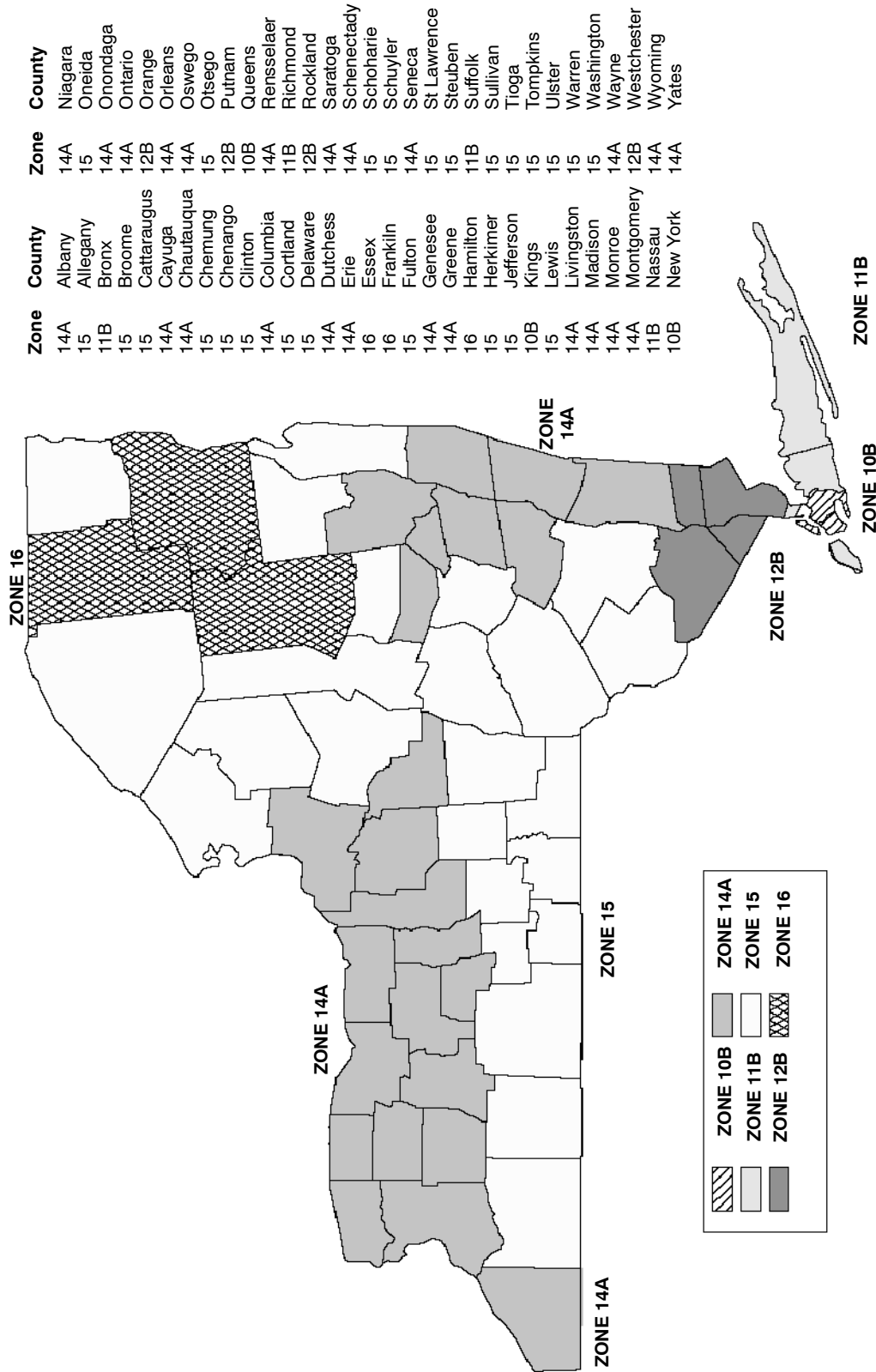


FIGURE 302.1
NEW YORK

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CHAPTER 4

RESIDENTIAL BUILDING DESIGN BY SYSTEMS ANALYSIS AND DESIGN OF BUILDINGS UTILIZING RENEWABLE ENERGY SOURCES

SECTION 401 SCOPE

401.1 General. This chapter establishes design criteria in terms of total energy use by a residential building, including all of its systems.

SECTION 402 SYSTEMS ANALYSIS

402.1 Energy analysis. Compliance with this chapter will require an analysis of the annual energy usage, hereinafter called an "annual energy analysis."

Exception: Chapters 5 and 6 establish criteria for different energy-consuming and enclosure elements of the building which, if followed, will eliminate the requirement for an annual energy analysis while meeting the intent of this code.

402.1.1 Standard design. A building designed in accordance with this chapter will be deemed as complying with this code if the calculated annual energy consumption is not greater than a similar building (defined as a "Standard design") whose enclosure elements and energy-consuming systems are designed in accordance with Chapter 5. Specific building envelope elements of the Standard design shall comply with Sections 402.1.1.1 through 402.1.1.4.

402.1.1.1 Exterior walls. The exterior wall assembly U -factors for the Standard design shall be selected by climate in accordance with Table 402.1.1(1).

402.1.1.2 Fenestration U -factor. The fenestration system U -factor used in the Standard design shall be selected by climate in accordance with Table 402.1.1(2).

402.1.1.3 Window area. The window area of the Standard design, inclusive of the framed sash and glazing area, shall be equal to 18 percent of the conditioned floor area of the Proposed design.

402.1.1.4 Skylights. Skylights and other nonvertical roof glazing elements shall not be included in the Standard design, and ceiling U -factors used in the Standard design shall not include such elements in their computation.

402.1.2 Proposed design. For a proposed alternate building design (defined as a "Proposed design") to be considered similar to a "Standard design," it shall utilize the same energy source(s) for the same functions and have equal conditioned floor area and the same ratio of thermal envelope area to floor area (i.e., the same geometry), exterior design conditions, occupancy, climate data, and usage operational schedule as the Standard design.

TABLE 402.1.1(1)
STANDARD DESIGN WALL ASSEMBLY U -FACTORS (U_w)

HEATING DEGREE DAYS ^a	U_w (air to air) ^b
> 13,000	0.038
9,000-12,999	0.046
6,500-8,999	0.052
4,500-6,499	0.058
3,500-4,499	0.064
2,600-3,499	0.076
< 2,600	0.085

a. From Table 302.1.

b. Including framing effects.

TABLE 402.1.1(2)
STANDARD DESIGN FENESTRATION SYSTEM U -FACTORS (U_g or U_f)

HEATING DEGREE DAYS ^a	U_g FOR SECTION 502.2.1.1 AND U_f FOR SECTION 502.2.3.1 (air to air) ^b
>13,000	0.25
9,000-12,999	0.26
6,500-8,999	0.28
4,500-6,499	0.30
3,500-4,499	0.41
2,600-3,499	0.44
700-2,599	0.47
<700	0.74

a. From Table 302.1.

b. Entire assembly, including sash.

402.1.2.1 Orientation for groups of buildings. The worst possible orientation of the Proposed design, in terms of annual energy use, considering north, northeast, east, southeast, south, southwest, west, and northwest orientations, shall be used to represent a group of otherwise identical designs.

402.1.3 Input values for residential buildings. The input values in Sections 402.1.3.1 through 402.1.3.10 shall be used in calculating annual energy performance. The requirements of this section specifically indicate which variables shall remain constant between the Standard design and Proposed design calculations. The Standard design shall be a base version of the design that directly complies with the provisions of this code. The proposed building shall be permitted to utilize a design methodology that is demonstrated through calculations to have equal or lower annual energy use than the Standard design. ←