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Final DRAFT

Proposed Changes to the 2020 New York State Energy Conservation Construction Code

Part 3 of 3 | Residential Provisions

July 26, 2024

This document is being developed for the purpose of posting a notice of rule in development for the New York State Fire Prevention and Building Code Council and the New York State Department of State. The purpose is to show the DRAFT proposed changes to the current version of the **New York State Energy Conservation Construction Code** (The State Energy Code). Separate parts of this document are being issued on the same date: Parts 1 and 2 of 3 contain the proposed changes to the Commercial provisions. This Part 3 of 3 contains the proposed changes to the Residential provisions of the document *Energy Conservation Construction Code of New York State* (ECCCNYS).

This document **is not intended to include** all of the proposed code language; it only contains those sections of code that are proposed to be new or modified. Unaltered portions of the 2020 code books are not included within this document and should be considered to remain the same for this code update.

Separate incremental versions of this document have been issued for the Residential and Commercial provisions of the State Energy Code. This Final Version is a compilation of all code changes proposed to date and include those proposed in Versions 1.0 and 2.0. Proposal numbers higher than EC 07-0099, as summarized in the Quick Reference Guide, indicate new changes made since Version 2.0, presented to the Code Council at the meeting of June 2023. The proposed changes are based on the following:

1. Revisions made to Article 11 of the NYS Energy Law on July 5, 2022 by Chapter 374 of the Laws of 2022 Advanced Building Codes Act (previously included in Version 1.0 presented at the meeting of March 31, 2023) and other necessary statutory requirements and statutory amendments (new in this Version 3.0).
2. Proposed changes and editorial modifications received after publication of the 2020 codes of New York State (previously included in Version 1.0 and presented at the meeting of March 31, 2023).
3. Changes consistent with the Climate Action Council's - Scoping Plan of December 2022, in accordance with the Climate Leadership and Community Protection Act (CLCPA).
4. Because the 2020 ECCCNYS is based, in part, on the 2018 *International Energy Conservation Code* (IECC), coordination and inclusion of:
   a. changes resulting from the 2021 IECC development cycle that were not anticipated to change further in the 2024 IECC cycle (included in Version 2.0 and presented at the meeting of June 23, 2023).
   b. changes based on the IECC current development cycle that have been published in interim Public Comment Documents, Monographs, and Redline documents intended to result in the publication of the 2024 IECC (new in this Version 3.0).
5. Incorporation of provisions of NYStretch 2020 that modify the ECCCNYS:
   a. Those that were not anticipated to change further in the 2024 IECC cycle (previously included in Version 2.0 and presented at the meeting of June 23, 2023).
   b. balance of changes with modifications made during development of the 2024 IECC (new in this Version 3.0).
6. Provisions of NYStretch 2020 that modify ASHRAE 90.1 (new in this Version 3.0 and included in Part 2 of this document).

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- This document may not include grammatical, punctuation, and simple word clarifications that do not change the intent or meaning of a provision.
- The terms "(Prescriptive)" and "(Mandatory)" were removed in the 2021 version of the IECC. Code sections where the only change was the removal of those terms are not included in this document.
- Where a change is made by NYS, rather than an ICC level change, "[NY]" is added to the section numbers; however, grammatical and punctuation changes made by NYS that do not change the intent or meaning of a provision are typically not denoted by [NY]. Similarly, updates made by NYS where the only change is to the referenced code book (i.e. ~~International Plumbing Code~~ Plumbing Code of New York State are not denoted by [NY]).
- Changes to the existing text are denoted in the following manner:
  - Text insertions: Text
  - Text deletions: ~~Text~~
- Section numbers presently shown in this document may be based on the 2020 ECCCNYS or the 2024 IECC, **with publication pending as of the time of this issuance**. Cross-referenced code section numbers may not be accurate and/or may change based on ongoing development.
- Where multiple code changes deal with the same topic, they are listed together and consolidated into one proposal number.
- Some code changes involve complex tables, lists, or lengthy sections in which a small change was made to only a portion. In those instances, portions of the section, table, list, etc. that were unchanged may not be included. Conversely, when an exception or a subsection are proposed to be modified, the charging language might be shown for context, such as Chapter 1, which is here presented in its entirety, even where no changes or only purely editorial changes are being proposed.
- Sections that were presented in earlier version of this document might have been further modified as triggered by items 1 through 6 above, and if so, an explanation for the change has been added to the Quick Reference Guide.

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Proposal #	Code Section(s)	Section Title	Subject	Origin / Consistency*
Residential				
EC 07-0011	R101.3	Scope	1. Remove the exceptions and consolidate with the exceptions listed in Sections R503.1.1 and R503.1.4. 2. Further modified to add "*residential* accessory structures."	ABCA CCP
EC 07-0012	R101.4	Intent	1. Add the reference to "clean energy" and "greenhouse gas" to align with Energy Law. 2. Remove redundant language. 3. Remove language that is no longer part of the Energy Law.	ABCA
EC 07-0013	R101.7	Historic Buildings	Remove duplicate blanket exception for historic buildings.	ABCA
EC 07-0014	R102.2	Other laws and regulations	1. Add the term "clean energy" and "greenhouse gas" to align with Energy Law. 2.Remove text that is no longer part of the Energy Law. 3. Align with Section C102.2.	ABCA
EC 07-0015	R202	Definitions, modified	Modify the definition for ASHRAE 90.1 to align with the definition or ASHRAE 90.1 in Energy Law.	ABCA
EC 07-0016	R202	Definitions, new	Add a defined term for "character-defining features" which is referenced in Section R501.6.1, below.	ABCA
EC 07-0017	R202	Definitions, modified	Modify the definition for historic buildings to align with the definition for historic buildings in Energy Law.	ABCA
EC 07-0018	R501.6	Historic Buildings	1. Modify the exception for historic buildings. 2. Created a subsection identifying the historic building report requirements.	ABCA
EC 07-0019	R503.1.1	Existing Buildings	1. Modify and consolidate exceptions from Section R101.3. 2. Further modified Exception 1 for consistency with the 2021 IECC.	ABCA IECC 21 IECC 24
EC 07-0020	R503.1.4	Existing Buildings	1. Consolidate exceptions previously contained in Section R101.3. 2. Further modified for consistency with Section R504.2.	ABCA
Items EC 07-0001 to -0020 are part of Version 1.0 presented to the Code Council at the meeting of March 31, 2023. For items 07-0021 to 07-0065 refer to Part 1 of this document.				
Residential				
EC 07-0066	R101.2 R101.2.1	Title Amendments of New York State code publications	Add amendments section for consistency with the Uniform Code.	CCP
Proposal #	**Code Section(s)**	**Section Title**	**Subject**	**Origin /**

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				Consistency*
EC 07-0067	R103	Interpretations of Energy Code requirements	1. Modify to align with interpretation provisions as stated in Section 11-103(4) of the NYS Energy Law. 2. Italicize defined terms.	CCP
EC 07-0068	R202	Definitions, new	Add new definitions for the following terms: access (to), cavity insulation, dimmer, occupant sensor control, on-site renewable energy, ready access (to), renewable energy resources, testing unit enclosure area, and thermal distribution efficiency (TDE).	IECC 21 IECC 24
EC 07-0069	R202	Definitions, deleted	Delete the definitions for the following terms: accessible [replaced with "access (to)"], air-impermeable insulation, and readily accessible.	IECC 21
EC 07-0070	R202	Definitions, modified	Modify the definitions for the following terms: demand recirculation water system, fenestration, and roof recover.	IECC 21
EC 07-0071	R202	Definitions, modified	Modify the definition for the term "residential building" for clarity.	CCP
EC 07-0072	Table R301.1	Climate Zones by County	Modify Climate Zone Table to align with the 2021 IECC, based on ASHRAE 169-2021.	IECC 21
EC 07-0073	Table R301.3(2)	Thermal Climate Zone Definitions	Revision of thermal criteria range to align with the 2021 IECC, based on ASHRAE 169-2021.	IECC 21
EC 07-0074	R303.1.5	Air-impermeable insulation	Add new provision specifically for air-impermeable insulation.	IECC 21
EC 07-0075	R402.1.4	R-value computation	Modify to clarify R-value calculations for different types of insulation.	IECC 21
EC 07-0076	R402.2.3	Eave baffle	Add installation criteria.	IECC 21
EC 07-0077	R402.2.4 R402.2.4.1	Access hatches and doors Access hatches and door insulation installation and retention	1. Modify for clarity. 2. Add new exception allowing for a reduction of insulation with limitations. 3. Move installation criteria to a subsection.	IECC 21
EC 07-0078	R402.2.5	Mass walls	Add mass timber to the list of options for mass walls.	IECC 21
EC 07-0079	R402.2.7	Walls with partial structural sheathing	Delete provisions that allowed for a reduction in insulation values on walls with partial structural sheathing.	IECC 21
EC 07-0080	R402.3.5	Sunroom and heated garage fenestration	Add heated garages to the sunroom fenestration requirements.	IECC 21
EC 07-0081	R402.5	Maximum fenestration U-factor and SHGC	Improved U-factors and SHGC for fenestration above 2024 IECC values and editorial modifications. Add exception for storm shelters.	IECC 21
EC 07-0082	R403.1.1	Programmable thermostat	Add different days of the week to the programmable thermostat requirements.	IECC 21

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Proposal #	Code Section(s)	Section Title	Subject	Origin / Consistency*
EC 07-0083	R403.3	Ducts	Requires duct systems to be installed in conditioned space.	Strtch 20
EC 07-0084	R403.3.8	Duct system sizing	Requires duct sizing to be in accordance with ACCA Manual D.	Strtch 20
EC 07-0085	Not Used			
EC 07-0086	R403.10.3	Covers (pools and spas)	Modifies exception to increase percentage of energy use for heating and to include the use of a heat pump as an option.	IECC 21
EC 07-0087	R404.4	Dwelling electrical meter	Add separate metering requirement for Group R-2 dwellings consistent with the parallel Commercial provisions.	CCP
EC 07-0088	Not Used			
Items EC 07-0021 to 07-0088 were added in Version 2.0 and presented to the Code Council at the meeting of June 23, 2023				
EC 07-0089 to EC 07-0099	NOT USED			
For items EC 07-0100 to EC 07-0199 See the Commercial provisions in Part 1 of this document				
Items EC 07-0200 to 07-0264 were added in Version 3.0 and are scheduled to be presented to the Code Council at the meeting of June, 2024				
EC 07-0200	Chapter 1	Scope and Application Administration and Enforcement	Re-organize, update, and consolidate language for consistency with 2024 IECC. Modify for consistency with modifications made to the State Energy Law. Other editorial modifications.	ABCA IECC 24
EC 07-0201	R201	Definitions. General	Clarification on the use of italics and defined terms consistent with the Preface and the Commentary.	CCP
EC 07-0202	R202	Definitions, deleted	High-efficacy lamps and low-voltage lighting	IECC 24
EC 07-0203	R202	Definitions, new	Air-handling unit, approved source, authority having jurisdiction, automatic shut-off control, automobile parking space, balanced ventilation system, biodiesel blend, common areas, construction documents, continuous pilot, damper, demand response signal, demand responsive control, distribution system efficiency, ductwork, emittance, enclosed reflective air space, existing building, F-factor, fuel gas, fuel oil, grade plane, heat exchanger, intermittent ignition, interrupted ignition, knee wall, liquid fuel, living space, low slope, market value, occupiable space, on-demand pilot, plenum, radiant barrier, reflective insulation, renewable energy certificate, simulated building performance, sleeping unit, solar-ready zone, space conditioning, space conditioning equipment, steep slope, substantial improvement, substantially	IECC 24 CLCPA

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			complete building permit application, and work area.	
Proposal #	**Code Section(s)**	**Section Title**	**Subject**	**Origin / Consistency***
EC 07-0204	R202	Definitions, modified	Duct system, energy rating index (ERI), proposed design, rated design, roof replacement, and standard reference design.	IECC 24
EC 07-0205	R303.1.1 R303.1.2	Building thermal envelope insulation Insulation mark installation	Revision of building thermal envelope insulation to include reflective insulation. Revision to require an insulation certificate for insulation that doesn't contain an R-marking.	
EC 07-0206	R303.1.6	Air spaces	New provision for enclosure of air spaces and minimizing airflow.	
EC 07-0207	R303.2.2	Radiant barrier	New product and installation referenced standards.	
EC 07-0208	R401.2 R401.2.1 R401.2.2 R401.2.3	Application Prescriptive compliance option Simulated building performance option Energy rating index option	Renaming and restructuring of compliance options.	IECC 21 IECC 24 CLCPA
EC 07-0209	R401.3 R402.1.2 Table R402.1.2	Certificate Insulation and fenestration criteria Maximum assembly *u*-factors and fenestration requirements	Restructuring and addition of new information to be contained in the compliance certificate. Improved efficiency for opaque building thermal envelope assemblies beyond 2024 IECC values and editorial modifications.	IECC 24 CLCPA
EC 07-0210	R402.1.3 [NY] Table R402.1.3	*R-value* alternative Insulation minimum *R-value*s and fenestration requirements by component	New charging language and improved efficiency for opaque building thermal envelope assemblies beyond 2024 IECC values and editorial modifications.	Strtch 20 IECC 21 IECC 24 CLCPA
EC 07-0211	R402.1.5	Component performance alternative	Introduction of formula for component performance alternative.	IECC 24
EC 07-0212	R402.2.1 [NY] R402.2.2 R402.2.3 R402.2.3.1	Ceilings with attics ceilings without attics Attic knee wall Roof truss framing separating conditioned and unconditioned space	More stringent specific insulation requirements for ceilings, attic knee walls, and roof truss framing.	Strtch 20 IECC 21 IECC 24
EC 07-0213	R402.2.7 ~~Table R402.2.6~~	Steel-frame ceilings, walls and floors Steel-frame ceiling, wall and floor insulation *R-values*	Replaces the table with standard AISI 250 as the method to calculate the *U-factor* in steel frame ceilings and walls.	IECC 24
EC 07-0214	R402.2.8	Floors	Sets specific compliance options for cavity insulation.	IECC 24

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EC 07-0215	R402.2.9 R402.2.9.1	Basement walls Basement wall insulation installation	New exceptions for basement wall insulation and modified insulation criteria.	IECC 24
Proposal #	**Code Section(s)**	**Section Title**	**Subject**	**Origin / Consistency***
EC 07-0216	R402.2.10 R402.2.10.1 R402.2.10.2	Slab-on-grade floors Slab-on-grade floor insulation installation Alternative slab-on-grade insulation configurations	Modified provisions for slab on grade insulation.	IECC24
EC 07-0217	R402.2.11 R402.2.11.1 R402.2.11.2	Crawl space walls Crawl space Alternative crawl space wall insulation configurations	Modified provisions for crawl space insulation.	IECC 24
EC 07-0218	R402.2.13	Sunroom and heated garage insulation.	Revision to apply the provisions applicable to sunrooms also to heated garages.	IECC 24
EC 07-0219	R402.3	Radiant barriers	New provision modified for consistency with parallel requirements in R303.2.2.	IECC 24
EC 07-0220	[NY] R402.5.1.1 Table R402.5.1.1	Installation Air barrier, air sealing and insulation installation	Installation and air barrier criteria revised to include detailed inspection and installation requirements.	IECC 24 Strtch 20 CLCPA
EC 07-0221	R402.5.1.2 ~~[NY] R402.4.1.3~~ ~~[NY] R402.4.1.3.1~~ R402.5.1.2.1	Air leakage testing ~~Buildings with two or more dwelling units within the building thermal envelope~~ ~~Buildings with more than seven dwelling units~~ Unit sampling	Exception added to exclude heated sunrooms and garages. Replaced provisions that allow unit sampling.	IECC 24 CLCPA
EC 07-0222	R402.5.1.3 R402.5.5	Maximum air leakage rate Air sealed electrical and communication outlet boxes	Modified air leakage rate provisions with tighter rates in climate zone 6 and specific requirements for multi-unit testing and small buildings. New provision requiring air-sealing of electrical boxes.	IECC 24 CLCPA
EC 07-0223	[NY] R403.1.2	Heat pump supplementary heat	Revision to list instances where supplemental heat operation is permitted.	IECC 24 CLCPA
EC 07-0224	R403.2	Hot water boiler temperature reset	Revision to outdoor setback controls for some systems.	IECC 24
EC 07-0225	R403.3.1	Duct system design	New provision detailing sizing procedures depending on number of dwelling units served	IECC 24
EC 07-0226	R403.3.3	Ductwork located outside conditioned space	Expanded to address ductwork buried beneath a building.	IECC 24

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EC 07-0227	R403.3.4	Ductwork located in conditioned space	Modified to include specific provisions for ductwork within walls that separate conditioned and unconditioned spaces. Added sections pertaining to ductwork located in crawlspaces and basements. Added insulation requirement.	IECC 24
Proposal #	**Code Section(s)**	**Section Title**	**Subject**	**Origin / Consistency***
EC 07-0228	R403.3.7 R403.3.8 Table R403.3.8 R403.3.9	Duct system testing Duct system leakage Maximum total duct system leakage Unit sampling	Modified to reference standard Resnet 380 with maximum allowed leakage rates expressed in tabular values. New provision allowing sample testing.	IECC 24
EC 07-0229	R403.4.1	Protection of piping insulation.	Revision to protection of piping insulation provisions.	IECC 24
EC 07-0230	R403.5.1.1 R403.5.1.1.1	Circulation systems Demand recirculation water systems	Revision to heated water circulation systems and demand recirculation water system control functions.	IECC 24
EC 07-0231	R403.5.2 Table R403.5.2	Hot water pipe insulation Minimum pipe insulation thickness	Revision to hot water pipe insulation criteria and minimum pipe insulation thickness expressed in tabular values.	IECC 24
EC 07-0232	R403.5.4 Table R403.5.4	Demand responsive water heating Demand responsive controls for water heating	New requirement for electric storage water heaters.	IECC 24
EC 07-0233	R403.6.1	Heat or energy recovery ventilation	New requirement for a heat recovery or energy recovery ventilation system.	IECC-24 CCP
EC 07-0234	R403.6.2 Table R403.6.2	Whole-house mechanical ventilation system fan efficacy Whole-house mechanical ventilation system fan efficacy	Revised to include a testing procedure and modifications to the efficacy table.	IECC 24
EC 07-0235	R403.6.3 R403.6.4 R403.6.5	(Mechanical system) Testing Unit sampling Intermittent exhaust control for bathrooms and toilet rooms	New provisions for testing of mechanical ventilation systems and bathroom exhaust controls	IECC 24
EC 07-0236	R403.7.1	Electric-resistance space heating	New provision limiting the use of electric resistance heating	IECC 24
EC 07-0237	R403.9 R403.9.1 R403.9.3 R403.9.4	Mechanical systems located outside of the *building* thermal envelope Heating outside a building	Expanded provisions for energy consuming-systems providing heat outside a building to include additional systems and those located outside of building thermal envelope. Consistent with the commercial provisions.	IECC 24

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		Roof and gutter deicing controls Freeze protection system controls		
EC 07-0238	R403.13 R403.13.1	Gas fireplaces Gas fireplace efficiency	New provision prohibiting continuous pilots in gas fireplaces. New provision for listing and minimum efficiency for gas fireplaces.	IECC 24
EC 07-0239	R404.1	Lighting equipment	Revision to use a lumens per watt efficiency metric with exceptions.	IECC 24
Proposal #	**Code Section(s)**	**Section Title**	**Subject**	**Origin / Consistency***
EC 07-0240	Table R404.1 R404.1.1 R404.1.2 R404.1.3 R404.1.4	Lighting power allowances for building exteriors Exterior lighting Exterior lighting power requirements Exterior lighting power allowance Additional exterior lighting power	New power allowances for exterior lighting.	IECC 24
EC 07-0241	R404.1.5	Gas lighting equipment	Revision to pilot provisions for gas lighting appliances.	IECC 24
EC 07-0242	R404.2	Interior lighting controls	New timed lighting control provisions for permanently installed interior lighting and daylight control for exterior lighting with power greater than 30W	IECC 24
EC 07-0243	R404.4	Renewable energy certificate (REC) documentation	New documentation requirements where renewable energy certificates are used.	IECC 24
EC 07-0244	R404.5	Electrification ready	Pointer to the specific provisions of the Uniform Code to be met where/when readiness is required.	Energy Law CLCPA
EC 07-0246	NOT USED			
EC 07-0247	R405 [NY] R405.1 R405.2 Table R405.2	Simulated Building Performance Scope Simulated building performance-based compliance Requirements for simulated building performance	Scope statement revised to indicate the analysis is limited to dwelling units and sleeping units but not to common areas. "Mandatory" simulated building performance provisions requirements expressed in tabular format. Addition of electric readiness, photovoltaic systems, dwelling unit electrical metering, and energy storage systems.	IECC 24 CCP
EC 07-0248	R405.3	Compliance documentation	Modified with references to other sections containing the requirements reports submitted with a building permit application and before issuance of a certificate of occupancy. Relocation of the requirements for "additional documentation."	IECC 24

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EC 07-0249	R405.4 R405.4.1 R405.4.2 [NY] Table R405.4.2(1) Table R405.4.2(2)	Calculation procedure General Residence specifications Specifications for the standard reference and proposed designs Default distribution system efficiencies for proposed designs	Revised provisions for software tools used to calculate performance and new options for determining the slab-on-grade thermal efficiency. Modifications to the applicable tables with stricter requirements consistent with the prescriptive provisions.	IECC 24
Proposal #	**Code Section(s)**	**Section Title**	**Subject**	**Origin / Consistency***
EC 07-0250	R405.5 R405.5.1	Calculation software tools Minimum capabilities	New requirement for hourly calculations and related sections consolidated.	IECC 24
EC 07-0251	R405.5.2 R405.5.3	Testing required by software vendors Algorithms not tested	Replaced requirements with new provisions for software testing in accordance with ASHRAE Standard 140 or ANSI/RESNET/ICC 301	IECC 24
EC 07-0252	R405.5.4 R405.5.4.1 R405.5.4.2	Compliance reports Compliance report for permit application Compliance report for certificate of occupancy	Modifications to the requirements for software-generated compliance reports.	IECC 24
EC 07-0253	R406 [NY] R406.1	Energy Rating Index Compliance Alternative Scope	Scope statement revised to indicate the analysis is limited to dwelling units and sleeping units but not to common areas.	IECC 21 IECC 24
EC 07-0254	R406.2 Table R406.2	ERI compliance Requirements for energy rating index	Reconfigured the "mandatory" provisions with modifications to Section R406.2 (formerly R402.4) and new Table R406.2.	IECC 21 IECC 24
EC 07-0255	R406.3	Building thermal envelope	Modified building thermal envelope requirements and a new 15% envelope efficiency backstop.	IECC 21 IECC 24
EC 07-0256	R406.4 R406.5 [NY] Table R406.5	Energy Rating Index ERI-based compliance Maximum energy rating index	Revision to ERI-based compliance to remove ventilation rates (relying on the Residential Code) Stricter ERI values consistent with the prescriptive provisions.	IECC 24
EC 07-0257	R406.7.1 R406.7.2 R406.7.3	Compliance software tools Compliance report Renewable energy certificate (REC) documentation	Revision to require software to validated published on a public website. Revision of required content of compliance reports. New documentation requirements for renewable energy certificates.	IECC 24
EC 07-0245	R407	Tropical	Reserved	
EC 07-0258	R408	Additional Efficiency (credit) Requirements Table R408.2.6 minimum efficiency requirements	New provisions requiring a minimum of 10 credits earned from a list of options that include more efficient building thermal envelope, HVAC systems, water heating, and lighting, as well as energy efficient appliances, renewable energy, demand response, or renewable energy.	IECC 24 CLCPA

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	Chapter R5	Existing Buildings		
EC 07-0259	R502.2.1 R502.2.2	Additions Building thermal envelope Heating and cooling systems	Exception for unconditioned space moved to separate section and new exception or air infiltration test. Modification to the ductwork requirements.	IECC 24
EC 07-0260	R502.2.5	Additional efficiency credit requirements for additions	New provision requiring 5 “additional efficiency credits” for additions.	IECC 24 CLCPA
Proposal #	**Code Section(s)**	**Section Title**	**Subject**	**Origin / Consistency***
EC 07-0261	R503.1.1.2 R503.1.1.3 R503.1.1.4 R503.1.1.5 R503.1.1.6	Alterations Roof, ceiling, and attic alterations Above-grade wall alterations Floor alterations Below-grade wall alterations Air barrier	Reconfiguration of building thermal envelope requirements for alterations, with separate provisions for each envelope component and addressing requirements previously framed as an exception. Added specific R-value requirements where cavities are to be filled with insulation with an exception for some existing concrete slabs.	IECC 24
EC 07-0262	R503.1.2 R503.1.2.1 R503.1.2.2 R503.1.2.3 R503.1.2.4	Heating and cooling systems Ductwork System sizing Duct system leakage Controls	Modification of the charging language and new specific provisions for ductwork that is part of an alteration.	IECC 24
EC 07-0263	R503.1.5	Additional efficiency credit requirements for substantial improvements	New provisions for 3 additional efficiency credits for alterations that constitute “substantial improvements.”	IECC 24
EC 07-0264	Appendix RF	Alternative Building Thermal Envelope Insulation R-Value Options	Optional efficiency metric to be used for building thermal envelope assemblies.	IECC 24

(*) “Origin [of] / Consistency [with]” Column

ABCA Modifications to Article 11 of the Energy Law made by the Advanced Building Codes, Appliance and Equipment Efficiency Standards Act of 2022
CCP Code change proposals received by the DBSC since publication of the 2020 State Energy Code
CLCPA Climate Action Council - Climate Leadership and Community Protection Act (**CLCPA**) - Scoping Plan, Dec. 2022.
IECC 21 2021 International Energy Conservation Code
IECC 24 2024 International Energy Conservation Code
Strtch 20 NYStretch 2020

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EC 07- 0200

Add new:

PART 1- SCOPE AND APPLICATION

[NY] SECTION R101
SCOPE AND GENERAL REQUIREMENTS

[NY] R101.1 The Energy Code. The *New York State Energy Conservation Construction Code* promulgated pursuant to Article 11 of the New York State Energy Law (hereinafter referred to as the "*Energy Code*") is contained in Title 19 of the New York Codes, Rules and Regulations, Part 1240 ("19 NYCRR Part 1240"), and in the publications incorporated by reference in 19 NYCRR Part 1240.

This publication (the ~~2020~~ 2024 *Energy Conservation Construction Code of New York State*, hereinafter referred to as the "ECCCNYS") is one of the publications incorporated by reference in 19 NYCRR Part 1240. The provisions set forth in this publication are part of the *Energy Code*.

The ~~*Energy Conservation Construction Code of New York State*~~ ECCCNYS has two separate sets of provisions. This set of provisions (the "ECCCNYS—Residential Provisions") includes provisions applicable to *residential building*s. The other set of provisions (the "ECCCNYS Commercial Provisions") includes provisions applicable to *commercial building*s.

EC 07- 0066

Revise as follows:

[NY] R101.2 Title. This portion of the ECCCNYS shall be known as the ~~"*ECCCNYS—Residential Provisions*."~~ "ECCCNYS—Residential Provisions," and shall be cited as such. References in the ~~*ECCCNYS—Residential Provisions*~~ ECCCNYS—Residential Provisions to "this code" shall be construed as references to the ~~*ECCCNYS—Residential Provisions*~~ ECCCNYS—Residential Provisions.

[NY] R101.2.1 Amendments of New York State code publications. The codes of New York State shall include the following publications: the *Residential Code of New York State*, the *Building Code of New York State*, the *Plumbing Code of New York State*, the *Mechanical Code of New York State*, the *Fuel Gas Code of New York State*, the *Fire Code of New York State*, the *Property Maintenance Code of New York State*, the *Existing Building Code of New York State*, and the *Energy Conservation Construction Code of New York State* (i.e., this publication). Provisions in any one or more of these publications may be amended from time to time by provisions in 19 NYCRR Parts 1220 to 1227 or 19 NYCRR Part 1240, as currently in effect and as hereafter amended from time to time. If this publication is now or hereafter so amended, references in this publication to "this code" shall be deemed to be references to this publication as so amended. If any other of these publications is now or hereafter so amended, references in this code to such other publication shall be deemed to be references to such publication as so amended.

EC 07- 0011

Revise as follows:

[NY] R101.3 Scope. This code ~~applies to~~ regulates the design and construction of new *residential buildings*, residential accessory structures, ~~and~~ ~~the~~ *building*~~s~~' *sites,* ~~sites~~ and associated systems and equipment~~.~~ and the *additions* to, and/or *alterations* ~~of, and/or renovations~~ thereto for the use and conservation of energy and clean energy features including the reduction in greenhouse gas emissions, over the life of each such *residential building.*

~~**Exceptions:**~~

~~The *Energy Code* shall not apply to any of the following, provided that the energy use of the *building* is not increased:~~

~~1.Storm windows installed over existing fenestration;~~

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~~2.Glass only replacements in an existing sash and frame;~~

~~3.Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation;~~

~~4.Construction where the existing roof, wall or floor cavity is not exposed;~~

~~5.Reroofing for roofs 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 such conditioned space from the exterior shall not be removed;~~

~~7.Alterations that replace less than fifty percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power; or~~

~~8.Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the alteration does not increase the installed interior lighting power.~~

EC 07- 0200

Revise as follows:

[NY] ~~**R101.6**~~ **R101.3.1 Statutory Limitations.** In the event of an *addition to,* or *alteration* of, an existing building or *building system* in an existing building, nothing in the ECCCNYS Residential Provisions or in any other provision of the *Energy Code* shall be interpreted to require any unaltered portion of such existing building or *building system* to comply with the *Energy Code*.

[NY] ~~**R101.3.1**~~**R101.3.2 Appendices.** Provisions in the following appendix have been adopted and are part of this code:

Appendix RF Alternative Building Thermal Envelope Insulation *R-value* Options

In addition, ~~Provisions in~~ the following appendices ~~appendix~~ have not been adopted and are included for informational purposes only:

~~Appendix RA Solar-Ready Zone—Residential~~

Appendix RB Solar-Ready Provisions—Detached One- and Two-Family Dwellings and Townhouses

Appendix RC Zero Net Energy Residential Building Provisions

Appendix RD Electric Energy Storage Provisions

Appendix RG 2024 IECC Stretch Code

Appendix RH Operational Carbon Rating and Energy Reporting

Appendix RI On-Site Renewable Energy

EC 07- 0012

Revise as follows:

[NY] R101.4 Intent. ~~The *ECCCNYS—Residential Provisions* regulate the design and construction of new *residential buildings*; *additions* to, *alterations* of, and/or renovations of existing *residential buildings*; and *additions* to, *alterations* of, and/or renovations of or *building systems* in existing *residential buildings* for the use and conservation of energy over the life of each such *residential building*.~~

The ~~*ECCCNYS—Residential Provisions*~~ *Energy Code* is ~~are~~ intended to provide flexibility to permit the use of innovative approaches and techniques to achieve the objectives set forth in ~~the preceding paragraph~~ Section R101.3. ~~However, nothing in this Section R101.4 shall be construed as permitting any *building official*, or any governmental unit or agency charged with the administration and enforcement of the *Energy Code*, to waive, vary, modify, or otherwise alter any standard or requirement of the ECCCNYS—Residential Provisions *ECCCNYS—Residential Provisions* or any other~~

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~~standard or requirement of the *Energy Code*. Standards or requirements of the *Energy Code* may be varied or modified only pursuant to Section 11-106 of the New York State Energy Law.~~

The ~~ECCCNYS—Residential Provisions are not intended to abridge safety, health or environmental requirements contained in other applicable statutes, laws, rules, regulations, codes or ordinances. However, nothing in Section R101.4 shall be construed as limiting the provisions of Section 11-103(3) of the New York State Energy Law, which provides that (1) any code, rule, or regulation promulgated or enacted prior to June 19, 1978 by any state agency other than the State Fire Prevention and Building Code Council, incorporating specific energy conservation requirements applicable to the construction of any building, is superseded by the Energy Code and (2) on and after June 19, 1978, the~~ State Fire Prevention and Building Code Council, in accordance with the mandate under Article 11 of the New York State Energy Law, shall have exclusive authority among state agencies to promulgate a construction code incorporating energy conservation and clean energy features including but not limited to the reduction in greenhouse gas emissions. The Energy Code is adopted for the purpose of protecting the health, safety and security of the people of the State and to assure a continuing supply of energy for future generations, requiring that economically reasonable energy conservation techniques be used in the design and construction of all public and private buildings in the State.

EC 07- 0200

Revise as follows:

[NY] R101.5 Compliance. *Residential buildings* shall meet the ~~provisions of~~ ECCCNYS—Residential Provisions.

~~*Commercial buildings* shall meet the~~ provisions of ~~ECCCNYS—Commercial Provisions. To the extent permitted by 19 NYCRR Part 1240, *commercial buildings* may comply with *ASHRAE 90.1-2016* (as amended) in lieu of complying with the ECCCNYS—Commercial Provisions.~~

[NY] R101.5.1 Compliance software. Where chosen by the applicant, compliance with the ECCCNYS—Residential Provisions, or portion thereof, can be demonstrated using either of the following:

1. Computer software that is developed by the United States Department of Energy ~~(~~, such as REScheck~~),~~ specifically for the ECCCNYS—Residential Provisions; or
2. Other software ~~that shall have been~~ expressly approved in writing by the New York Secretary of State as acceptable for demonstrating compliance with the ECCCNYS—Residential Provisions.

Software programs used to demonstrate compliance must indicate compliance with the ECCCNYS—Residential Provisions, the applicable code year, the applicable compliance path, and ~~must~~ reflect ~~the actual~~ all applicable requirements of the ECCCNYS—Residential Provisions.

[NY] R101.5.1.1 Other analysis tools. Other performance analysis tools used to document performance-based design or the energy rating index (ERI) for a specified application or limited scope in accordance with Sections R405 and R406, as applicable, are subject to the *approval* of the *building official*.

~~**[NY] R101.5.2 Mandatory provisions.** The use of the software approach to demonstrate compliance with the ECCCNYS Residential Provisions does not excuse compliance with any mandatory provision of the ECCCNYS Residential Provisions. When using the software approach to demonstrate compliance with the provisions of the ECCCNYS Residential Provisions, compliance with all applicable mandatory provisions of the ECCCNYS Residential Provisions will still be required.~~

~~**[NY] R101.7 Historic Buildings.** *Historic buildings* are exempt from the *Energy Code*.~~

EC 07- 0013

Delete:

~~**R101.7 Historic buildings.** *Historic buildings* are exempt from the *Energy Code*.~~

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PART 2- ADMINISTRATION AND ENFORCEMENT

EC 07- 0200

Revise as follows:

[NY] SECTION R102
APPLICABILITY

[NY] R102.1 Applicability. The ~~*ECCCNYS—Residential Provisions*~~ ECCCNYS—Residential Provisions apply to (1) the construction of new *residential buildings*, (2) *additions* to and *alterations* of existing *residential buildings*, (3) *additions* to and *alterations* of *building systems* in existing *residential 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.

[NY] R102.1.1 Mixed residential and commercial buildings. Where a *building*, having not more than three stories above grade plane, includes both *residential building* and *commercial building* portions, each portion shall be ~~separately~~ considered separately and:

1. Each *commercial building* portion shall meet the applicable provisions of ECCCNYS—Commercial Provisions or, to the extent permitted by 19 NYCRR Part 1240, the applicable provisions of the *2024 NYS ASHRAE 90.1-*~~2016 (as amended)~~, and
2. Each *residential building* portion shall meet the applicable provisions of the ECCCNYS—Residential Provisions.

[NY] ~~**R101.1.1**~~ **R102.2 Administration and enforcement.** The *Energy Code* shall be administered and enforced in accordance with this Chapter 1 [RE]; Chapter 1 [CE] of the ECCCNYS—Commercial Provisions, as applicable; and the strictest provisions of:

1. ~~the requirements of the~~ The code enforcement program established by the governmental unit or agency responsible for administration and enforcement of the Uniform Code and the *Energy Code* with respect to the building in question, or
2. ~~the~~ The minimum requirements established by the regulations adopted by the Department of State pursuant to section 381(1) of the New York State Executive Law~~, or~~.
3. ~~the requirements set forth in this Chapter 1 [RE] and, as applicable, in Chapter 1 [CE] of this publication~~.

EC 07- 0014

Revise as follows:

[NY] ~~**R102.2**~~ **R102.3 Other laws and regulations.** The provisions of this code shall not be deemed to abridge or nullify any provisions of local, state or federal law, statute, rule, regulation, code or ordinance relating to any matter as to which the *Energy Code* does not provide.

[NY] ~~**R102.2.1**~~ **R102.3.1 Other agencies' regulations.** Pursuant to Section 11-103(3) of the New York State Energy Law, any other code, rule or regulation heretofore promulgated or enacted by any state agency other than the State Fire Prevention and Building Code Council (Code Council), incorporating specific energy conservation and clean energy requirements applicable to the construction of any building, shall be superseded by the *Energy Code.* However, nothing in this section shall be deemed to expand the powers of the Code Council to include matters that are exclusively within the statutory jurisdiction of the NYS Public Service Commission, the NYS Department of Environmental Conservation, the NYS Office of Renewable Energy Siting or any other State entity.

EC 07- 0200

Revise as follows:

[NY] ~~**R102.2.2**~~ **R102.3.2 More** ~~stringent~~ **restrictive local energy codes.** Pursuant to section 11-109 of the New York

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State Energy Law, and subject to the provisions and requirements of that section, any municipality has the power to promulgate a local energy conservation construction code that is more ~~stringent~~ restrictive than the *Energy Code*.

[NY] ~~R102.3~~ R102.4 Application of references. References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of the ECCCNYS—Residential Provisions.

[NY] ~~R102.4~~ R102.5 Referenced codes and standards. The codes and standards referenced in the ECCCNYS—Residential Provisions shall be those indicated in Chapter 6 [RE], and such codes and standards shall be considered ~~as~~ part of the requirements of the ECCCNYS—Residential Provisions to the prescribed extent of each such reference and as further regulated in Sections ~~R102.4.1~~ R102.5.1 and ~~R102.4.2~~ R102.5.2.

[NY] ~~R102.4.1~~ R102.5.1 Conflicts. Where conflicts occur between provisions of the ECCCNYS—Residential Provisions and referenced codes and standards, the provisions of the ECCCNYS—Residential Provisions shall apply.

[NY] ~~R102.4.2~~ R102.5.2 Provisions in referenced codes and standards. Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of the ECCCNYS—Residential Provisions, the provisions of the ECCCNYS—Residential Provisions, as applicable, shall take precedence over the provisions in the referenced code or standard.

> **Exception:** Where the energy efficiency, energy use, or water use of covered products or equipment is subject to federal preemption pursuant to the Energy Policy and Conservation Act (EPCA), the requirements set forth by the Department of Energy (DOE) in the Code of Federal Regulations (CFR) take precedence over any requirement in the ECCCNYS.

[NY] ~~R102.5~~ R102.6 Partial invalidity. If a portion of the *Energy Code* is held to be illegal or void by a court of competent jurisdiction, such a decision shall not affect the validity of the remainder of the *Energy Code*.

EC 07- 0067

Revise as follows:

[NY] SECTION R103 INTERPRETATIONS OF ENERGY CODE REQUIREMENTS

[NY] R103.1 General. The Secretary of State is authorized by Section 11-103(4) of the New York State Energy Law to issue written interpretations of the *Energy Code* upon written request of a permit applicant or the *building official* responsible for the administration and enforcement of the provisions of the *Energy Code*.

[NY] R103.2 ~~Procedure.~~ Interpretation request. A written request for an interpretation shall be signed by the building permit applicant ~~and~~ or the ~~building official~~ *building 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 party making the request ~~building permit applicant and the building official~~;
2. A detailed description of the proposed construction, if applicable ~~including a copy of the building permit application and plans and specifications that have been filed by the building permit applicant with the building 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 the *Energy Code* for which an interpretation is requested;
4. A concise summary of the disagreement or ambiguity 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 ~~building official~~ *building official*.

~~**[NY] R103.3 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.~~

~~**[NY] R103.4 Notification.** Upon receipt of a complete request for an interpretation signed by only the building permit applicant or the building 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~~

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~~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 Secretary of State may waive this deadline when warranted by extenuating circumstances.~~

~~**[NY] R103.5 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 building 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 building 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.~~

~~**[NY] R103.6**~~ **R103.4 Enforcement.** Subsequent enforcement of the ~~Energy Code~~ *Energy Code* shall be consistent with the written interpretations issued by the Secretary of State pursuant to Section 11-103(4) of the New York State Energy Law.

EC 07- 0200

Revise as follows:

[NY] R~~103.7~~ R103.5 Interpretation of more restrictive ~~stringent~~ local energy code provisions. If a municipality has adopted a local energy code in accordance with the provisions of section 11-109 of the New York State Energy Law, and if such local energy code ~~shall have~~ has become effective in such municipality in accordance with the provisions of section 11-109 of the New York State Energy Law, such municipality or any official designated by such municipality is permitted to interpret those provisions of such local energy code that are (1) in addition to the provisions of *Energy Code* or (2) more stringent than the provisions of the *Energy Code*. However, no such interpretation shall be deemed to be an interpretation of the *Energy Code* by the Secretary of State pursuant to section 11-103(4) of the New York State Energy Law. In addition, if such municipality or an official designated by such municipality interprets a provision of a local energy code in a manner that makes such provision less stringent ~~that~~ than the corresponding provision of the *Energy Code,* the corresponding provision of the *Energy Code* shall supersede such provision of the local energy code.

[NY] SECTION R104
ALTERNATIVE MATERIALS, DESIGNS AND METHODS OF CONSTRUCTION ~~AND INSULATING SYSTEMS~~

[NY] R104.1 General. Provisions, standards, or requirements of the Energy Code may only be varied or modified, in whole or part, pursuant to Section 11-106 of the New York State Energy Law. A *building official*, governmental unit or agency responsible for administration and enforcement of the Energy Code or any other entity shall not be permitted to waive, vary, modify, or otherwise alter any provision, standard, or requirement of the Energy Code.

However, the ~~ECCCNYS Residential Provisions are~~ *Energy Code* is not intended to prevent the installation or use of any material~~, or to prohibit any~~ design or method of construction~~, or insulating system~~ not specifically prescribed by this code, provided that any such alternative has been *approved.* ~~shall have been approved by the building official, in writing.~~ When requesting approval of an alternative material, design or method of construction, the owner or the owner's authorized agent shall provide a written justification demonstrating that the proposed alternative is satisfactory and complies with ~~as (1) meeting~~ the intent of the provisions of this code and ~~(2) achieving energy savings that is equivalent or greater than that which would be achieved by the prescribed method of construction, design or insulating system~~ that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code for strength, effectiveness, fire resistance, durability, energy conservation and safety. The *building official* shall respond to the applicant, in writing, stating the reasons why the alternative was *approved* or was not *approved*.

~~Nothing in this section R104.1 shall be construed as permitting any building official or any governmental unit or agency responsible for administration and enforcement of the Energy Code to waive, vary, modify, or otherwise alter any provision, standard, or requirement of the Energy Code. Provisions, standards, or requirements of the Energy Code may be waived, varied or modified, in whole or part, only pursuant to Section 11-106 of the New York State Energy Law.~~

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[NY] SECTION R105
CONSTRUCTION DOCUMENTS

[NY] R105.1 General. *Construction documents*, technical reports and other supporting data shall be submitted ~~in one or more sets~~ with each application for a permit in the format and quantity required by the *authority having jurisdiction*. ~~The construction documents and technical reports shall be prepared by a *registered design professional* as~~ Where required by New York State Education Law Articles 145 and 147, *construction documents* and technical reports shall be prepared by a registered design professional and contain evidence that such documents were prepared by a *registered design professional,* including the design professional's signature and seal that legibly shows their name and license number.

[NY] R105.2 Information on construction documents. *Construction documents* shall be drawn to scale on suitable material. ~~Electronic media documents are permitted to be submitted where approved by the building official.~~ *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*, systems and equipment and the applicable provisions of this code ~~as herein governed~~. Details shall include, but are not limited to, the following as applicable:

1. *Energy Code* compliance path.
2. ~~1~~. Insulation materials and their ~~*R-values*~~ rated values.
3. ~~2~~. *Fenestration U-factor*s and *solar heat gain coefficients* (SHGC).
4. ~~3~~. Area-weighted *U-factor* and *solar heat gain coefficients* (SHGC) calculations.
5. ~~4~~. Mechanical system design criteria.
6. ~~5~~. Mechanical and *service water heating* systems and equipment types, sizes and efficiencies.
7. ~~6~~. Equipment and system controls.
8. ~~7~~. *Duct* sealing, *duct* and pipe insulation and location.
9. ~~8~~. *Air barrier* and Air sealing details, including the location of the *air barrier*.
10. If required by Section R408.2, selected energy credit options.
11. Location of pathways for routing of raceways or cable from the *on-site renewable energy* system to the electrical distribution equipment.
12. Location reserved for inverters, metering equipment, ESS, and a pathway reserved for routing of raceways or conduit from the renewable energy system to the point of interconnection with the electrical service and the ESS.
13. Location and layout of a designated area for ESS.
14. Rated energy capacity and rated power capacity of the installed or planned ESS.
15. Other information required by the *building official* in accordance with this code and local law.

[NY] R105.2.1 Building thermal envelope depiction. The *building thermal envelope* shall be graphically represented on the ~~construction documents~~ *construction documents*.

R105.2.2 Solar-ready system. Where a *solar-ready zone* is provided, the *construction documents* shall indicate the dedicated roof area for a *solar-ready zone*, roof dead load, roof live load, ground snow load, and routing of conduit or pre-wiring from *solar-ready zone* to electrical service panel or plumbing from *solar-ready zone* to *service water heating* system, as applicable.

[NY] ~~R105.2.2~~ R105.2.3 Written statement. When plans or specifications bear the seal and signature of a *registered design professional*, such *registered design professional* shall also include a written statement that to the best of ~~his or her~~ their knowledge, belief and professional judgment, such plans or specifications are in compliance with the *Energy Code*.

[NY] R105.3 Examination of documents. The *building official* shall examine or cause to be examined the application and accompanying ~~construction~~ documents and shall ascertain whether the construction indicated and described is in accordance with the requirements of this code and other pertinent laws or ordinances. The *building official* is authorized to utilize a *registered design professional*, or other *approved* entity not affiliated with the building design or construction, in conducting the review of the plans and specifications for compliance with the code, provided that the authority having

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jurisdiction shall satisfy itself that each individual performing such contracted-for services has qualifications comparable to those of a person who has met the requirements of 19 NYCRR Part 1208.

[NY] R105.3.1 Approval of construction documents. When the *building official* issues a permit where *construction documents* are required, the *construction documents* shall be endorsed by electronic marking or in writing and stamped as "Reviewed for Energy Code Compliance." Such *approved construction documents* shall not be changed, modified or altered without authorization from the *building official*. Work shall be done in accordance with the *approved* construction documents.

One set of construction documents so reviewed shall be retained by the *building official*. ~~The other~~ another set shall be returned to the applicant, and at least one set shall be kept at the site of work and ~~shall~~ be open to inspection by the *building official* or a duly authorized representative.

[NY] R105.3.2 Previous approvals. The ~~ECCCNYS Residential Provisions~~ *Energy Code* shall not require changes ~~in~~ to the construction documents, construction or designated occupancy of a structure to accommodate new or modified requirements of this code where ~~for which~~ a ~~lawful~~ substantially complete building permit application has been submitted prior to the effective date of the rule making the ECCCNYS part of the *Energy Code*, and the construction of which has been pursued in good faith within 180 days after the effective date of such rule and is thereafter diligently pursued through completion.

[NY] R105.3.3 Phased approval. The *building official* shall have the authority to issue a permit for the construction of part of an energy conservation system before the construction documents for the entire system have been submitted or *approved*, provided that adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holders of such permit shall proceed at their own risk without assurance that the permit for the entire energy conservation system will be granted or that subsequent permits will be based on the same version of the Energy Code.

[NY] R105.4 Amended construction documents. Work shall be performed in accordance with the *approved construction documents* and this code. An amended set of construction documents indicating any changes made during construction that are not in compliance with the approved construction documents shall be resubmitted to the building official for approval.

[NY] SECTION R106
INSPECTIONS

[NY] R106.1 General. Construction or work for which a permit is required shall be subject to inspection by the *building official* or an inspector who is *approved* by the *building official* as being ~~(i)~~ qualified to perform the inspections including ~~(such qualifications to include~~, where required, completion of the training required by 19 NYCRR Part 1208~~) and (ii) approved by the building official~~.

[NY] R106.1.1 Required approvals. Work shall not be performed ~~done~~ beyond the point indicated in each successive inspection without first obtaining the *approval* of the *building official*. ~~The permit holder or the permit holder's agent shall notify the building official when work has progressed to the point where the next required inspection described in Section R106.2 can be made.~~

The *building official*, ~~(~~or other qualified inspector ~~approved~~ *approved* by the *building official* pursuant to Section R106.1~~)~~, shall make such inspection~~,~~ and the ~~building official~~ *building official* shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or the permit holder's agent wherein the same fails to comply with the *Energy Code*. Any portions that fail to ~~do not~~ comply shall be corrected and such portion shall not be covered or concealed until authorized by the ~~building official~~ *building official*.

In the case of a *building* that is subject to the New York City Construction Codes, such required approvals and inspections shall be subject to the provisions of Title 28 of the New York City Administrative Code.

[NY] ~~R106.5~~ R106.1.2 Inspection requests. It shall be the duty ~~of the holder~~ of the permit holder or their duly authorized agent to notify the *building official* when ~~work is ready for~~ the next required inspection described in Section R106.2 can be made. It shall be the duty of the permit holder to provide access to and ~~means for inspections of such~~ maintain the work exposed ~~that are required by this code~~ until the *building official* has noted the work or a portion thereof to be satisfactory as completed, or the building permit holder shall be notified as to the manner in which the work fails to comply with this code.

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[NY] R106.2 Required inspections. The *building official* (or other qualified inspector ~~approved~~ *approved* by the *building official* pursuant to Section ~~R106.1~~ R106.4), upon notification, shall make the inspections set forth in Sections R106.2.1 through ~~R106.2.5~~R106.2.7.

[NY] R106.2.1 Footing and foundation inspection. Inspections associated with footings and foundations shall verify compliance with the code as to ~~*R-value*~~ the footing and foundation insulation rated values, location, thickness, depth of burial and protection of insulation as required by the code and *approved* ~~plans and specifications~~ *construction documents*.

[NY] R106.2.2 Framing and air barrier rough-in inspection. *Air barrier* i~~I~~nspections at framing and rough-in shall be made before application of ~~interior finish~~ air permeable insulation and shall verify compliance with the code ~~as to: types of insulation and corresponding R-values and their correct location and proper installation; fenestration properties such as U-factor and SHGC and proper installation; and air leakage controls as required by the code;~~ and ~~approved~~ *approved* ~~plans and specifications~~ *construction documents*. Exterior air barriers shall be permitted to be inspected after insulation is installed.

[NY] R106.2.3 Plumbing rough-in inspection. Inspections at plumbing rough-in shall verify compliance as required by the code and *approved* ~~plans and specifications~~ *construction documents* as to types of insulation and corresponding *R-value*s, plumbing heat traps, ~~and~~ protection, and required controls. Where a *solar-ready zone* is provided for a solar thermal system, inspections shall verify pathways for routing of plumbing from *solar-ready zone* to *service water heating* system.

[NY] R106.2.4 Mechanical rough-in inspection. Inspections at mechanical rough-in shall verify compliance as required by the code and *approved* ~~plans and specifications~~ *construction documents* as to installed HVAC equipment type, ~~and~~ size and efficiency, ~~required~~ controls, system insulation and corresponding *R-value*s, system air leakage control, programmable thermostats, dampers, energy recovery ventilators, and whole-house *ventilation*~~, and minimum fan efficiency~~, as required by the code, *construction documents*.

Exception: Systems serving multiple *dwelling unit*s shall be inspected in accordance with Section C106.2.4 of the ECCCNYS—Commercial Provisions.

[NY] R106.2.5 Electrical rough-in inspection. Inspections at electrical rough-in shall verify compliance as required by the code and the *approved construction documents* as to the locations, distribution, and capacity of the electrical system and high-performance lighting and controls. Where a *solar-ready zone* is installed for electricity generation, inspections shall verify conduit or pre-wiring from *solar-ready zone* to electrical panel.

[NY] R106.2.6 Insulation and fenestration rough-in inspection. Inspections of insulation and *fenestration* rough-in shall be made before application of interior finish and shall verify compliance with the code as to types of insulation, corresponding rated values, their correct location and proper installation and *fenestration* properties such as *U-factor*, *SHGC* and proper installation.

[NY] ~~R106.2.5~~R106.2.7 Final inspection. The *building* shall have a final inspection and shall not be occupied until a *certificate of occupancy* has been issued by the *authority having jurisdiction* ~~*approved*~~. The final inspection shall include verification of the installation of all required *building systems*, equipment and controls and their proper operation and the required number of high-efficacy lamps and fixtures.

[NY] R106.3 Reinspection and re-testing. Where any work or installation does not pass an initial test or inspection, or ~~A building shall be reinspected~~ where determined necessary by the *building official*~~.~~, the necessary corrections shall be made to achieve compliance with this code. The work or installation shall then be resubmitted to the *building official* for reinspection and re-testing.

[NY] R106.4 Approved third-party inspection agencies. The *building official* is authorized to accept reports ~~of~~ from *approved* third-party inspection agencies not affiliated with the *building* design or construction, provided that such agencies are *approved* as to qualifications and reliability relevant to the *building* components and *building* ~~systems~~ *systems* that they are inspecting or testing.

[NY] R106.4.1 Authorization of approved third-party inspection agency. An *approved* third-party inspection agency shall provide all requested information for the *building official* to determine that the agency meets the applicable requirements specified in Sections R106.4.1.1 through R106.4.1.3 and, as applicable, the *code enforcement program* of the *authority having jurisdiction*.

[NY] R106.4.1.1 Independence. An *approved* third-party inspection agency shall be an independent individual or business identity. The agency shall perform its duties in accordance with the scope of delegated responsibilities *approved*

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by the *building official.* The agency shall disclose to the *building official* any conflicts of interest including where fees for service are derived.

[NY] R106.4.1.2 Equipment. An *approved* third-party inspection agency shall have adequate equipment to perform inspections and tests required by the *building official* and this code. All testing equipment shall be periodically calibrated as required by the manufacturer, testing standards used in this code, or certifications held by the *approved* third-party inspection agency.

[NY] R106.4.1.3 Personnel. Personnel assigned by an *approved* third-party inspection agency to perform inspections and testing shall be trained or credentialed and documentation of training or credentials shall be available to the *building official* upon request.

[NY] R106.4.1.4 Delegated authority. Where *approved,* a third-party inspection agency shall have the authority to perform delegated inspections and determine compliance or noncompliance of work with the *approved construction documents*.

[NY] R106.4.2 Approved third-party inspection agency reporting. An *approved* third-party inspection agency shall keep records of delegated inspections, tests, and compliance documentation required by this code. The agency shall submit reports of delegated inspections and tests to the *building official* and to the owner or owner's representative. Reports shall indicate the compliance determination for the inspected or tested work based on *approved construction documents*. A final report documenting required delegated inspections and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted, with other required compliance documentation, at a time required by the *building official* prior to the issuance of a *certificate of occupancy.*

~~**[NY] R106.6 Reinspection and testing.** Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made to achieve compliance with the ECCCNYS Residential Provisions. The work or installation shall then be resubmitted to the *building official* for reinspection and re-testing.~~

[NY] SECTION R107
STOP WORK ORDER

[NY] R107.1 Authority. The *building official* shall issue a stop work order in accordance with the *code enforcement program* of the *authority having jurisdiction* for any work regulated by this code being performed in a manner contrary to the provisions of this code, or such work is being performed in a dangerous or unsafe manner, without obtaining a required building permit or when a building permit has been issued in error.

[NY] R107.2 Issuance. The stop work order shall be issued in writing and shall be given to the owner, the owner's authorized agent or the person performing the work. The stop work order shall state the reason for the order and the conditions under which the cited work is authorized to resume. Upon issuance of a stop work order, the cited work shall immediately cease.

[NY] R107.3 Emergencies. Where an emergency exists, the *building official* shall not be required to give a written notice prior to stopping the work.

[NY] R107.4 Penalty. Any person, taking part or assisting in the construction or use of any *building* in violation of the provisions of this code, who after having been served with an order to remedy issued in accordance with the *code enforcement program* of the *authority having jurisdiction,* fails to comply within thirty days or within the time fixed by such order to remedy, whichever is greater, shall be subject to the penalties prescribed in Section 11-108 of the New York State Energy Law.

[NY] SECTION R108
CERTIFICATE OF OCCUPANCY

[NY] ~~**R106.7**~~ **R108.1** ~~**Approval**~~ **Certificate of occupancy.** After the prescribed tests and inspections indicate that the work for which a permit has been issued is complete and complies in all respects with this code, a ~~notice of approval~~ *certificate of occupancy* shall be issued by the *building official*. The *building* shall not be occupied until a *certificate of occupancy* has been issued by the *authority having jurisdiction*.

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[NY] ~~**R106.7.1**~~ **R108.2 Revocation.** The *building official* is authorized to~~, in writing,~~ suspend or revoke a ~~notice of approval~~ *certificate of occupancy* ~~issued~~ wherever the *building official* determines the ~~notice~~ certificate is issued in error~~,~~ or on the basis of incorrect information supplied, or where it is determined that the *building* or structure, premise, or portion thereof is in violation of any provision of the *Energy Code*~~; any provision of the Uniform code or New York City Construction Codes, as applicable;~~ or any other ~~any~~ applicable code, law, statute, rule, regulation or ordinance if the relevant deficiencies are not corrected within a period of time specified by the *building official*. Any such suspension or revocation shall be in writing, signed by the *building official* or by ~~his or her~~ their designated agent.

Chapter R2. Definitions

EC 07-0201

Revise as follows:

SECTION 201
GENERAL

[NY] R201.1 Scope. Unless stated otherwise, ~~the following~~ the words and terms ~~in~~ provided in italics within the ECCCNYS—Residential Provisions shall have the meanings ~~indicated in this Chapter 2[RE]~~ as defined in Section R202, C202 or as defined within the chapter or appendix where the word or term is found, except as provided in Sections R201.3 and R201.4.

[NY] R201.2 Interchangeability. Words and terms used in the present tense include the future; words and terms stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural includes the singular.

[NY] R201.3 ~~Terms~~ Words and terms defined in other codes. ~~Terms that~~ Where italicized words and terms are not defined in this ~~Chapter 2 [RE]~~ publication but are defined in the *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* or the *Residential Code of New York State* such terms shall have the meanings ascribed to them in those codes.

[NY] R201.4 ~~Terms~~ Words and terms not defined. ~~Terms~~ Where words and terms are not italicized or are italicized but not defined in this ~~Chapter 2 [RE]~~ publication or in the ~~*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,* or the *Residential Code of New York State*~~ publications listed in Section R201.3, such words and terms shall have the meanings defined in applicable referenced standards, statutes, or regulations or shall have the ordinarily accepted meanings such as the context implies.

EC 07-0068

Add new:

ACCESS (TO). That which enables a device, appliance or equipment to be reached by *ready access* or by a means that first requires the removal or movement of a panel or similar obstruction.

EC 07-0069

Delete:

~~**ACCESSIBLE.** Admitting close approach as a result of not being guarded by locked doors, elevation or other effective means (see "Readily *accessible*").~~

EC 07-0203

Add new:

AIR-HANDLING UNIT. A blower or fan used for the purpose of distributing supply air to a room, space or area.

DRAFT

APPROVED SOURCE. An independent person, firm or corporation, approved by the *building official*, who is competent and experienced in the application of engineering principles to materials, methods or system analyses.

EC 07-0069

Delete:

~~**[NY] AIR-IMPERMEABLE INSULATION.** An insulation having an air permeance equal to, or less than 0.02 L/s-m2 at 75 Pa pressure differential tested according to ASTM E 2178 or E 283.~~

EC 07- 0015

Revise as follows:

[NY] 2024 NYS ASHRAE 90.1~~—2016~~. The New York State-specific version of the publication ~~entitled~~ titled "ANSI/ASHRAE/IES Standard 90.1~~—2016~~, Energy Standard for Buildings Except Low-rise Residential Buildings" ~~(October 2016 printing)~~ published by ASHRAE~~, formerly~~ (formally 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 (IES) ~~of North America~~ and the American National Standards Institute (ANSI), and is also known as "ANSI/ASHRAE/IES 90.1~~—2016" or "ANSI/ASHRAE/IESNA 90.1—2016~~."~~)~~.

EC 07-0203

Add new:

[NY] AUTHORITY HAVING JURISDICTION. The governmental unit or agency responsible for administration and enforcement of this code.

AUTOMATIC SHUT-OFF CONTROL. A device capable of automatically turning loads off without manual intervention. Automatic shut-off controls include devices such as, but not limited to, occupancy sensors, vacancy sensors, door switches, programmable time switches (i.e., timeclocks), or count-down timers.

AUTOMOBILE PARKING SPACE. A space within a building or private or public parking lot, exclusive of driveways, ramps, columns, office and work areas, for the parking of an automobile.

BALANCED VENTILATION SYSTEM. A *ventilation* system that simultaneously supplies outdoor air to and exhausts air from a space, where the mechanical supply airflow rate and the mechanical exhaust airflow rate are each within 10 percent of the average of the two airflow rates.

BIODIESEL BLEND. A homogeneous mixture of hydrocarbon oils and mono alkyl esters of long chain fatty acids.

EC 07-0068

Add new:

CAVITY INSULATION. Insulating material located between framing members.

[NY] CERTIFICATE OF OCCUPANCY. A document issued by the *authority having jurisdiction* certifying that the building, or portion thereof, complies with the *approved construction documents* that have been submitted to and *approved* by the *authority having jurisdiction,* indicating it to be in a condition suitable for occupancy.

EC 07- 0016

Add new:

[NY] CHARACTER-DEFINING FEATURES. Those visual aspects and physical elements and spaces that comprise the appearance of a *historic building* and that are significant to the historical, architectural, and cultural values, including the overall shape of the *historic building* or property, its materials, craftsmanship, decorative details, interior spaces and features, as well as the various aspects of its site and environment.

DRAFT

EC 07-0203

Add new:

COMMON AREAS. All conditioned spaces within Group R occupancy *buildings* that are not *dwelling units* or *sleeping units*.

CONSTRUCTION DOCUMENTS. Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit.

CONTINUOUS PILOT. Pilot which, once placed in operation, is intended to remain ignited continuously until it is manually interrupted.

DAMPER. A manually or automatically controlled device to regulate draft or the rate of flow of air or combustion gases.

EC 07-0070

Revise as follows:

DEMAND RECIRCULATION WATER SYSTEM. A water distribution system ~~having~~ where one or more ~~recirculation pumps that pump water from a heated water supply pipe back to the heated water source through a cold water supply~~ pumps prime the service hot water piping with heated water upon demand for hot water.

EC 07-0203

Add new:

DEMAND RESPONSE SIGNAL. A signal that indicates a price or a request to modify electricity consumption for a limited time period.

DEMAND RESPONSIVE CONTROL. A control capable of receiving and automatically responding to a demand response signal.

EC 07-0068

Add new:

DIMMER. A control device that is capable of continuously varying the light output and energy use of light sources.

EC 07-0203

Add new:

DISTRIBUTION SYSTEM EFFICIENCY (DSE). A system efficiency factor that adjusts for the energy losses associated with delivery of energy from the equipment to the source of the load.

EC 07-0204

Revise as follows:

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~~ A system that consists of *space conditioning equipment, ductwork*, and includes any apparatus installed in connection therewith.

DRAFT

EC 07-0203

Add new:

DUCTWORK. The assemblies of connected *ducts, plenums*, boots, fittings, *dampers*, supply registers, return grilles, and filter grilles through which air is supplied to or returned from the space to be heated, cooled, or ventilated. Supply *ductwork* delivers air to the spaces from the *space conditioning equipment*. Return *ductwork* conveys air from the spaces back to the *space conditioning equipment*. *Ventilation ductwork* conveys air to or from any space.

EMITTANCE. The ratio of the radiant heat flux emitted by a specimen measured on a scale from 0 to 1, where a value of 1 indicates perfect release of thermal radiation.

ENCLOSED REFLECTIVE AIR SPACE. An unventilated cavity with a low-emittance surface bounded on all sides by building components.

EC 07-0204

Revise as follows:

~~**ERI REFERENCE DESIGN**~~ **ENERGY RATING INDEX (ERI).** A ~~version of the *rated design* that meets the minimum requirements of the 2006 International Energy Conservation Code, and which establishes the index~~ A numerical integer value that represents the relative energy performance of a *rated design* or constructed *dwelling unit* as compared with the energy performance of the ERI Reference Design, where an ERI value of 100 ~~on the Energy Rating Index scale~~ represents the energy performance of the *ERI Reference Design* and an ERI value of 0 represents a *rated design* or constructed *dwelling unit* with zero net energy performance.

EC 07-0203

Add new:

[NY] EXISTING BUILDING. A *building* that is legally occupied and/or for which a *certificate of occupancy* authorizing its use(s) has been issued, without regard to the date on which such legal occupancy began or the date on which such *certificate of occupancy* was issued.

EC 07-0070

Revise as follows:

FENESTRATION. Products classified as either *vertical fenestration* or *skylights*.

Skylights. Glass or other transparent or translucent glazing material installed at a slope of less than 60 degrees (1.05 rad) from horizontal including unit skylights, tubular daylighting devices, and glazing materials in solariums, sunrooms, roofs and sloped walls.

Vertical fenestration. Windows that are fixed or operable, opaque doors, glazed doors, glazed block and combination opaque/glazed doors composed of glass or other transparent or translucent glazing materials and installed at a slope of not less than 60 degrees (1.05 rad) from horizontal.

EC 07-0203

Add new:

F-FACTOR (THERMAL TRANSMITTANCE). The perimeter heat loss factor for slab-on-grade floors (Btu/h·ft·°F) [W/(m·K)].

FUEL GAS. A natural gas, manufactured gas, liquified petroleum gas or a mixture of these.

FUEL OIL. Kerosene or any hydrocarbon oil having a flash point not less than 100°F (38°C).

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GRADE PLANE. A reference plane representing the average of the finished ground level adjoining the *building* at all exterior walls. Where the finished ground level slopes away from the *exterior wall*, the reference plane is 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 structure and a point 6 feet (1829 mm) from the *building*.

HEAT EXCHANGER. A device that transfers heat from one medium to another.

EC 07-0202

Delete:

~~**HIGH-EFFICACY LAMPS.** Compact fluorescent lamps, light-emitting diode (LED) lamps, T-8 or smaller diameter linear fluorescent lamps, or other lamps with an efficacy of not less than the following:~~

1. ~~60 lumens per watt for lamps over 40 watts.~~
2. ~~50 lumens per watt for lamps over 15 watts to 40 watts.~~
3. ~~40 lumens per watt for lamps 15 watts or less.~~

EC 07- 0017

Revise as follows:

[NY] HISTORIC BUILDING. ~~The term historic building means~~ An existing *building* ~~or structure~~ that is any of the following:

1. ~~is~~ Listed, or certified as eligible for listing, in the National Register of Historic Places or in the New York State Register of Historic Places~~, either individually or as a contributing building to a historic district; or~~.
2. ~~is listed in the National Register of Historic Places, either individually or as a contributing building to a historic district~~ Designated as historic under an applicable state or local law~~; or~~.
3. ~~has been determined to be eligible for listing in either the New York State or National Register of Historic Places, either individually or as a contributing building to a historic district, by the New York State Commissioner of Parks, Recreation and Historic Preservation; or~~
4. ~~has been determined to be eligible for listing in the National Register of Historic Places, either individually or~~ Certified as a contributing resource within a National Register-listed, State Register-listed, or locally designated ~~building to a~~ historic district~~, by the U.S. Secretary of the Interior~~.

EC 07-0203

Add new:

INTERMITTENT IGNITION. Type of ignition which is energized when an appliance is called on to operate and which remains continuously energized during each period of main burner operation and where the ignition is deenergized when the main burner operating cycle is completed.

INTERRUPTED IGNITION. Type of ignition which is energized prior to the admission of fuel to the main burner and which is deenergized when the main flame is established.

KNEE WALL. An above-grade wall assembly, or wall defined by vertical truss members, of any height that separate conditioned space from unconditioned buffer spaces, such as ventilated attics and entry porch roofs, rather than ambient outdoors.

LIQUID FUEL. A *fuel oil* or *biodiesel blend*.

LIVING SPACE. Space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes.

LOW SLOPE. A roof slope less than 2 units vertical in 12 units horizontal (17 percent slope).

DRAFT

EC 07-0202

Delete:

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

EC 07-0203

Add new:

MARKET VALUE. For the purposes of determining *substantial improvement, market value* pertains only to the *building* or structure in question before and after improvement is undertaken. *Market value* does not include the value of the land and site improvements including but not limited to landscaping, pavement, and detached structures or the value of the location of the property, the use and occupancy, or business income potential.

EC 07-0068

Add new:

OCCUPANT SENSOR CONTROL. An automatic control device that detects the presence or absence of people within an area and causes lighting, equipment or appliances to be regulated accordingly.

EC 07-0203

Add new:

OCCUPIABLE SPACE. An enclosed space intended for human activities, excluding those spaces intended primarily for other purposes, such as storage rooms and equipment rooms, that are only intended to be occupied occasionally and for short periods of time.

ON-DEMAND PILOT. A pilot which, once placed into operation, is intended to remain ignited for a predetermined period of time following an *automatic* or *manual* operation of the main burner gas valve, after which the pilot is automatically extinguished when no automatic or manual operation of the main burner gas valve occurs during the predetermined period of time.

EC 07-0068

Add new:

ON-SITE RENEWABLE ENERGY. Energy from *renewable energy resources* harvested at the building site.

EC 07-0203

Add new:

PLENUM. An enclosed portion of the *building* structure, other than an *occupiable space* being conditioned, that is designed to allow air movement, and thereby serve as part of the supply or return *ductwork.*

EC 07- 0204

Revise as follows:

[NY] PROPOSED DESIGN. A description of the proposed ~~*building*~~ *dwelling unit* or *sleeping unit* used to estimate annual energy use for determining compliance based on ~~*total*~~ simulated building performance.

EC 07-0203

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Add new:

RADIANT BARRIER. A material having a low emittance surface of 0.1 or less installed in building assemblies.

EC 07- 0204

Revise as follows:

[NY] **RATED DESIGN.** A description of the proposed ~~*building*~~ *dwelling unit* or *sleeping unit* used to determine the energy rating index.

EC 07-0069

Delete:

~~**READILY ACCESSIBLE.** Capable of being reached quickly for operation, renewal or inspection without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders or access equipment (see "Accessible").~~

EC 07-0068

Add new:

READY ACCESS (TO). That which enables a device, appliance or equipment to be directly reached without requiring the removal or movement of any panel or similar obstruction.

EC 07-0203

Add new:

REFLECTIVE INSULATION. A material with a surface emittance of 0.1 or less in an assembly consisting of one or more enclosed reflective air spaces.

RENEWABLE ENERGY CERTIFICATE (REC). A market based instrument that represents and conveys the environmental attributes of one megawatt hour of renewable electricity generation and could be sold separately from the underlying physical electricity associated with renewable energy resources; also known as an energy attribute and energy attribute certificate (EAC).

EC 07-0068

Add new:

RENEWABLE ENERGY RESOURCES. Energy derived from solar radiation, wind, waves, tides, landfill gas, biogas, biomass or extracted from hot fluid or steam heated within the earth.

EC 07- 0071

Revise as follows:

[NY] RESIDENTIAL BUILDING. For this code, includes the following:

1. Detached one- and two-family dwellings and *townhouses* having not more than three stories above grade plane;

~~2. Detached two-family dwellings having not more than three stories above grade plane;~~

~~3. Buildings that (i) consist of three or more attached *townhouse* units and (ii) have not more than three stories above grade plane;~~

~~4.~~ 2. Buildings that ~~(i)~~ are classified in accordance with Chapter 3 of the *Building Code of New York State* ~~in~~ as Group R-2, R-3 or R-4 ~~and (ii) have~~ having not more than three stories above grade plane; and

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~~5.~~ 3. Factory manufactured homes (as defined in Section 372(8) of the New York State Executive Law)~~; and~~.

~~6. Mobile homes (as defined in Section 372(13) of the New York State Executive Law).~~

~~For the purposes of this definition of the term "Residential building," the term "Townhouse unit" means a single-family dwelling unit constructed in a group of three or more attached units in which each unit (1) extends from the foundation to roof, (2) has open space on at least two sides, and (3) has a separate means of egress.~~

EC 07-0070

Revise as follows:

ROOF ~~RE-COVER~~RECOVER. The process of installing an additional roof covering over ~~a prepared~~ an existing roof covering without removing the existing roof covering.

EC 07-0204

Revise as follows:

[NY] **ROOF REPLACEMENT**~~. The process of removing the~~ An *alteration* that includes the removal of any existing layer of roof material ~~covering, repairing any damaged substrate~~ and installing ~~a~~ new replacement material(s) above the existing roof ~~covering.~~ deck.

EC 07-0203

Add new:

SIMULATED BUILDING PERFORMANCE. A process in which the proposed building design is compared to a standard reference design for the purposes of estimating relative energy use to determine code compliance.

SLEEPING UNIT. A single unit that provides rooms or spaces for one or more persons, includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are part of a *dwelling unit* are not *sleeping units*.

SOLAR-READY ZONE. A section or sections of the roof or building overhang designated and reserved for the future installation of a solar *photovoltaic system* or solar thermal system.

SPACE CONDITIONING. The treatment of air so as to control the temperature, humidity, filtration or distribution of the air to meet the requirements of a conditioned space.

SPACE CONDITIONING EQUIPMENT. The *heat exchangers, air-handling units*, filter boxes, and any apparatus installed in connection therewith used to provide *space conditioning*.

EC 07-0204

Revise as follows:

STANDARD REFERENCE DESIGN. A version of the *proposed design* that meets the minimum prescriptive and mandatory baseline requirements of this code~~. The standard reference design, as the code baseline, is used to determine the maximum allowable annual energy use requirement for compliance. The proposed design is measured against the standard reference design in an annual energy use simulation and is based on total building performance. Parameters of the standard reference design and the proposed design are specified in Tables contained in Section R405.~~ And is used to determine the maximum annual energy use requirement for compliance based on simulated building performance.

EC 07-0203

Add new:

STEEP SLOPE. A roof slope 2 units vertical in 12 units horizontal (17 percent slope) or greater.

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[NY] SUBSTANTIAL IMPROVEMENT. Any *repair*, rehabilitation, *alteration*, *addition* or other improvement of a *building* or structure, the cost of which equals or exceeds 50 percent of the *market value* of the *building* or structure before the improvement. The cost of improvements to a *building* to correct health, sanitary or safety code violations issued by the *building official* does not need to be included in the calculation of *market value.* **[NY] SUBSTANTIALLY COMPLETE BUILDING PERMIT APPLICATION.** A building permit application that, in the opinion of the authority having jurisdiction, includes sufficient information and documentation required by the stricter of either the authority having jurisdiction's Code Enforcement Program or the requirements set forth in 19 NYCRR Part 1203, such that the authority having jurisdiction can examine the application and make a determination as to whether the proposed work is in conformance with the requirements of the Uniform Code and Energy Code.

EC 07-0068

Add new:

TESTING UNIT ENCLOSURE AREA. The sum of the area of ceiling, floors, and walls separating a *dwelling unit* or *sleeping unit's conditioned space* from the exterior or from adjacent conditioned or unconditioned spaces. Wall height shall be measured from the finished floor of the *dwelling unit* or *sleeping unit* to the underside of the floor above.

THERMAL DISTRIBUTION EFFICIENCY (TDE). The resistance to changes in air heat as air is conveyed through a distance of air duct. TDE is a heat loss calculation evaluating the difference in the heat of the air between the air duct inlet and outlet caused by differences in temperatures between the air in the duct and the duct material. TDE is expressed as a percent difference between the inlet and outlet heat in the duct.

EC 07-0203

Add new:

WORK AREA. That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code.

Chapter R3. General Requirements

EC 07-0072

Revise as follows:

[NY] TABLE R301.1
NEW YORK STATE CLIMATE ZONES BY COUNTY

Zone 4A	Zone 5A		Zone 6A	
Bronx	Albany	Orange	~~Allegany~~	~~Schuyler~~
Kings	Allegany	Orleans	~~Broome~~	~~Steuben~~
Nassau	Broome	Oswego	~~Cattaraugus~~	St. Lawrence
New York	Cattaraugus	Putnam	Chenango	Sullivan
Queens	Cayuga	Rensselaer	Clinton	~~Tompkins~~
Richmond	Chautauqua	Rockland	Delaware	Ulster
Suffolk	Chemung	Saratoga	Essex	Warren
Westchester	Columbia	Schenectady	Franklin	~~Wyoming~~
	Cortland	Schoharie	Fulton	
	Dutchess	Schuyler	Hamilton	
	Erie	Seneca	Herkimer	
	Genesee	Steuben	Jefferson	
	Greene	Tioga	Lewis	

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	Livingston	Tompkins	Madison
	Monroe	Washington	Montgomery
	Niagara	Wayne	Oneida
	Onondaga	Wyoming	Otsego
	Ontario	Yates	~~Schoharie~~

EC 07-0073

Revise as follows:

[NY] TABLE R301.3(2)
~~INTERNATIONAL~~ THERMAL CLIMATE ZONE DEFINITIONS

ZONE NUMBER	THERMAL CRITERIA	
	IP Units	SI Units
4~~A~~	CDD50°F ≤ ~~4500~~6,300 AND 3,600 < HDD65°F ≤ 5400	CDD10°C ≤ ~~2500~~3500 AND 2000 ≤ HDD18°C ≤ 3000
5	CDD50°F < 6,300 AND 5400 < HDD65°F ≤ 7200	CDD10°C < 3500 AND 3000 < HDD18°C ≤ 4000
6	7200 < HDD65°F ≤ 9000	4000 < HDD18°C ≤ 5000

For SI: °C = [(°F) - 32]/1.8.

EC 07-0205

Revise as follows:

R303.1.1 Building thermal envelope insulation. An *R-value* identification mark shall be applied by the manufacturer to each piece of *building thermal envelope* insulation that is 12 inches (305 mm) or greater in width. Alternatively, the insulation installers shall provide a certification that indicates the type, manufacturer and *R-value* of insulation installed in each element of the *building thermal envelope*. For blown-in or sprayed fiberglass and cellulose insulation, the initial installed thickness, settled thickness, settled *R-value*, installed density, coverage area and number of bags installed shall be indicated on the certification. For sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and the *R-value* of the installed thickness shall be indicated on the certification. For reflective insulation, the number of reflective sheet(s), the number and thickness of the enclosed reflective air space(s) and the R-value for the installed assembly determined in accordance with Section R303.1.6, shall be listed on the certification. For insulated siding, the *R-value* shall be on a label on the product's package and shall be indicated on the certification. The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.

> **Exception:** For roof insulation installed above the deck, the *R-value* shall be *labeled* as required by the material standards specified in Table 1508.2 of the *Building Code of New York State* or Table R906.2 of the *Residential Code of New York State*, as applicable.

R303.1.2 Insulation mark installation. Insulating materials shall be installed such that the manufacturer's *R-value* mark is readily observable at inspection. For insulation materials that are installed without an observable manufacturer's *R*-value mark, such as blown or draped products, an insulation certificate complying with **Section R303.1.1** shall be left immediately after installation by the installer, in a conspicuous location within the building, to certify the installed *R*-value of the insulation material.

> **Exception:** For roof insulation installed above the deck, the R-value shall be labeled as specified by the material standards in Table 1508.2 of the *Building Code of New York State* or Table R906.2 of the *Residential Code of New York State*, as applicable.

EC 07-0074

Add new:

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R303.1.5 Air-impermeable insulation. Insulation having an air permeability not greater than 0.004 cubic feet per minute per square foot [0.002 L/(s × m2)] under pressure differential of 0.3 inch water gauge (75 Pa) when tested in accordance with ASTM E2178 shall be determined air-impermeable insulation.

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EC 07-0206

Add new:

R303.1.6 Air spaces. Where the R-value of an enclosed reflective air space or enclosed nonreflective air space is used for compliance with this standard, the air space shall be enclosed in a cavity bounded on all sides by *building* components and constructed to minimize airflow into and out of the enclosed air space. Airflow shall be deemed minimized where one of the following conditions occur:

1. The enclosed air space is unventilated.

2. The enclosed air space is bounded on one or more sides by an anchored masonry veneer, constructed in accordance with Chapter 7 of the *Residential Code of New York State*, and vented by veneer weep holes located only at the bottom portion of the air space and spaced not less than 15 inches (381 mm) on center with the top of the cavity air space closed.

Exception: For ventilated cavities, the effect of the *ventilation* of air spaces located on the exterior side of the continuous *air barrier* and adjacent to and behind the *exterior wall* covering material shall be determined in accordance with ASTM C1363 modified with an airflow entering the bottom and exiting the top of the air space at an air movement rate of not less than 70 mm/second.

EC 07-0207

Add new:

R303.2.2 Radiant barrier. Where installed, *radiant barriers* shall comply with the requirements of ASTM C1313/C1313M and shall be installed in accordance with ASTM C1743.

Chapter R4. Residential Energy Efficiency.

EC 07-0208

Revise as follows:

[NY] R401.2 ~~Compliance~~ Application. ~~Projects~~ *Residential buildings* shall comply with ~~one of the following:~~ either Sections R401.2.1, R401.2.2, or R401.2.3.

~~1. Sections R401 through R404.~~

~~2. Section R405 and the provisions of Sections R401 through R404 indicated as "Mandatory."~~

~~3. The energy rating index (ERI) approach in Section R406.~~

Exception: Additions, *alterations*, repairs and changes of occupancy to existing buildings complying with Chapter 5.

~~**[NY]**~~ **R401.2.1 ~~Reserved.~~ Prescriptive Compliance Option.** The Prescriptive Compliance Option requires compliance with Sections R401 through R404 and R408.

R401.2.2 Simulated Building Performance Option. The Simulated Building Performance Option requires compliance with Section R405.

R401.2.3 Energy Rating Index Option. The Energy Rating Index (ERI) Option requires compliance with Section R406.

~~**R401.2.4 Tropical Climate Region Option.** The Tropical Climate Region Option requires compliance with Section R407.~~

EC 07-0209

Revise as follows:

R401.3 Certificate ~~(Mandatory)~~. A permanent certificate shall be completed by the builder or other *approved* party and posted on a wall in the space where the furnace is located, a utility room or an *approved* location inside the *building*. Where located on an electrical panel, the certificate shall not cover or obstruct the visibility of the circuit directory label,

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service disconnect label or other required labels. The certificate shall indicate the following: ~~predominant *R-values* of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, *basement walls*, crawl space walls and floors and ducts outside *conditioned spaces*; *U-factors* of fenestration and the *solar heat gain coefficient* (SHGC) of fenestration, and the results from any required *duct system* and *building* envelope air leakage testing performed on the *building*. Where there is more than one value for each component, the certificate shall indicate the value covering the largest area. The certificate shall indicate the types and efficiencies of heating, cooling and *service water heating* equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall indicate "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces and electric baseboard heaters.~~

1. The predominant *R*-values of insulation installed in or on ceilings, roofs, walls, foundation components such as slabs, *basement walls*, *crawl space walls* and floors and ducts outside *conditioned spaces*.
2. *U*-factors of fenestration and the *solar heat gain coefficient* (SHGC) of fenestration. Where there is more than one value for any component of the *building thermal envelope*, the certificate shall indicate both the value covering the largest area and the area weighted average value if available.
3. The results from any required duct system and *building thermal envelope* air leakage testing performed on the building.
4. The types, sizes and efficiencies of heating, cooling and service water-heating equipment. Where a gas-fired unvented room heater, electric furnace or baseboard electric heater is installed in the residence, the certificate shall indicate "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be indicated for gas-fired unvented room heaters, electric furnaces and electric baseboard heaters.
5. Where on-site *photovoltaic panel* systems have been installed, the array capacity, inverter efficiency, panel tilt and orientation shall be noted on the certificate.
6. For buildings where an Energy Rating Index score is determined in accordance with **Section R406**, the Energy Rating Index score, both with and without any on-site generation, shall be listed on the certificate.
7. The code edition under which the structure was permitted, and the compliance path used, and where applicable, the additional efficiency measures selected for compliance with R408.
8. Where a solar-ready zone is provided, the certificate shall indicate the location, and dimensions.

R402.1 General ~~(Prescriptive)~~. The *building thermal envelope* shall comply with the requirements of ~~Sections R402.1.1 through R402.1.5.~~ one of the following:

1. Sections R402.1.1 through R402.1.4 and R402.1.6, or

2. Sections R402.1.1, R402.1.5, and R402.1.6

Exceptions:

1. The following low-energy *buildings*, or portions thereof, separated from the remainder of the building by *building thermal envelope* assemblies complying with this section shall be exempt from the *building thermal envelope* provisions of Section R402.
   1.1. Those with a peak design rate of energy usage less than 3.4 Btu/h • ft^2 (10.7 W/m^2) or 1.0 watt/ft^2 of floor area for space-conditioning purposes.
   1.2. Those that do not contain *conditioned space*.
2. Log homes designed in accordance with ICC 400.

~~[NY]~~ **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 3. ~~In *climate zone* 6, the *building thermal envelope* shall meet either the requirements of the *climate zone* 6 "Option 1" row in Table R402.1.2 or the requirements of the *climate zone* 6 "Option 2" row in Table R402.1.2.~~ Assemblies shall have a *U*-factor or *F-factor* equal to or less than that specified in **Table R402.1.2**. Fenestration shall have a *U*-factor and glazed fenestration SHGC equal to or less than that specified in **Table R402.1.2**.

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[NY] TABLE ~~R402.1.4~~ R402.1.2
~~EQUIVALENT~~ MAXIMUM ASSEMBLY *U*-FACTORS AND FENESTRATION REQUIREMENTS [a]

CLIMATE ZONE	4	5	6
VERTICAL FENESTRATION *U*-FACTOR	~~0.32~~ 0.27	~~0.30~~ 0.27[d]	~~0.30~~ 0.27[d]
SKYLIGHT *U*-FACTOR	~~0.55~~ 0.50	~~0.55~~ 0.50	~~0.55~~ 0.50
GLAZED VERTICAL FENESTRATION SHGC[d,e]	0.40	NR	NR
SKYLIGHT SHGC	0.40	NR	NR
CEILING *U*-FACTOR	~~0.026~~ 0.024	~~0.026~~ 0.024	~~0.026~~ 0.024
INSULATION ENTIRELY ABOVE ROOF DECK	0.032	0.032	0.032
WOOD FRAME WALL *U*-FACTOR[~~b~~]	~~0.060~~ 0.045	~~0.060~~ 0.045	0.045
MASS WALL *U*-FACTOR[b]	~~0.098~~ 0.060	~~0.082~~ 0.060	0.060
FLOOR *U*-FACTOR	~~0.047~~ 0.033	0.033	0.033
BASEMENT WALL *U*-FACTOR	~~0.059~~ 0.050	0.050	0.050
UNHEATED SLAB F-FACTOR[e]	0.48	0.48	0.48
HEATED SLAB F-FACTOR[e]	0.55	0.55	0.55
CRAWL SPACE WALL *U*-FACTOR	~~0.065~~ 0.055	0.055	0.055

NR = Not Required.
For SI: 1 foot = 304.8 mm.

a. Nonfenestration *U-factor*s shall be obtained from measurement, calculation, ~~or~~ an approved source, or Appendix RF of this code where such appendix is adopted or *approved*.

b. Mass walls shall be in accordance with Section ~~R402.2.5~~R402.2.6. Where more than half the insulation is *on the interior, the mass wall U-factors shall not exceed ~~0.17 in Climate Zone~~ 1, 0.14 ~~in Climate Zone 2, 0.12 in Climate Zone~~ 3, ~~0.087 in Climate Zone~~ 4 ~~except Marine, 0.065 in Climate Zone~~ 5 ~~and Marine 4, and 0.057 in Climate Zones~~ 6 ~~through 8~~*0.56.

c. In warm-humid locations as defined by Figure R301.1 and Table R301.1, the basement wall *U-factor* shall not exceed 0.360.

d. A maximum U-factor of 0.30 shall apply in Climate Zones 5 and 6 to vertical fenestration products installed in buildings located either:
   1. Above 4,000 feet in elevation above sea level, or
   2. In windborne debris regions where protection of openings is required by Section R301.2.1.2 of the *Residential Code of New York State*.

e. *F-factors* for slabs correspond to the R-values of Table R402.1.3 and the installation conditions of Section R402.2.10.1.

EC 07-0210

Add new:

R402.1.3 R-value alternative. Assemblies with R-value of insulation materials equal to or greater than that specified in Table R402.1.3 shall be an alternative to the U-factor or *F*-factor in Table R402.1.2.

Revise as follows:

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[NY] TABLE ~~R402.1.2~~ R402.1.3
INSULATION MINIMUM *R*-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT [a]

CLIMATE ZONE	4	5	6 ~~Option 1~~	~~6 Option 2~~
VERTICAL FENESTRATION *U*-FACTOR ~~b, i~~ g	~~0.32~~ 0.27	~~0.30~~ 0.27	~~0.30~~ 0.27	~~0.30~~
SKYLIGHT ~~b~~ *U*-FACTOR	~~0.55~~ 0.50	~~0.55~~ 0.50	~~0.55~~ 0.50	~~0.55~~
GLAZED VERTICAL FENESTRATION SHGC ~~b, e~~	0.40	~~NR~~ 0.40	NR	~~NR~~
SKYLIGHT SHGC	0.40	NR	NR	
CEILING *R*-VALUE ~~i~~ h	49	49	49	~~60~~
INSULATION ENTIRELY ABOVE ROOF DECK	R-30ci	R-30ci	R-30ci	
WOOD FRAME WALL *R*-VALUE ~~g~~	~~20 or 13+5~~ h 30 or 20&5ci h or 13&10ci h or 0&20ci h	~~20 or 13+5~~ h 30 or 20&5ci h or 13&10ci h or 0&20ci h	~~20+5~~ h ~~or 13+10~~ h 30 or 20&5ci h or 13& 10ci h or 0&20ci h	~~23 cavity~~
MASS WALL *R*-VALUE ~~h~~ f	~~8/13~~ 15/20	~~13/17~~ 15/20	15/20	~~19/21~~
FLOOR *R*-VALUE h	~~19or 13+5ci or 15ci~~ 30 g or 19+7.5ci or 20ci	30 g or 19+7.5ci or 20ci	30 g or 19+7.5ci or 20ci	~~30 g~~
BASEMENT ~~c, g~~ b WALL *R*-VALUE	~~10/13~~ 15ci or 19 or 13 + 5ci	~~15/19~~ 15ci or 19 or 13 + 5ci	~~15/19~~ 15ci or 19 or 13 + 5ci	~~15/19~~
UNHEATED SLAB ~~d~~ c *R*-VALUE & DEPTH	10ci, ~~2~~ 4 ft	10ci, ~~2~~ 4 ft	10ci, 4 ft	~~10ci, 4 ft~~
HEATED SLAB c *R*-VALUE & DEPTH	R10ci, 4ft and R-10 full slab	R10ci, 4ft and R-10 full slab	R10ci, 4ft and R-10 full slab	~~R10ci, 4 ft and R-5 full slab~~
CRAWL SPACE ~~c, g~~ b, f WALL *R*-VALUE	~~10/13~~ 15ci or 19 or 13 + 5ci	~~15/19~~ 15ci or 19 or 13 + 5ci	~~15/19~~ 15ci or 19 or 13 + 5ci	~~15/19~~

For SI: 1 foot = 304.8 mm.
NR = Not Required.
ci = continuous insulation.

a. *R-value*s are minimums. *U-factor*s 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.

~~b. The fenestration *U-factor* column excludes skylights. The SHGC column applies to all glazed fenestration.~~

~~**Exception:** In *Climate Zones* 1 through 3, skylights shall be permitted to be excluded from glazed fenestration SHGC requirements provided that the SHGC for such skylights does not exceed 0.30.~~

~~c~~ b. ~~"10/13"~~ "15ci or 19" means ~~R-10~~ R-15 *continuous insulation* (ci) on the interior or exterior surface of the ~~home~~ wall or ~~R-13~~ R-19 *cavity insulation* on the interior side of the ~~basement~~ wall. ~~"15/19"~~ ~~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*~~ 13 + 5ci means 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~~ c. ~~R-5 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.~~ Slab insulation shall be installed in accordance with Section R402.2.9.1.

~~e. There are no SHGC requirements in the Marine Zone.~~

~~f~~ d. Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1.

~~g. Alternatively, insulation sufficient to fill the framing cavity and providing not less than an *R-value* of R-19.~~

~~h~~ e. The first value is cavity insulation, the second value is *continuous insulation*. Therefore, as an example, "13+5" means R-13 cavity insulation plus R-5 *continuous insulation.*

~~i~~ f. 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.

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~~i~~g. A maximum U-factor of 0.30 shall apply in Climate Zones 5 and 6 to vertical fenestration products installed in buildings located either:
1.Above 4,000 feet in elevation, or
2.In windborne debris regions where protection of openings is required by Section R301.2.1.2 of the *Residential Code of New York State.*
h. "30 or 20&5ci " means R30 cavity insulation alone or R19 cavity insulation with R7.5 continuous insulation or R20 continuous insulation alone.

EC 07-0075

Revise as follows:

~~R402.1.3~~R402.1.4 R-value computation. ~~Insulation material used in layers, such as framing *cavity insulation* or *continuous insulation*,~~ *Cavity insulation* alone shall be used to determine compliance with the *cavity insulation* R-value requirements in Table R402.1.3. Where cavity insulation is installed in multiple layers, the R-values of the *cavity insulation* layers shall be summed to ~~compute the corresponding component R-value~~ determine compliance with the *cavity insulation* R-value requirements. The manufacturer's settled *R-value* shall be used for blown-in insulation. *Continuous insulation* (ci) alone shall be used to determine compliance with the *continuous insulation* R-value requirements in Table R402.1.3. Where *continuous insulation* is installed in multiple layers, the R-values of the *continuous insulation* layers shall be summed to determine compliance with the *continuous insulation* R-value requirements. *Cavity insulation* R-values shall not be used to determine compliance with the *continuous insulation* R-value requirements in Table R402.1.3. Computed *R-values* shall not include an *R-value* for other building materials or air films. Where insulated siding is used for the purpose of complying with the *continuous insulation* requirements of Table ~~R402.1.2~~ R402.1.3, the manufacturer's *labeled R-value* for the insulated siding shall be reduced by R-0.6.

EC 07-0211

Revise as follows:

[NY] R402.1.5 ~~Total UA~~ Component performance alternative. Where the proposed total *building thermal envelope* ~~UA, the sum of *U-factor* times assembly area,~~ *thermal conductance* TC_p is less than or equal to the required total ~~UA resulting from multiplying the *U-* *building thermal envelope*~~ thermal conductance TC_r using factors in Table ~~R402.1.4~~R402.1.2 ~~by the same assembly area as in the proposed *building*,~~ the *building* shall be considered to be in compliance with Table R402.1.2. The ~~UA calculation~~ total thermal conductance shall be ~~performed~~ determined in accordance with Equation 4-1. Proposed *U*-factors and slab-on-grade *F*-factors shall be taken from the 2024 NYS ASHRAE Standard 90.1 Appendix A or determined using a method consistent with the ASHRAE *Handbook of Fundamentals* and shall include the thermal bridging effects of framing materials. In addition to ~~UA~~ total thermal conductance compliance, the SHGC requirements of Table R402.1.2 and the maximum fenestration U-factors of Section ~~R402.5~~R402.6 shall be met.

$$TC_p \leq TC_r \qquad \textbf{(Equation 4-1)}$$

$TCp = Up\ A + Fp\ P$

$TCr = Ur\ A + Fr\ P$

Up A = the sum of proposed U-factors times the assembly areas in the proposed *building* .

Fp P = the sum of proposed F-factors times the slab-on-grade perimeter lengths in the proposed *building* .

Ur A = the sum of U-factors in Table R402.1.2 times the same assembly areas as in the proposed *building* .

Fr P = the sum of F-factors in Table R402.1.2 times the same slab-on-grade perimeter lengths as in the proposed building.

EC 07-0212

Revise as follows:

[NY] R402.2.1 Ceilings with ~~attic spaces~~ attics. Where Section ~~R402.1.2~~ R402.1.3 requires ~~R-38~~ R-49 insulation in the ceiling or attic, installing ~~R-30~~ R-38 over 100 percent of the ceiling area requiring insulation shall satisfy the requirement for ~~R-38~~ R-49 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves.

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Where Section ~~R402.1.2~~ R402.1.3 requires ~~R-49~~ R-60 insulation in the ceiling or attic, installing ~~R-38~~ R-49 over 100 percent of the ceiling or attic area requiring insulation shall satisfy the requirement for ~~R-49~~ R-60 insulation wherever the full height of uncompressed ~~R-38~~ R-49 insulation extends over the wall top plate at the eaves. This reduction shall not apply to ~~the *U-factor* alternative approach in Section R402.1.4~~the insulation and fenestration criteria in Section R402.1.2 and the ~~Total UA~~ component performance alternative in Section R402.1.5.

[NY] R402.2.2 Ceilings without ~~attic spaces~~ attics. Where Section R402.1.3 requires insulation R-values greater than R-38 in the interstitial space above a ceiling and below the structural roof deck, 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. Where Section ~~R402.1.2~~ R402.1.3 requires insulation *R-value*s greater than ~~R-30~~ R-49 in the ~~ceiling~~ interstitial space above a ceiling and below the structural roof deck, 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-30~~ R-49. Insulation shall extend over the top of the wall plate to the outer edge of such plate and shall not be compressed. This reduction of insulation from the requirements of Section ~~R402.1.2~~ R402.1.3 shall be limited to 500 ~~square feet~~ ft^2 (46 m^2) or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the ~~*U-factor* alternative approach in Section R402.1.4 and the Total UA~~ component performance alternative in Section R402.1.5.

R402.2.3 Attic knee wall. Wood attic *knee wall* assemblies that separate *conditioned space* from unconditioned attic spaces shall comply with Table R402.1.3 for wood frame walls. Steel attic *knee wall* assemblies shall comply with Section R402.2.7. Such knee walls shall have an *air barrier* between conditioned and unconditioned space.

R402.2.3.1 Roof truss framing separating conditioned and unconditioned space. Where wood vertical roof truss framing members are used to separate *conditioned space* and unconditioned space, they shall comply with Table R402.1.3 for wood frame walls. Steel frame vertical roof truss framing members used to separate *conditioned space* and unconditioned space shall comply with Section R402.2.7.

EC 07-0076

Revise as follows:

~~**R402.2.3**~~ **R402.2.4 Eave baffle.** For air-permeable insulations in vented attics, a baffle shall be installed adjacent to soffit and eave vents. Baffles shall maintain ~~an~~ a net free area opening equal or greater than the size of the vent. The baffle shall extend over the top of the attic insulation. The baffle shall be permitted to be any solid material. The baffle shall be installed to the outer edge of the *exterior wall* top plate so as to provide maximum space for attic insulation coverage over the top plate. Where soffit venting is not continuous, baffles shall be installed continuously to prevent ventilation air in the eave soffit from bypassing the baffle.

EC 07-0077

Revise as follows:

[NY] ~~R402.2.4~~ R402.2.5 Access hatches and doors. Access hatches and doors from conditioned spaces to unconditioned spaces such as attics and crawl spaces shall be ~~weatherstripped and~~ insulated to ~~a level equivalent to the insulation and surrounding surfaces. Access that prevents damaging or compressing the insulation shall be provided to all equipment. Where loose-fill insulation is installed, a wood-framed or equivalent baffle or retainer shall be installed to prevent the loose-fill insulation from spilling into the living space when the attic access is opened. The baffle or retainer shall provide a permanent means of maintaining the installed R-value of the loose-fill insulation.~~ the same R-value required by Table R402.1.3 for the wall or ceiling in which they are installed.

Exceptions:

1. Vertical doors providing access from *conditioned spaces* to unconditioned spaces that comply with the fenestration requirements of ~~Table R402.1.2~~ Table R402.1.3 based on the applicable *climate zone* specified in Chapter 3.

2. Horizontal pull-down, stair-type access hatches in ceiling assemblies that provide access from conditioned to unconditioned spaces in Climate Zone 4 shall not be required to comply with the insulation level of the surrounding surfaces provided the hatch meets all of the following:

    2.1. The average U-factor of the hatch shall be less than or equal to U-0.10 or have an average insulation R-value of R-10 or greater.

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2.2. Not less than 75 percent of the panel area shall have an insulation R-value of R-13 or greater.
2.3. The net area of the framed opening shall be less than or equal to 13.5 square feet (1.25 m2).
2.4. The perimeter of the hatch edge shall be weatherstripped.

The reduction shall not apply to the total UA alternative in Section R402.1.5.

R402.2.5.1 Access hatches and door insulation installation and retention. Vertical or horizontal access hatches and doors from *conditioned spaces* to unconditioned spaces such as attics and crawl spaces shall be weatherstripped. Access that prevents damaging or compressing the insulation shall be provided to all equipment. Where loose-fill insulation is installed, a wood-framed or equivalent baffle, retainer, or dam shall be installed to prevent loose-fill insulation from spilling into living space from higher to lower sections of the attic and from attics covering conditioned spaces to unconditioned spaces. The baffle or retainer shall provide a permanent means of maintaining the installed *R-value* of the loose-fill insulation.

EC 07-0078

Revise as follows:

~~R402.2.5~~ R402.2.6 **Mass walls.** Mass walls where used as a component of the *building thermal envelope* shall be one of the following:

1. Above-ground walls of concrete block, concrete, insulated concrete form, masonry cavity, brick but not brick veneer, adobe, compressed earth block, rammed earth, solid timber, mass timber or solid logs.
2. Any wall having a heat capacity greater than or equal to 6 Btu/ft^2 • °F (123 kJ/m^2 • K).

EC 07-0213

Revise as follows:

~~R402.2.6~~R402.2.7 **Steel-frame ceilings, walls and floors.** Steel-frame ceilings, walls, and floors shall comply with the ~~insulation requirements of Table R402.2.6 or the~~ *U-factor* requirements of Table ~~R402.1.4~~ R402.1.2. The calculation of the *U-factor* for a steel-~~frame~~ framed ceilings and walls in a *building thermal envelope* assembly shall ~~use a series-parallel path calculation method~~ be determined in accordance with AISI S250 as modified herein.

1. Where the steel-framed wall contains no cavity insulation, and uses continuous insulation to satisfy the U-factor maximum, the steel-framed wall member spacing is permitted to be installed at any on center spacing.

2. Where the steel-framed wall contains framing spaced at 24 inches (610 mm) on center with a 23 percent framing factor or framing spaced at 16 inches (400 mm) on center with a 25 percent framing factor, the next lower framing member spacing input values shall be used when calculating using AISI S250.

3. Where the steel-framed wall contains less than 23 percent framing factors the AISI S250 shall be used without any modifications.

4. Where the steel-framed wall contains other than standard C-shape framing members the AISI S250 calculation option for other than standard C-shape framing is permitted to be used.

~~**TABLE R402.2.6**~~
~~**STEEL-FRAME CEILING, WALL**~~
~~**AND FLOOR INSULATION *R*-VALUES**~~

~~WOOD FRAME *R*-VALUE REQUIREMENT~~	~~COLD-FORMED STEEL-FRAME EQUIVALENT *R*-VALUE[a]~~
~~Steel Truss Ceilings[b]~~	
~~R-30~~	~~R-38 or R-30 + 3 or R-26 + 5~~

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R-38	R-49 or R-38 + 3
R-49	R-38 + 5
Steel Joist Ceilings[b]	
R-30	R-38 in 2 × 4 or 2 × 6 or 2 × 8 R-49 in any framing
R-38	R-49 in 2 × 4 or 2 × 6 or 2 × 8 or 2 × 10
Steel-Framed Wall, 16 inches on center	
R-13	R-13 + 4.2 or R-21 + 2.8 or R-0 + 9.3 or R-15 + 3.8 or R-21 + 3.1
R-13 + 3	R-0 + 11.2 or R-13 + 6.1 or R-15 + 5.7 or R-19 + 5.0 or R-21 + 4.7
R-13+5	R-0 + 15 or R-13 + 9 or R-15 + 8.5 or R-19 + 8 or R-21 + 7
R-13+10	R-0+20 or R-13 + 15 or R-15 + 14 or R-19 + 13 or R-21 + 13
R-20	R-0 + 14.0 or R-13 + 8.9 or R-15 + 8.5 or R-19 + 7.8 or R-19 + 6.2 or R-21 + 7.5
R-20 + 5	R-13 + 12.7 or R-15 + 12.3 or R-19 + 11.6 or R-21 + 11.3 or R-25 + 10.9
R-21	R-0 + 14.6 or R-13 + 9.5 or R-15 + 9.1 or R-19 + 8.4 or R-21 + 8.1 or R-25 + 7.7
Steel Framed Wall, 24 inches on center	
R-13	R-0 + 9.3 or R-13 + 3.0 or R-15 + 2.4
R-13 + 3	R-0 + 11.2 or R-13 + 4.9 or R-15 + 4.3 or R-19 + 3.5 or R-21 + 3.1
R-13+5	R-0 + 15 or R-13 + 7.5 or R-15 + 7 or R-19 + 6 or R-21 + 6
R-13+10	R-0 + 20 or R-13 + 13 or R-15 + 12 or R-19 + 11 or R-21 + 11
R-20	R-0 + 14.0 or R-13 + 7.7 or R-15 + 7.1 or R-19 + 6.3 or R-21 + 5.9
R-20 + 5	R-13 + 11.5 or R-15 + 10.9 or R-19 + 10.1 or R-21 + 9.7 or R-25 + 9.1
R-21	R-0 + 14.6 or R-13 + 8.3 or R-15 + 7.7 or R-19 + 6.9 or R-21 + 6.5 or R-25 + 5.9
Steel Joist Floor	
R-13	R-19 in 2 × 6, or R-19 + 6 in 2 × 8 or 2 × 10
R-19	R-19 + 6 in 2 × 6, or R-19 + 12 in 2 × 8 or 2 × 10

a. The first value is cavity insulation *R* value the second value is *continuous insulation R* value. Therefore, for example, "R-30+3" means R-30 cavity insulation plus R-3 *continuous insulation*.

b. Insulation exceeding the height of the framing shall cover the framing.

EC 07-0079

Delete:

R402.2.7 Walls with partial structural sheathing. Where Section R402.1.2 requires *continuous insulation* on *exterior walls* and structural sheathing covers 40 percent or less of the gross area of all *exterior walls*, the required *continuous*

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~~*insulation R-value* shall be permitted to be reduced by an amount necessary, but not more than R-3 to result in a consistent total sheathing thickness on areas of the walls covered by structural sheathing. This reduction shall not apply to the *U-factor* alternative in Section R402.1.4 and the Total UA alternative in Section R402.1.5.~~

EC 07-0214

Revise as follows:

~~**R402.2.8**~~**R402.2.8 Floors.** Floor ~~framing~~ *cavity insulation* shall ~~be installed to maintain permanent contact with the underside of the subfloor decking.~~ be installed in accordance with all of the following:

1. Table R402.1.2 or Table R402.1.3 and manufacturer's instructions.

2. Floor framing members that are part of the *building thermal envelope* shall be air sealed to maintain a *continuous air barrier*.

3. One of the following methods:

   3.1. *Cavity insulation* shall be installed to maintain permanent contact with the underside of the subfloor decking.

   3.2. *Cavity insulation* shall be installed to maintain contact with the top side of sheathing separating the cavity and the unconditioned space below. Insulation shall extend from the bottom to the top of all perimeter floor framing members.

   3.2. A combination of *cavity insulation* and continuous insulation shall be installed such that the *cavity insulation* maintains contact with the top side of the *continuous insulation* and the *continuous insulation* maintains contact with the underside of the structural floor system. Insulation shall extend from the bottom to the top of all perimeter floor framing members.

   3.4 Continuous *insulation* shall be installed to maintain contact with the underside of thestructural floor system. Insulation shall extend from the bottom to the top of all perimeter floor framing members.

~~**Exception:** As an alternative, the floor framing *cavity insulation* shall be in contact with the topside of sheathing or *continuous insulation* installed on the bottom side of floor framing where combined with insulation that meets or exceeds the minimum wood frame wall *R-value* in Table R402.1.2 and that extends from the bottom to the top of all perimeter floor framing members.~~

EC 07-0215

Add new:

R402.2.9 Basement walls. Basement walls shall be insulated in accordance with Table R402.1.3.

Exception: Basement walls associated with unconditioned basements where all of the following requirements are met:

1. The floor overhead including the underside stairway stringer leading to the basement, is insulated in accordance with Section R402.1.3 and applicable provisions of Sections R402.2 and R402.2.8.
2. There are no uninsulated *ductwork*, domestic hot water piping, or hydronic heating surfaces exposed to the basement.
3. There are no HVAC supply or return diffusers serving the basement.
4. The walls surrounding the stairway and adjacent to conditioned space are insulated in accordance with Section R402.1.3 and applicable provisions of Section R402.2.
5. The door(s) leading to the basement from conditioned spaces are insulated in accordance with Sections R402.1.3 and applicable provisions of Section R402.2, and weatherstripped in accordance with Section R402.5.
6. The building thermal envelope separating the basement from adjacent conditioned spaces complies with Section R402.5.

~~**R402.2.9**~~ **R402.2.9.1 Basement ~~walls~~ wall insulation installation.** ~~Walls associated with conditioned basements~~ Where basement walls are insulated, the insulation shall be ~~insulated~~ installed from the top of the *basement wall* down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less. ~~Walls associated with unconditioned basements shall comply with this requirement except where the floor overhead is insulated in accordance with Sections R402.1.2 and R402.2.8.~~ , or in accordance with the *proposed design* or the *rated design* , as applicable.

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EC 07-0216

Revise as follows:

~~**R402.2.10**~~ **R402.2.10 Slab-on-grade floors.** Slab-on-grade floors with a floor surface ~~less than 12 inches~~ within 24 inches (~~305~~600 mm) above or below grade shall be insulated in accordance with ~~Table R402.1.2~~R402.1.3. ~~The insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table R402.1.2 by any combination of vertical insulation, insulation extending under the slab or insulation extending out from the *building*. Insulation extending away from the *building* shall be protected by pavement or by not less than 10 inches (254 mm) of soil. The top edge of the insulation installed between the *exterior wall* and the edge of the interior slab shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the *exterior wall*. Slab-edge insulation is not required in jurisdictions designated by the *building official* as having a very heavy termite infestation.~~ either Section R402.2.10.1 or R402.2.10.2.

Exception: Slab-edge insulation is not required in jurisdictions designated by the *building official* as having a very heavy termite infestation probability.

R402.2.10.1 Slab-on-grade floor insulation installation. For *buildings* complying with Section R401.2.1, the slab edge continuous insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table R402.1.3 but need not exceed the footing depth in accordance with Section R403.1.4 of the *Residential Code of New York State*. Where a proposed design includes insulation extending away from the building shall be protected by pavement or by not less than 10 inches (254 mm) of soil.

The top edge of the insulation installed between the exterior wall and the edge of the interior slab shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the exterior wall. Full slab insulation shall be continuous under the entire area of the slab-on-grade floor, except at structural column locations and service penetrations. Slab edge insulation required at the heated slab perimeter shall not be required to extend below the bottom of the heated slab and shall be continuous with the full slab insulation.

R402.2.10.2 Alternative slab-on-grade insulation configurations. For *buildings* complying with Sections R405 or R406, slab-on-grade insulation shall be installed in accordance with the *proposed design* or *rated design*.

EC 07-0217

Revise as follows:

R402.2.11 Crawl space walls. Crawl space walls shall be insulated in accordance with one of the following:

Exception: Crawl space walls associated with a crawl space that is vented to the outdoors and the floor overhead is insulated in accordance with Table R402.1.3 and Section R402.2.8.

~~**[NY] R402.2.11**~~**R402.2.11.1 Crawl space ~~walls~~ wall insulation installations.** ~~As an alternative to insulating floors over crawl spaces, crawl space walls shall be insulated provided that the crawl space is not vented to the outdoors.~~ Where ~~Crawlcrawl space wall insulation is~~ installed, ~~it shall be permanently fastened to the wall and shall extend downward from the floor to the finished grade elevation and then vertically or horizontally for not less than an additional 24 inches (610 mm).~~ crawl space wall insulation shall be secured to the wall and extend downward from the sill plate to not less than the top of the foundation wall footing.

Exception: Where the *crawl space wall* insulation is installed on the interior side of the wall and the crawl space floor is more than 24 inches (610 mm) below the exterior grade, the *crawl space wall* insulation shall be permitted to extend downward from the sill plate at the top of the foundation wall to not less than the interior floor of the crawl space.

Exposed earth in ~~unvented~~ crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the *Building Code of New York State* or *Residential Code of New York State*, as applicable. Joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend not less than 6 inches (153 mm) up stem walls and shall be attached to the stem walls.

R402.2.11.2 Alternative crawl space wall insulation configurations. For *buildings* complying with Sections R405 or R406 *crawl space wall* insulation shall be installed in accordance with the *proposed design* or *rated design* .

EC 07-0218

Revise as follows:

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[NY] ~~R402.2.13~~R402.2.13 **Sunroom and heated garage insulation.** *Sunrooms* enclosing *conditioned space* and heated garages shall meet the insulation requirements of this code.

Exception: For *sunrooms* and heated garages with *thermal isolation*, and enclosing *conditioned space*, the following exceptions to the insulation requirements of this code shall apply:

1. The minimum ceiling insulation *R-value*s shall be R-19 in ~~Climate Zones 1 through~~ *Climate Zone* 4 and R-24 in *Climate Zones* 5 ~~through 8~~ and 6.

2. The minimum wall insulation *R-value* shall be R- 13 in all *climate zones*. Walls separating a *sunroom* or heated garage with a *thermal isolation* from *conditioned space* shall comply with the *building thermal envelope* requirements of this code.

EC 07-0219

Add new:

[NY] R402.3 Radiant barriers. Where installed, *radiant barriers* shall comply with the requirements of ASTM C1313/C1313M and shall be installed in accordance with ASTM C1743.

EC 07-0080

Revise as follows:

[NY] ~~R402.3.5~~R402.4.5 **Sunroom and heated garage fenestration.** *Sunrooms* and heated garages enclosing *conditioned space* shall comply with the fenestration requirements of this code.

Exception: ~~In Climate Zones 2 through 8, for~~ For *sunrooms* and heated garages with *thermal isolation* and enclosing *conditioned space*, the fenestration *U-factor* shall not exceed 0.45 and the *skylight U-factor* shall not exceed 0.70.

New fenestration separating ~~the~~ a *sunroom* or heated garage with *thermal isolation* from *conditioned space* shall comply with the *building thermal envelope* requirements of this code.

EC 07-0220

Revise as follows:

[NY] ~~R402.4.1.1~~ R402.5.1.1 **Installation.** The components of the *building thermal envelope* as indicated in Table ~~R402.4.1.1~~R402.5.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria indicated in Table ~~R402.4.1.1~~R402.5.1.1, as applicable to the method of construction. Where required by the *building official*, an *approved* third party shall inspect all components and verify compliance. The inspection shall include an open wall visual inspection of all components included in Table R402.5.1.1 and shall be installed so that the insulation material uniformly fills each cavity side-to-side and top-to-bottom, without gaps or voids around obstructions, and is split, installed, or fitted tightly around wiring and other penetrations in the cavity. No more than 2 percent of the total insulated area shall contain gaps or voids in the insulation or be compressed below the thickness required to attain the labeled R-value.

[NY] TABLE ~~R402.4.1.1~~R402.5.1.1
AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION[a]

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
General requirements	A continuous *air barrier* shall be installed in the *building thermal envelope*. ~~The exterior thermal envelope contains a continuous *air barrier.*~~	Air-permeable insulation shall not be used as a sealing material.

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	Breaks or joints in the air barrier shall be sealed.	
Ceiling/attic	~~The~~ An *air barrier* shall be installed in any dropped ceiling or soffit ~~shall be aligned with the insulation and any gaps in the *air barrier* shall be sealed.~~ to separate it from unconditioned space. Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be air sealed with gasketing materials that allow for repeated entrance over time.	The insulation in any dropped ceiling/soffit shall be aligned with the *air barrier*. Access hatches and doors shall be installed and insulated in accordance with Section R402.2.5 Eave Baffles shall be installed in accordance with Section R402.2.4
Walls	The junction of the foundation and sill plate shall be sealed. The junction of the top plate and the top of *exterior walls* shall be sealed. Knee walls 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. Exterior *building thermal envelope* insulation for framed walls shall be installed in substantial contact and continuous alignment with the *air barrier*.
Knee wall	Knee walls shall have an air barrier between conditioned and unconditioned space	Insulation installed in a knee wall assembly shall be installed in accordance with Section R402.2.3 Air-permeable insulation shall be enclosed inside an air barrier assembly.
Windows, skylights and doors	The ~~space~~rough opening gap between framing and the frames of skylights~~, and the jambs of~~ windows and doors, shall be sealed in accordance with fenestration manufacturer's instructions.	Insulation shall not be required in the rough opening gap except as required by the fenestration manufacturer's instructions.
Rim joists	Rim joists shall include ~~the~~an ~~exterior~~ *air barrier*.[b] The junctions of the rim board to the sill plate and the rim board and the subfloor shall be air sealed.	Rim joists shall be insulated so that the insulation maintains permanent contact with the exterior rim board.[b]
Floors, including cantilevered floors and floors above garages	~~The *air barrier* shall be installed at any exposed edge of insulation.~~ Floor framing members that are part of the *building thermal envelope* shall be air sealed to maintain a *continuous air barrier*. Air permeable floor *cavity insulation* shall be enclosed.	Floor ~~framing cavity~~ insulation shall be installed in accordance with the requirements of Section R402.2.8. ~~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.~~
Basement ~~Crawl~~ crawl space, and slab foundations ~~walls~~	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder/air barrier in accordance with Section R402.2.11 ~~with overlapping joints taped~~. Penetrations through concrete foundation walls and slabs shall be air sealed. Class 1 vapor retarders shall not be used as an air barrier on below-grade walls and shall be installed in accordance with Section R702.7 of the *Residential Code of New York State*.	Crawl space insulation, where provided instead of floor insulation, shall be ~~permanently attached to the walls.~~ installed in accordance with Section R402.2.11. Conditioned basement foundation wall insulation shall be installed in accordance with Section R402.2.9.1. Slab-on-grade floor insulation shall be installed in accordance with **Section** R402.2.11.

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Shafts, penetrations	Duct and flue shafts~~, utility penetrations, and flue shafts opening~~ to exterior or unconditioned space shall be sealed. Utility penetrations of the air barrier shall be caulked, gasketed or otherwise sealed and shall allow for expansion, contraction of materials and mechanical vibration.	Insulation shall be fitted tightly around utilities passing through shafts and penetrations in the building thermal envelope to maintain required *R*-value.
Narrow cavities	Narrow cavities of 1 inch or less that are not able to be insulated shall be air sealed.	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.	Insulated portions of the garage separation assembly shall be insulated in accordance with Sections R303 and R402.
Recessed lighting	Recessed light fixtures installed in the *building thermal envelope* shall be air sealed in accordance with **Section** R402.5.4~~to the finished surface~~.	Recessed light fixtures installed in the building thermal envelope shall be air tight and IC rated, and shall be buried in or surrounded with insulation.
Plumbing, ~~and~~ wiring or other obstructions	All holes created by wiring, plumbing or other obstructions in the air barrier assembly shall be air sealed	~~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, shall extend behind piping and wiring.~~ Insulation shall be installed to fill the available space and surround wiring, plumbing, or other obstructions, unless the required R-value can be met by installing insulation and air barrier systems completely to the exterior side of the obstructions.
~~Shower/tub on *exterior wall*~~ Showers, tubs, and fireplaces adjacent to the *building thermal envelope*	~~The~~ An *air barrier* ~~installed at *exterior walls* adjacent to showers and tubs~~ shall separate insulation in the *building thermal envelope* ~~wall~~ from the shower, ~~or~~ tub, or fireplace assemblies.	*Exterior* framed *walls* adjacent to showers, ~~and~~ tubs, and fireplaces shall be insulated.
Electrical ~~phone box on *exterior walls*~~, communication, and other equipment boxes, housings, and enclosures	~~The *air barrier* shall be installed behind electrical and communication boxes. Alternatively, air-sealed boxes shall be installed.~~ Boxes, housing, and enclosures that penetrate the air barrier shall be caulked, taped, gasketed, or otherwise sealed to the air barrier element being penetrated. All concealed openings into the box, housing, or enclosure shall be sealed. Alternatively, air-sealed boxes shall be installed in accordance with R402.5.6.	Boxes, housing, and enclosures shall be buried in or surrounded by insulation.
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.	HVAC supply and return register boots located within a *building thermal envelope* assembly shall be buried in or surrounded by insulation.
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.	—

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Common walls or double walls separating attached single-family dwellings or townhouses	An interior air barrier shall be provided. Air sealing at the intersections with *building thermal envelope* shall be provided. Where installed in a fire resistance rated wall assembly, air sealing materials shall comply with one of the following: 1. be in accordance with an *approved* design for the fire resistance-rated assembly. 2. be supported by *approved* data that shows the assembly as installed complies with the required fire-resistance rating	Insulation materials recognized in the listed common wall or double-wall design and installed in accordance with the listing, or insulation materials recognized in the approved design, shall be used.

a. Inspection of log walls shall be in accordance with the provisions of ICC 400.
b. Insulation full enclosure is not required in unconditioned/ventilated attic spaces and at rim joists.

EC 07-0221

Revise as follows:

[NY] ~~R402.4.1.2~~ R402.5.1.2 ~~Testing~~ Air leakage testing. The *building* or each *dwelling unit* or *sleeping unit* in the building shall be tested ~~and verified as having an air leakage rate not exceeding three air changes per hour.~~ for air leakage. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779, ~~or~~ ASTM E1827 or ASTM E3158 and reported at a pressure differential of 0.2 inch ~~w.g.~~water gauge (50 ~~Pascals~~Pa). Where required by the *building official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *building official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope* have been sealed.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other *infiltration* control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended *infiltration* control measures.
3. Interior doors, where installed at the time of the test, shall be open.
4. Exterior ~~doors~~ or interior terminations for continuous *ventilation* systems ~~and heat recovery ventilators~~ shall be ~~closed and~~ sealed.
5. Heating and cooling systems, where installed at the time of the test, shall be turned off.
6. Supply and return registers, where installed at the time of the test, shall be fully open.

Exceptions:

1. For heated sunrooms and heated attached or detached private garages accessory to *residential buildings*, *building thermal envelope* tightness and insulation installation shall be considered acceptable where the items in Table R402.5.1.1, applicable to the method of construction, are field verified. Where required by the *building official*, an *approved* third party independent from the installer shall inspect both air barrier and insulation installation criteria. Heated sunrooms and heated attached or detached private garage space shall be thermally isolated from all other *conditioned spaces* in accordance with Sections R402.2.13 and R402.4.5, as applicable.
2. Where tested in accordance with R402.5.1.2.1, testing of each *dwelling unit* or *sleeping unit* is not required.

~~Where required by the *building official*, testing shall be conducted by an approved third party. A written report of the results of the test shall be prepared and signed by the party conducting the test and provided to the *building official*. The written report shall include:~~

~~1. the name and place of business of the party conducting the test;~~
~~2. the address of the building which was tested;~~
~~3. the *conditioned floor area* of dwelling, calculated in accordance with ANSI Z 65, except that *conditioned floor area* shall include areas where the ceiling height is less than 5 feet (1524 mm);~~

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4. measurement of the air volume lost at an internal pressurization of 0.2 inches w.g. (50 Pascals);
5. the date(s) of the test;
6. a certification by the party conducting the test of the accuracy of the test results; and
7. the signature of the party conducting the test.

Delete:

[NY] R402.4.1.3 Optional testing procedure for buildings with two or more dwelling units within the building thermal envelope. Where two or more *dwelling units* are located within the *building thermal envelope* of a *building*, the testing procedure specified in this Section R402.4.1.3 shall be permitted as an alternative to compliance with Section R402.4.1.2.

In this section, each *dwelling unit* and each other conditioned occupied space located within the *building thermal envelope* of the *building* shall be referred to as a "testing unit," and the "enclosure surface area" within a testing unit shall be equal to the sum of the areas of (i) each *exterior wall* in such testing unit, (ii) each interior wall in such testing unit that abuts other testing unit(s), (iii) each ceiling in such testing unit that abuts other testing unit(s) or abuts unconditioned space, and (iv) each floor in such testing unit that abuts other testing unit(s) or abuts *unconditioned space*.

Each testing unit shall be tested and verified as having an air leakage rate not exceeding 0.3 cubic feet per minute per square foot of enclosure surface area within the testing area. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals), and shall be conducted in accordance with ASTM E779. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weather stripping or other *infiltration* control measures.
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended *infiltration* control measures.
3. Interior doors, if installed at the time of the test, shall be open.
4. Exterior doors for continuous *ventilation* systems and heat recovery ventilators shall be closed and sealed.
5. Heating and cooling systems, if installed at the time of the test, shall be turned off.
6. Supply and return registers, if installed at the time of the test, shall be fully open. Where required by the *building official*, testing shall be conducted by an approved third party.

A written report of the results of the test shall be prepared and signed by the party conducting the test and provided to the building official. The written report shall include:

1. the name and place of business of the party conducting the test;
2. the address of the building which was tested;
3. the *conditioned floor area* of dwelling, calculated in accordance with ANSI Z 65–1996, except that *conditioned floor area* shall include areas where the ceiling height is less than 5 feet (1524 mm);
4. measurement of the air leakage rate of each testing unit
5. the date(s) of the test;
6. a certification by the party conducting the test of the accuracy of the test results; and
7. the signature of the party conducting the test.

[NY] R402.4.1.3.1 Buildings with more than seven dwelling units. 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 shall be permitted, when approved by the *building official*.

1. Testing units shall be grouped into sample sets of not more than seven testing units and common rooms in each sample set. Each sample set shall contain testing units that are representative of all *dwelling unit* types and all other conditioned occupied spaces.
2. If all testing units in the first sample set tested are verified as having an air leakage rate not exceeding 0.3 cubic feet per minute per square foot of enclosure surface area within the testing area, remaining sample sets shall be permitted to be tested at the rate of one testing unit per sample set.
3. If any testing unit tested in accordance with paragraph 2 above is not verified as having an air leakage rate not exceeding 0.3 cubic feet per minute per square foot of enclosure surface area within the testing area, two additional testing units in the sample set shall be tested.

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4. If any testing unit tested in accordance with paragraph 3 above is not verified as having an air leakage rate not exceeding 0.3 cubic feet per minute per square foot of enclosure surface area within the testing area, all testing units in the sample set shall be tested, and all testing units in the subsequent sample set, if any, shall be tested.
5. If all testing units in the sample set tested in accordance with paragraph 4 above are verified as having an air leakage rate not exceeding 0.3 cubic feet per minute per square foot of enclosure surface area within the testing area, subsequent sample sets shall be permitted
6. to be tested in accordance with paragraph 2 above, where approved by the *building official*.

R402.5.1.2.1 Unit sampling. For buildings with eight or more *dwelling units or sleeping units*, seven or 20 percent of the *dwelling units or sleeping units*, whichever is greater, shall be tested. Tested units shall include a top floor unit, a ground floor unit, a middle floor unit, and the *dwelling unit or sleeping unit* with the largest *testing unit enclosure area*. Where the air leakage rate of a tested unit is greater than the maximum permitted rate, corrective actions shall be taken and the unit re-tested until it passes. For each tested *dwelling unit or sleeping unit* with an air leakage rate greater than the maximum permitted rate, three additional units, including the corrected unit, shall be tested. Where buildings have fewer than eight *dwelling units or sleeping units*, each *dwelling unit or sleeping unit* shall be tested.

EC 07-0222

Revised as follows:

[NY] R402.4.1.2. Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding three air changes per hour. Testing shall be conducted in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

[NY] R402.5.1.3 Maximum air leakage rate. Where tested in accordance with Section R402.5.1.2, the air leakage rate for the *buildings* or the *dwelling units* or *sleeping units* in the *building* shall be 3.0 air changes per hour in *Climate Zones* 4 and 5; and 2.5 air changes per hour in *Climate Zone* 6.

Exceptions:

1. Where *dwelling units* or *sleeping units* are attached or located in an R-2 occupancy, and are tested without simultaneously testing adjacent *dwelling units* or *sleeping units*, the air leakage rate is permitted to be not greater than 0.27 cfm/ft2 (1.35 L/s x m2) of the *testing unit enclosure area*. Where adjacent *dwelling units or sleeping units* are simultaneously tested in accordance with ASTM E779, the air leakage rate is permitted to be not greater than 0.27 cfm/ft2 (1.35 L/s x m2) of the *testing unit enclosure area* that separates *conditioned space* from the exterior.
2. Where *buildings* have 1,500 square feet (139.4 m2) or less of *conditioned floor area*, the air leakage rate is permitted to be not greater than 0.27 cfm/ft2 (1.35 L/s x m2).

R402.5.5 Air-Sealed electrical and communication outlet boxes. Air-sealed electrical and communication outlet boxes that penetrate the air barrier of the building thermal envelope shall be caulked, taped, gasketed, or otherwise sealed to the air barrier element being penetrated. Air sealed boxes shall be buried in or surrounded by insulation. Air-sealed boxes shall be tested in accordance with NEMA OS 4.–Air-sealed boxes shall be installed in accordance with the manufacturer's instructions.

EC 07-0081

Revise as follows:

[NY] R402.5 R402.6 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 0.48 in *Climate Zones* 4 and 5 and 0.40 in *Climate* Zones *Zone* 6 through 8 for vertical *fenestration*, and 0.75 in *Climate Zones* 4 through 86 for *skylights*. The area-weighted average maximum fenestration SHGC permitted using tradeoffs from Section R405 in Climate Zones 1 through 3 shall be 0.50 0.40.

Exception: The maximum U-factor and solar heat gain coefficient (SHGC) for fenestration shall not be required in storm shelters complying with ICC 500.

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EC 07-0082

Revise as follows:

R403.1.1 Programmable thermostat. The thermostat controlling the primary heating or cooling system of the *dwelling unit* shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature setpoints at different times of the day and different days of the week. This thermostat shall include the capability to set back or temporarily operate the system to maintain *zone* temperatures of not less than 55°F (13°C) to not greater than 85°F (29°C). The thermostat shall be programmed initially by the manufacturer with a heating temperature setpoint of not greater than 70°F (21°C) and a cooling temperature setpoint of not less than 78°F (26°C).

EC 07-0223

Revise as follows:

[NY] R403.1.2 Heat pump supplementary heat ~~(Mandatory)~~. Where permitted, ~~Heat~~ heat pumps having supplementary electric-resistance, *fuel gas*, or *liquid fuel* heating systems ~~heat~~ shall have controls that~~, except during defrost,~~ are configured to prevent supplemental heat operation when the capacity of the heat pump compressor can meet the heating load. Supplemental heat operation shall be limited to only where one of the following applies:

1. The vapor compression cycle cannot provide the necessary heating energy to satisfy the thermostat setting.
2. The heat pump is operating in defrost mode.
3. The vapor compression cycle malfunctions.
4. The thermostat malfunctions.

EC 07-0224

Revise as follows:

R403.2 Hot water boiler ~~outdoor~~ temperature ~~setback~~ reset**.** ~~Hot water boilers that supply heat to the building through one- or two-pipe heating systems shall have an outdoor setback control that decreases the boiler water temperature based on the outdoor temperature.~~ Other than where equipped with tankless domestic water heating coils, the manufacturer shall equip each gas, liquid fuel and electric boiler with *automatic* means of adjusting the water temperature supplied by the boiler so that incremental change of the inferred heat load will cause an incremental change in the temperature of the water supplied by the boiler. This can be accomplished with outdoor reset, indoor reset or water temperature sensing.

EC 07- 0083

Revise as follows:

[NY] R403.3 Ducts. ~~All ducts and air handlers~~ *Duct systems* shall be installed in accordance with Sections R403.3.1 through ~~R403.3.7~~ R403.3.9. The *duct system* in new buildings and additions shall be located in *conditioned space* in accordance with Section R403.3.4.

Exception: *Ventilation ductwork* that is not integrated with *duct systems* serving heating or cooling systems.

EC 07- 0225

Add new:

R403.3.1 Duct system design. *Duct systems* serving one or two *dwelling units or sleeping units* shall be designed and sized in accordance with ANSI/ACCA Manual D. *Duct systems* serving more than two *dwelling units or sleeping units* shall be sized in accordance with the ASHRAE Handbook of Fundamentals, ANSI/ACCA Manual D, or other equivalent computation procedure.

EC 07-0084

Add new:

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[NY] R403.3.8 Duct system sizing. Ducts shall be sized in accordance with ACCA Manual D based on calculations made in accordance with Section R403.7.

EC 07-0226

Add new:

~~**R403.3.1**~~ **R403.3.3 Ductwork located outside conditioned space.** ~~**Insulation (Prescriptive).**~~ Supply and return ducts ~~in attics~~ located outside *conditioned space* 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. ~~Supply and return ducts in other portions of the *building* shall be insulated to not less than R-6 for ducts 3 inches (76 mm) in diameter and not less than R-4.2 for ducts smaller than 3 inches (76 mm) in diameter.~~ *Ductwork* buried beneath a building shall be insulated as required per this section or have an equivalent *thermal distribution efficiency*. Underground *ductwork* utilizing the *thermal distribution efficiency* method shall be listed and *labeled* to indicate the *R*-value equivalency.

~~**Exception:** Ducts or portions thereof located completely inside the *building thermal envelope*.~~

EC 07-0227

Revise as follows:

~~**R403.3.7**~~**R403.3.4** ~~**Ducts**~~ **Duct systems** **located in conditioned space.** For ~~ducts~~ *duct systems* to be considered ~~as~~ inside a *conditioned space*, ~~such ducts~~ the *space conditioning equipment* shall be located completely on the conditioned side of the *building thermal envelope*. The *ductwork* shall comply with ~~either~~ the following as applicable:

1. The ~~*duct system*~~ *ductwork* shall be located completely ~~within the continuous *air barrier* and within~~ on the conditioned side of the *building thermal envelope*.
2. ~~The ducts shall~~ Ductwork in ventilated attic spaces or unvented attic with vapor diffusion port shall be buried within ceiling insulation in accordance with Section ~~R403.3.6~~R403.3.5 and ~~all of~~ shall comply with the following ~~conditions shall exist~~:

   ~~2.1. The air handler is located completely within the *continuous air barrier* and within the *building thermal envelope*.~~

   ~~2.2~~2.1. The ~~duct~~ *ductwork* leakage, as measured either by a rough-in test of the ~~ducts~~ supply and return *ductwork* or a post-construction ~~total~~ *duct* system leakage test to outside the *building thermal envelope* in accordance with Section ~~R403.3.4~~ R403.3.7, ~~is less than or equal to~~ is not greater than 1.5 ~~cubic feet per minute~~ cfm (42.5 L/min) per 100 ~~square feet~~ ft^2 (9.29 m^2) of *conditioned floor area* served by the *duct system*.

   ~~2.3~~2.2. The ceiling insulation *R*-value installed against and above the insulated ~~duct~~*ductwork* is greater than or equal to the proposed ceiling insulation *R*-value, less the *R*-value of the insulation on the ~~duct~~ *ductwork*.

3. Ductwork contained within wall or floor building assemblies separating unconditioned from conditioned space shall comply with the following:

   3.1. A continuous air barrier shall be installed as part of the building assembly between the *ductwork* and the unconditioned space.

   3.2 *Ductwork* shall be installed in accordance with Section R403.3.3.

   Exception: Where the building assembly cavities containing *ductwork* have been air sealed in accordance with Section R402.5.1, and insulated in accordance with Item 3.3, duct insulation is not required.

   3.3 Not less than R-10 insulation, or not less than 50 percent of the required insulation R-value specified in Table R402.1.3, whichever is greater, shall be located between the *ductwork* and the unconditioned space.

   3.4 Segments of *ductwork* contained within these building assemblies shall not be considered completely inside conditioned space in Sections R405 or R406.

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EC 07-0228

Revise as follows:

~~R403.3.3~~ R403.3.7 Duct system testing ~~(Mandatory)~~. ~~Ducts~~ Each *duct system* shall be ~~pressure~~ tested for air leakage in accordance with ANSI/RESNET/ICC 380 or ASTM E1554 ~~to determine air leakage by one of the following methods:~~ Total leakage shall be measured with a pressure differential of 0.1 inch water gauge (25 Pa) across the *duct system* and shall include the measured leakage from the supply and return *ductwork*. A written report of the test results shall be signed by the party conducting the test and provided to the *building official*. *Duct system* leakage testing at either rough-in or post-construction shall be permitted with or without the installation of registers or grilles. Where installed, registers and grilles shall be sealed during the test. Where registers and grilles are not installed, the face of the register boots shall be sealed during the test.

~~1. Rough-in test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. Registers shall be taped or otherwise sealed during the test.~~

~~2. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Registers shall be taped or otherwise sealed during the test.~~

Exceptions:

~~1. A duct air leakage test shall not be required where the ducts and air handlers are located entirely within the *building thermal envelope*.~~

~~1. A duct air leakage test shall not be required for ducts serving heat or energy recovery ventilators ventilation systems that are not integrated with ducts serving heating or cooling systems.~~

1. Testing shall not be required for *duct systems* serving ventilation systems that are not integrated with *duct systems* serving heating or cooling systems.

   Testing shall not be required where there is not more than 10 feet (3.03 m) of total ductwork external to the space conditioning equipment and both the following are met:

   1.1. The duct system is located entirely within conditioned space.

   2.2 The ductwork does not include plenums constructed of building cavities or gypsum board.

2. Where the space conditioning equipment is not installed, testing shall be permitted. The total measured leakage of the supply and return ductwork shall be less than or equal to 3.0 cfm (85 L/min) per 100 ft^2 (9.29 m2) of conditioned floor area.

Where tested in accordance with Section R403.3.9 testing of each *duct system* is not required.

~~A written report of the results of the test shall be signed by the party conducting the test and provided to the *building official*.~~

~~R403.3.4~~ R403.3.8 Duct system leakage ~~(Prescriptive)~~. The total ~~leakage of the ducts, where measured in accordance with Section R403.3.3, shall be as follows:~~ measured *duct system* leakage shall not be greater than the values in Table R403.3.8, based on the *conditioned floor area*, number of ducted returns, and location of the *duct* system. For *buildings* complying with Section R405 or R406, where duct system leakage to outside is tested in accordance with ANSI/RESNET/ICC 380 or ASTM E1554, the leakage to outside value shall not be used for compliance with this section but shall be permitted to be used in the calculation procedures of Section R405 and R406.

~~1. Rough-in test: The total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m^2) of *conditioned floor area* where the air handler is installed at the time of the test. Where the air handler is not installed at the time of the test, the total leakage shall be less than or equal to 3.0 cubic feet per minute (85 L/min) per 100 square feet (9.29 m^2) of *conditioned floor area*.~~

~~2. Postconstruction test: Total leakage shall be less than or equal to 4.0 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m^2) of *conditioned floor area*.~~

TABLE R403.3.8

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MAXIMUM TOTAL DUCT SYSTEM LEAKAGE

	Duct systems serving more than 1,000 ft² of conditioned floor area		Duct systems serving 1,000 ft² or less of conditioned floor area
	cfm/100 ft²(LPM/9.29 m²)		cfm (LPM)
	Number of ducted returns[a]		
	<3	≥3	Any
Space conditioning equipment is not installed[b,c]	3 (85)	4 (113)	30 (850)
All components of the *duct system* are installed[c]	4 (113)	6 (170)	40 (1133)
Space conditioning equipment is not installed, but the *ductwork* is located entirely in conditioned space[c,d]	6 (170)	8 (227)	60 (1699)
All components of the *duct system* are installed and entirely located in *conditoned space*[c]	8 (227)	12 (340)	80 (2265)

a. A ducted return is a duct made of sheet metal or flexible *duct* that connects one or more return grilles to the return-side inlet of the *air-handling unit*. Any other method to convey air from return or transfer grille(s) to the *air-handling unit* does not constitute a ducted return for the purpose of determining maximum total *duct system* leakage allowance.

b. Duct system testing is permitted where space conditioning equipment is not installed, provided the return ductwork is installed, and the measured leakage from the supply and return ductwork is included.

c. For *duct systems* to be considered inside a *conditioned space*, where the *ductwork* is located in ventilated attic spaces or unvented attics with vapor diffusion ports, *duct system* leakage to outside must comply with Item 2.1 of Section R403.3.2.

d. Prior to certificate of occupancy, where the air-handling unit is not verified as being located in *conditioned space*, the total duct system leakage must be re-tested.

R403.3.9 Unit sampling. For *buildings* with eight or more *dwelling units* or *sleeping units* the *duct systems* in the greater of seven or 20 percent of the *dwelling units* or *sleeping units* in the *building* shall be tested, including a top floor unit, a ground floor unit, a middle floor unit, and the unit with the largest conditioned floor area. Where buildings have fewer than eight *dwelling units* or *sleeping units*, the *duct systems* in each unit shall be tested. Where the leakage of a *duct system* is greater than the maximum permitted *duct system* leakage, corrective actions shall be made to the *duct system* and the *duct system* shall be retested until it passes. For each tested *dwelling unit* or *sleeping unit* that has a greater total *duct system* leakage than the maximum permitted *duct system* leakage, an additional three *dwelling units* or *sleeping units*, including the corrected unit, shall be tested.

EC 07-0229

Revise as follows:

R403.4.1 Protection of piping insulation. Piping insulation exposed to weather shall be protected from damage, including that caused by sunlight, moisture, ~~equipment maintenance~~ physical damage and wind. The protection shall provide shielding from solar radiation that can cause degradation of the material and shall be removable no less than 6 feet (1828 mm) from the equipment for maintenance. Adhesive tape shall be prohibited.

EC 07-0230

Revise as follows:

R403.5.1.1 Circulation systems. Heated water circulation systems shall be provided with a circulation pump. ~~The system return pipe shall be a dedicated return pipe or a cold water supply pipe.~~ Gravity and thermos-syphon circulation systems

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shall be prohibited. Controls for *circulating hot water system* pumps shall ~~start the pump based on the identification of a demand for hot water within the occupancy. The controls shall~~ automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is no demand for hot water. The system return pipe shall be a dedicated return pipe or a cold water supply pipe. Where a cold water supply pipe is used as the return pipe, a temperature sensor connected to the controls shall be located on the hot water supply no more than two feet from the connection to the cold water supply pipe. The controls shall limit the temperature of the water entering the cold water piping to not greater than 104°F (40°C).

~~R403.5.2~~R403.5.1.1.1 Demand recirculation water systems. ~~Where installed,~~ *Demand recirculation water systems* shall have controls that ~~comply with both of the following:~~ start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture or sensing the flow of hot or tempered water to a fixture fitting or appliance. The controls shall limit pump operation by:

~~1. The controls shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture or sensing the flow of hot or tempered water to a fixture fitting or appliance.~~

1. Shutting off the pump when the temperature sensor detects one of the following:

1.1 An increase in the water temperature of not more than 10°F (5.6°C) above the initial temperature of the water in the pipe.

~~2.~~ 1.2 The ~~controls shall limit the~~ temperature of the water ~~entering the cold water piping to not greater than~~ in the pipe reaches 104°F (40°C).

2. Limiting pump operation to a maximum of five minutes following activation.

3. Not activating the pump for at least five minutes following shutoff or when the temperature of the water in the pipe exceeds 104°F (40°C).

EC 07-0231

Revise as follows:

~~R403.5.3~~R403.5.2 Hot water pipe insulation ~~(Prescriptive).~~ Insulation for service hot water piping ~~with a thermal resistance, R-value, of not less than R-3~~shall comply with Table R403.5.2 and be applied to the following:

1. Piping 3/4 inch (19.1 mm) and larger in nominal diameter located inside the *conditioned space*.
~~2. Piping serving more than one *dwelling unit*.~~
~~3~~2. Piping located outside the *conditioned space*.
~~4~~3. Piping from the water heater to a distribution manifold.
~~5~~4. Piping located under a floor slab.
~~6~~5. Buried piping.
~~7~~6. Supply and return piping in ~~circulation~~ circulating hot water ~~and recirculation~~ systems ~~other than cold water pipe return demand recirculation systems~~.

Exception: Cold water returns in demand recirculation water systems.

TABLE R403.5.2
MINIMUM PIPE INSULATION THICKNESS

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		MINIMUM PIPE INSULATION THICKNESS (in inches)
	Conductivity Btu × in./(h × ft² × °F)[a]	Mean Rating Temperature, °F	
141-200	0.25-0.29	125	1.0
105-140	0.21-0.28	100	1.0

For SI: 1 inch = 25.4 mm, °C = [(°F) – 32]/1.8.a For insulation outside the stated conductivity range listed in Table R403.5.2, the minimum thickness (T) listed in Table R403.5.2, shall be determined as follows:

$$T=r[(1+t/r)^{K/k}-1]$$

Where:
T = Minimum insulation thickness.

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r = Actual outside radius of pipe.
t = Insulation thickness listed in the table for applicable fluid temperature and pipe size; 1-inch.
K = Conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature (Btu × in/h × ft2 × °F).
k = The upper value of the conductivity range listed in Table R403.5.2 for the applicable fluid temperature.

EC 07-0232

Add new:

[NY] R403.5.4 Demand responsive water heating. All electric storage water heaters with a rated water storage volume of 40 gallons (150L) to 120 gallons (450L) and a nameplate input rating equal to or less than 12kW shall be provided with demand responsive controls in accordance with Table R403.5.4.

Exceptions:

1. Water heaters that are capable of delivering water at a temperature of 180°F (82°C) or greater.

2. Water heaters that comply with Section IV, Part HLW or Section X of the ASME Boiler and Pressure Vessel Code.

3. Water heaters that use 3-phase electric power.

TABLE R403.5.4

DEMAND RESPONSIVE CONTROLS FOR WATER HEATING

Equipment Type	Controls	
	Manufactured Before 7/1/2025	Manufactured On or After 7/1/2025
Electric storage water heaters	AHRI Standard 1430 (I-P) or ANSI/CTA-2045-B Level 1 and also capable of initiating water heating to meet the temperature set point in response to a demand response signal.	AHRI Standard 1430 (I-P)

EC 07-0233

Revise as follows:

R403.6 Mechanical ventilation. The *buildings* and *dwelling units* complying with Section R402.5.1.1 shall be provided with mechanical *ventilation* that complies with the requirements of Section M1505 of the *Residential Code of New York State,* or the *Mechanical Code of New York State* or the *New York City Construction Code*, as applicable, or with other *approved* means of *ventilation*. Outdoor air intakes and exhausts shall have *automatic* or gravity *dampers* that close when the *ventilation* system is not operating.

[NY] R403.6.1 Heat or energy recovery ventilation. *Dwelling units* shall be provided with a heat recovery or energy recovery ventilation system in Climate Zone 6. The system shall be a balanced ventilation system with a sensible recovery efficiency (SRE) of no less than 65 percent at 32°F (0°C) at an airflow greater than or equal to the design airflow. The SRE shall be determined from a listed value or from interpolation of listed values.

EC 07-0234

Revise as follows:

~~**R403.6.1**~~ **R403.6.2** ~~**Whole-house mechanical ventilation system fan efficacy.**~~ **Fan efficacy for whole-house mechanical ventilation systems and outdoor air ventilation systems.** Fans used to provide whole-~~house~~ *dwelling* mechanical *ventilation* shall meet the efficacy requirements of Table ~~R403.6.1~~ R403.6.2 at one or more rating points. Fans shall be tested in accordance with the test procedure referenced by Table R403.6.2 and *listed*. The airflow shall be reported in the product listing or on the label. Fan efficacy shall be reported in the product listing or shall be derived from the input power and airflow values reported in the product listing or on the label. Fan efficacy for fully ducted HRV, ERV, *balanced ventilation system*, and in-line fans shall be determined at a static pressure of not less than 0.2 inch water

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gauge (50 Pa). Fan efficacy for ducted range hoods, bathroom and utility room fans shall be determined at a static pressure of not less than 0.1 inch water gauge (25 Pa).

~~**Exception:** Where an air handler that is integral to tested and *listed* HVAC equipment is used to provide whole house mechanical ventilation, the air handler shall be powered by an electronically commutated motor.~~

TABLE ~~R403.6.1~~ R403.6.2
WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM FAN EFFICACY[a]

~~FAN LOCATION~~ SYSTEM TYPE	AIR FLOW RATE ~~MINIMUM~~ (CFM)	MINIMUM EFFICACY (CFM/WATT)	~~AIR FLOW RATE MAXIMUM (CFM)~~ TEST PROCEDURE
HRV, or ERV	Any	1.2[a] ~~cfm/watt~~	~~Any~~ CAN/CSA 439
Balanced ventilation system without heat or energy recovery	Any	1.2[a]	~~Any~~ ASHRAE 51 (ANSI/AMCA Standard 210)
~~Range hoods~~ Range hood	Any	~~2.8 cfm/watt~~2.8	
In-line supply or exhaust fan	Any	~~2.8~~3.8 ~~cfm/watt~~	
~~Bathroom, utility room~~ Other exhaust fan	~~10~~<90	~~1.4~~2.8 ~~cfm/watt~~	
	≥90 and < 200	~~2.8~~3.5 ~~cfm/watt~~	
	≥200	4.0	
~~Air handler~~ *Air-handling unit* that is integrated to tested and *listed* HVAC equipment	Any	1.2 ~~cfm/watt~~	Outdoor airflow as specified. *Air-handling unit* fan power determined in accordance with the applicable US Department of Energy Code of Federal Regulations DOE10 CFR 430, or other approved test method.

For SI: 1 cfm = 28.3 L/min.

a. ~~When tested in accordance with HVI Standard 916~~ For *balanced ventilation systems*, HRVs, and ERVs, determine the efficacy as the outdoor airflow divided by the total fan power

EC 07-0235

Add new:

[NY] R403.6.3 Testing. Mechanical *ventilation* systems shall be tested and verified to provide the minimum ventilation flow rates required by Section R403.6, in accordance with ANSI/ RESNET/ICC 380. Where required by the *building official*, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *building official*.

Exceptions:

1. Kitchen range hoods that are ducted to the outside with ducts 6-inch (152 mm) diameter or larger, a length of 10ft (3048 mm) or less, and not more than two 90° elbows or equivalent.
2. Where the ventilation system has an integrated diagnostic tool used for airflow measurement and a user interface that communicates the installed airflow rate.
3. Where tested in accordance with Section R403.6.4, testing of each mechanical ventilation system is not required.

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R403.6.4 Unit sampling. For *buildings* with eight or more *dwelling units* or *sleeping units* the mechanical *ventilation* systems in seven, or 20 percent of the *dwelling units* or *sleeping units*, whichever is greater shall be tested., Tested systems shall include a systems in a top floor unit, systems in a ground floor unit, systems in a middle floor unit, and the systems in the *dwelling unit* or *sleeping unit* with the largest *conditioned floor area* . Where *buildings* have fewer than eight *dwelling units* or *sleeping units*, the mechanical *ventilation* systems in each unit shall be tested. Where the *ventilation* flow rate of a mechanical *ventilation* system is less than the minimum permitted rate, corrective actions shall be taken and the system retested until it passes. For each tested *dwelling unit* or *sleeping unit* system with a *ventilation* flow rate lower than the minimum permitted three additional systems, including the corrected system, shall be tested.

R403.6.5 Intermittent exhaust control for bathrooms and toilet rooms. Where an exhaust system serving a bathroom or toilet room is designed for intermittent operation, the exhaust system controls shall include one or more of the following:

1. A timer control with one or more delay setpoints that automatically turns off exhaust fans when the selected setpoint is reached. Not fewer than one delay-off setpoint shall be 30 minutes or less.
2. An *occupant sensor control* with one or more delay setpoints that automatically turns off exhaust fans in accordance with the selected delay setpoint after all occupants have vacated the space. Not fewer than one delay-off setpoint shall be 30 minutes or less.
3. A humidity control with an adjustable setpoint ranging between 50 percent or more and 80 percent or less relative humidity that automatically turns off exhaust fans when the selected setpoint is reached.
4. A contaminant control that responds to a particle or gaseous concentration and automatically turns off exhaust fans when a design setpoint is reached.

Manual-off functionality shall not be used in lieu of the minimum setpoint functionality required by this section.

Exception: Bathroom and toilet room exhaust systems serving as an integral component of an outdoor air *ventilation* system or a whole-house mechanical *ventilation* system.

EC 07-0236

Add new:

[NY] R403.7.1 Electric-resistance space heating. *Dwelling units*, *sleeping units*, and other *occupiable spaces* within the *building* using electric-resistance space heating shall limit the total installed heating capacity of all electric-resistance space heating to no more than 2.0 kW.

EC 07-0237

Add new:

R403.9 Mechanical systems located outside of the *building* thermal envelope. Mechanical systems providing heat outside of the *building thermal envelope* of a *building* shall comply with Sections R403.9.1 through R403.9.4.

R403.9.1 Heating outside a building. Systems installed to provide heat outside a *building* shall be radiant systems. Such heating systems shall be controlled by an occupancy sensing device or a timer switch, so that the system is automatically de-energized when occupants are not present.

R403.9.3 Roof and gutter deicing controls Roof and gutter deicing systems, including but not limited to self-regulating cable, shall include *automatic* controls that are configured to shut off the system when the outdoor temperature is above 40°F (4.4°C) and shall include one of the following:

1. A moisture sensor configured to shut off the system in the absence of moisture, or
2. A daylight sensor or other means configured to shut off the system between sunset and sunrise.

R403.9.4 Freeze protection system controls Freeze protection systems, such as heat tracing of outdoor piping and heat exchangers, including self-regulating heat tracing, shall include *automatic* controls configured to shut off the systems when outdoor air temperatures are above 40°F (4.8°C) or when the conditions of the protected fluid will prevent freezing.

EC 07-0086

Revise as follows:

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[NY] R403.10.3 Covers. Outdoor heated pools and outdoor permanent spas shall be provided with a vapor-retardant cover or other *approved* vapor-retardant means. Outdoor heated pools and outdoor heated permanent spas heated to more than 90 degrees F (32 degrees C) shall have a pool cover with a minimum insulation value of R-12.

Exception: Where more than ~~60~~ 75 percent of the energy for heating, computed over an operation season of not fewer than 3 calendar months, is from a heat pump ~~site recovered energy~~ or ~~solar energy source~~ an on-site renewable energy system, covers or other vapor-retardant means shall not be required.

EC 07-0238

Add new:

[NY] R403.13 Gas fireplaces. Gas fireplace systems shall not be equipped with a continuous pilot and shall be equipped with an on-demand pilot, intermittent ignition, or interrupted ignition, as defined by ANSI Z21.20.

Exception: Gas-fired appliances using pilots within a *listed* combustion safety device.

R403.13.1 Gas fireplace efficiency. Vented gas fireplace heaters shall have a fireplace efficiency (FE) rating not less than 50 percent as determined in accordance with CSA P.4.1, and shall be *listed* and *labeled* in accordance with CSA/ANSI Z21.88. Vented gas fireplaces (decorative appliances) shall be listed and labeled in accordance with CSA/ANSI Z21.50.

EC 07-0239

Revise as follows:

SECTION R404
ELECTRICAL POWER, ~~AND~~ LIGHTING, AND RENEWABLE ENERGY SYSTEMS

R404.1 Lighting equipment ~~(Mandatory)~~. ~~Not less than 90 percent of the~~ All permanently installed ~~lighting fixtures,~~ luminaires shall be capable of operation with an efficacy of not less than 45 lumens per watt or shall contain ~~only high-efficacy lighting sources~~ lamps capable of operation at 65 lumens per watt or greater.

Exceptions:
1. Kitchen appliance lighting.
2. Antimicrobial lighting used for the sole purpose of disinfect.
3. General service lamps complying with DOE 10 CFR 430.32.
4. Luminaires with a rated electric input of not greater than 3.0 watts.

EC 07-0240

Add new:

R404.1.1 Exterior lighting. Connected exterior lighting for Group R-2, R-3, and R-4 residential buildings shall comply with Sections R404.1.2 through R404.1.5.

Exceptions:
1. Detached one- and two- family dwellings.
2. Townhouses.
3. Group R-3 buildings that do not contain more than 2 dwelling units.
4. Solar-powered lamps not connected to any electrical service.
5. Luminaires controlled by a motion sensor.
6. Lamps and luminaires that comply with Section R404.1.

R404.1.2 Exterior lighting power requirements. The total exterior connected lighting power shall be not greater than the exterior lighting power allowance calculated in accordance with Section R404.1.3. The total exterior connected lighting power shall be the total maximum rated wattage of all lighting that is powered through the energy service for the *building*.

Exceptions: Lighting used for the following applications shall not be included.
1. Lighting *approved* for safety reasons.

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2. Emergency lighting that is automatically off during normal operations
3. Exit signs.
4. Specialized signal, directional and marker lighting associated with transportation.
5. Lighting for athletic playing areas
6. Temporary lighting.
7. Lighting used to highlight features of art, public monuments and the national flag
8. Lighting for water features and swimming pools.
9. Lighting controlled from within *sleeping units* and *dwelling units*.
10. Lighting of the exterior means of egress as required by the *Building Code of New York State.*

R404.1.3 Exterior lighting power allowance. The total area or length of each area type multiplied by the value for the area type in Table R404.1.3 shall be the lighting power (watts) allowed for each area type. For area types not listed, the area type that most closely represents the proposed use of the area shall be selected. The total exterior lighting power allowance (watts) shall be the sum of the base site allowance plus the watts from each area type.

TABLE R404.1.3

LIGHTING POWER ALLOWANCES FOR BUILDING EXTERIORS

Base site allowance	280 watts
Uncovered parking areas and drives	0.026 W/ft^2
Building Grounds	
Walkways and ramps	0.50 W/linear foot
Plaza areas	0.49 W/ft^2
Dining areas	0.273 W/ft^2
Stairways	Exempt
Pedestrian tunnels	0.110 W/ft^2
Landscaping	0.025 W/ft^2
Building Entrances and Exits	
Pedestrian and vehicular entrances and exits	9.8 W/linear foot of opening
Entry canopies	0.126 W/ft^2

For SI: 1 watt per square foot = 10.76 w/m2, 1 foot = 304.8 mm.

R404.1.4 Additional exterior lighting power. Additional exterior lighting power allowance shall be available for the building facades at 0.075 W/ft2 (0.807 w/m2) of gross above-grade wall area. This additional power allowances shall be used only for the luminaires serving the facade and shall not be used to increase any other lighting power allowance.

EC 07-0241

Revise as follows:

~~**R404.1.1**~~ **R404.1.5** ~~**Fuel gas**~~ **Gas** ~~**Lighting**~~ **lighting equipment** ~~**(Mandatory).**~~ ~~Fuel gas~~ Gas-fired lighting ~~systems~~ appliances shall not ~~have~~ be equipped with ~~continuously burning~~ a *continuous pilot* ~~lights~~ and shall be equipped with an *on-demand pilot, intermittent ignition*, or *interrupted ignition* as defined by ANSI Z21.20.

EC 07-0242

Add new:

R404.2 Interior lighting controls. All permanently installed luminaries shall be controlled as required in Sections R404.2.1 and R404.2.2.

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Exception: Lighting controls shall not be required for safety or security lighting.

R404.2.1 Habitable spaces. All permanently installed luminaires in habitable spaces shall be controlled with a *manual dimmer* or with an *automatic* shut-off control that automatically turns off lights within 20 minutes after all occupants have left the space and shall incorporate a *manual* control to allow occupants to turn the lights on or off.

R404.2.2 Specific locations. All permanently installed luminaires in garages, unfinished basements, laundry rooms, and utility rooms shall be controlled by an *automatic shut-off control* that automatically turns off lights within 20 minutes after all occupants have left the space and shall incorporate a *manual* control to allow occupants to turn the lights on or off.

R404.3 Exterior lighting controls. Exterior lighting controls shall comply with Section R404.3.1.

R404.3.1 Controls for individual dwelling units. Where the total permanently installed exterior lighting power is greater than 30 watts, the permanently installed exterior lighting shall comply with the following:

1. Lighting shall be controlled by a manual on and off switch which permits automatic shut-off actions.
2. Lighting shall be automatically shut off when daylight is present and satisfies the lighting needs.
3. Controls that override automatic shut-off actions shall not be allowed unless the override automatically returns automatic control to its normal operation within 24 hours.

EC 07-0243

Add new:

[NY] R404.4 Renewable energy certificate (REC) documentation. Where renewable energy generation is used to comply with this code, a signed attestation shall be provided to the *building official* by the property owner or owner's authorized agent which demonstrates that where RECs or EACs are associated with that portion of renewable energy used to comply with this code, the owner has entered into a REC or EAC agreement that complies with the applicable provisions of this code, including that RECS or EACs shall be retained, or retired, on behalf of the property owner.

EC 07-0244

Add new:

[NY] R404.5 Electric readiness. Where required by 19 NYCRR Part 1240, water heaters, household clothes dryers and cooking appliances that use *fuel gas* or *liquid fuel* shall comply with Section E3707 of the *Residential Code of New York State*, or Section 2703 of the *Building Code of New York State*, as applicable.

Exceptions: Owner-occupied one-family *dwellings* not supplied with electrical power in accordance with Section E3401.2.1 of the *Residential Code of New York State*.

EC 07-0087

Add new:

[NY] R404.7 Dwelling electrical meter. Each dwelling unit located in a Group R-2 building shall have a separate electrical meter.

SECTION R405 SIMULATED BUILDING PERFORMANCE

EC 07-0247

Revise as follows:

[NY] R405.1 Scope. This section establishes criteria for compliance using ~~simulated energy~~ *simulated building performance analysis*. Such analysis shall include heating, cooling, mechanical *ventilation* and *service water heating* energy only. Such analysis shall be limited to *dwelling units* or *sleeping units*. *Common areas* shall comply with Sections R402 through R404.

[NY] R405.2 ~~Mandatory requirements~~ Simulated building performance-based compliance. Compliance ~~with this section~~ based on *simulated building performance* requires that ~~the mandatory provisions identified in Section R401.2 be~~

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~~met. Supply and return ducts not completely inside the *building thermal envelope* shall be insulated to an *R-value* of not less than R-6.~~ a building comply with the following:

1. The requirements of the sections indicated within Table R405.2.
2. The proposed total building thermal envelope thermal conductance TC shall be less than or equal to the required total *building thermal envelope* thermal conductance TC using the prescriptive U-factors and F-factors from Table R402.1.2 multiplied by 1.15 in accordance with Equation 4-2 and Section R402.1.5.

For Climate Zones 4-6:$TC_{proposed\ design} \leq 1.15 \times TC_{Prescriptive\ reference\ design}$

3. For each *dwelling unit* with one or more fuel burning appliance for space heating or water heating, the annual *energy cost* of the *dwelling unit* shall be less than or equal to 80 percent of the annual energy cost of the standard reference design. For all other *dwelling units*, the annual *energy cost* of the *proposed design* shall be less than or equal to 85 percent of the annual *energy cost* of the *standard reference design* .For each dwelling unit with greater than 5,000 square feet (465 m2) of *living space* located above grade plane, the annual energy cost of the *dwelling unit* shall be reduced by an additional 5 percent of annual energy cost of the standard reference design. Energy prices shall be taken from an *approved* source, such as the Department of Energy, Energy Information Administration's State Energy Data System Prices and Expenditures reports. *Building officials* shall be permitted to require time-of-use pricing in energy cost calculations.

Exceptions:

1. 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 multipliers for electricity shall be-2.51. The source energy multipliers shall be 1.09 for natural gas, 1.15 for propane, 1.19 for fuel oil, and 1.30 for imported liquified natural gas.
2. The energy use based on site energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost.

[NY] TABLE R405.2
REQUIREMENTS FOR SIMULATED BUILDING PERFORMANCE

SECTION[a]	TITLE
General	
R401.2.5	Additional energy efficiency
R401.3	Certificate
Building Thermal Envelope	
SECTION[a]	**TITLE**
R402.1.1	Vapor retarder
R402.2.3	Attic knee or pony wall
R402.2.4	Eave baffle
R402.2.5.1	Access hatches and door insulation installation and retention
R402.2.10	Slab-on-grade floors
R402.2.11	Crawl space walls
R402.5.1.1	Installation
R402.5.1.2	Air leakage testing
R402.5.1.3	Maximum air leakage rate
R402.5.2	Fireplaces
R402.5.3	Fenestration air leakage
R402.1.6	Room containing fuel burning appliances

DRAFT

R402.5.4	Recessed lighting
R402.5.5	Air-sealed electrical and communication outlet boxes
R402.6	Maximum fenestration U-factor and SHGC
Mechanical	
R403.1	Controls
R403.2	Hot water boiler temperature reset
R403.3	Ducts
R403.4	Mechanical system piping insulation
R403.5	Service hot water system
R403.6	Mechanical ventilation
R403.7, except Section R403.7.1	Equipment sizing and efficiency rating
R403.8	Systems serving multiple dwelling units
R403.9.2	Snow melt and ice system controls
R403.10	Energy consumption of pools and spas
R403.11	Portable spas
R403.12	Residential pools and permanent residential spas
R403.13	Gas fireplaces
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
R404.5	Electric readiness
R404.8	Dwelling electrical meter

a. Reference to a code section includes all the relative subsections except as indicated in the table.

Delete:

~~**R405.3 Performance-based compliance.** Compliance based on simulated energy performance requires that a proposed residence (*proposed* design) be shown to have an annual energy cost that is less than or equal to the annual *energy cost* of the *standard reference design*. Energy prices shall be taken from a source *approved* by the *building official*, such as the Department of Energy, Energy Information Administration's State Energy Data System Prices and Expenditures reports. *Building officials* shall be permitted to require time-of-use pricing in *energy cost* calculations.~~

~~**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 3.16. The source energy multiplier for fuels other than electricity shall be 1.1.~~

EC 07-0248

Revise as follows:

~~**R405.4**~~ **R405.3 Compliance Documentation.** ~~Documentation of the software used for the performance design and the parameters for the building shall be in accordance with Sections R405.4.1 through R405.4.3.~~ The following compliance reports, which document that the performance of the *proposed design* and the performance of the as-built *dwelling unit* comply with the requirements of Section R405, shall be submitted to the *building official*.

DRAFT

1. A compliance report, in accordance with Section R405.5.4.1, shall be submitted with the application for the building permit.
2. A compliance report, in accordance with Section R405.5.4.2 shall be submitted before a *certificate of occupancy* is issued.

Delete:

~~**R405.4.3 Additional documentation.** The *building official* shall be permitted to require the following documents:~~

1. ~~Documentation of the building component characteristics of the *standard reference design*.~~
2. ~~A certification signed by the builder providing the building component characteristics of the *proposed design* as given in Table R405.5.2(1).~~
3. ~~Documentation of the actual values used in the software calculations for the *proposed design*.~~
3. ~~Documentation of the actual values used in the software calculations for the *proposed design*.~~

EC 07-0249

Revise as follows:

~~**R405.5.1 General.**~~ **R405.4 Calculation procedure.** Performance calculations shall be in accordance with Sections R405.5.1 R405.4.1, and R405.5.2 R405.4.2, and R405.4.3. Except as specified by this section, the standard reference design and proposed design shall be configured and analyzed using identical methods and techniques.

~~**R405.5 Calculation Procedure.**~~ **R405.4.1** General. Calculation~~s~~ procedures used to comply with Section R405 ~~of the performance design~~ shall use an *approved* software tool, ~~be~~ in accordance with Section~~s~~ ~~R405.5.1 and R405.5.2~~ R405.5, capable of calculating the annual energy consumption of all *building* elements that differ between the *standard reference design* and the *proposed design*.

~~**R405.5.2**~~ **R405.4.2 Residence specifications.** The *standard reference design*, ~~and~~ *proposed design*, and as-built *dwelling unit* shall be configured and analyzed as specified by Table ~~R405.5.2(1)~~R405.4.2(1). Table ~~R405.5.2(1)~~R405.4.2(1) shall include, by reference, all notes contained in Table ~~R402.1.2~~R402.1.2. Proposed *U*-factors and slab-on-grade *F*-factors shall be taken from Appendix RF, ANSI/ASHRAE/IES Standard 90.1 Appendix A or determined using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials.

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[NY] TABLE ~~R405.5.2(1)~~ R405.4.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	Type: mass, where the proposed wall is a mass wall; otherwise, wood frame.	As proposed
	Gross area: same as proposed.	As proposed
	U-factor: as specified in Table R402.1.4.	As proposed
	Solar ~~absorptance~~ reflectance = ~~0.75~~0.25.	As proposed
	Emittance = 0.90.	As proposed
Basement and crawl space walls	Type: same as proposed.	As proposed
	Gross area: same as proposed.	As proposed
	U-factor: as specified in Table R402.1.4, with the insulation layer on the interior side of the walls.	As proposed
Above-grade floors	Type: wood frame.	As proposed
	Gross area: same as proposed.	As proposed
	U-factor: as specified in Table R402.1.4.	As proposed
Ceilings	Type: wood frame.	As proposed
	Gross area: same as proposed.	As proposed
	U-factor: as specified in Table R402.1.4.	As proposed
Roofs	Type: composition shingle on wood sheathing.	As proposed
	Gross area: same as proposed.	As proposed
	Solar ~~absorptance~~ reflectance = ~~0.75~~0.25.	As proposed
	Emittance = 0.90.	As proposed
Attics	Type: vented with an aperture of 1 ft^2 per 300 ft^2 of ceiling area.	As proposed
Foundations	Type: same as proposed.	As proposed
	Foundation wall ~~area~~ extention above and below grade: same as proposed ~~and soil~~ Soil characteristics: same as proposed.	As proposed
	Foundation wall *U*-factor and slab-on-grade *F*-factor: as specified in Table R402.1.2	
Opaque doors	Area: 40 ft^2.	As proposed
	Orientation: North.	As proposed
	U-factor: same as fenestration as specified Table R402.1.4.	As proposed
Vertical fenestration other than opaque doors	Total area[h] = (a) The proposed glazing area, where the proposed glazing area is less than 15 percent of the *conditioned floor area* (b) 15 percent of the *conditioned floor area*, where the proposed glazing area is 15 percent or more of the *conditioned floor area.*	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).	As proposed
	U-factor: as specified in Table R402.1.4.	As proposed

DRAFT

	SHGC: as specified in Table R402.1.2 except for *climate zones* without an SHGC requirement, the SHGC shall be equal to 0.40.	As proposed
	Interior shade fraction: 0.92-(0.21 × SHGC for the *standard reference design*).	Interior shade fraction: 0.92-(0.21 × SHGC as proposed)
	External shading: none.	As proposed
Skylights	None.	As proposed
Thermally isolated sunrooms	None.	As proposed
Air ~~exchange~~ leakage rate	~~The~~ For detached one-family dwellings, the air leakage rate at a pressure of 0.2 inch ~~w.g.~~ water guage~~.~~ (50 Pa) shall be as follows: ~~Climate Zones 1 and 2: 5.0 air changes per hour.~~ *Climate Zones* ~~3 through 8~~4 and 5: 3.0 air changes per hour. *Climate Zone* 6: 2.5 air changes per hour. ~~The mechanical *ventilation* rate shall be in addition to the air leakage rate and shall be the same as in the *proposed design*, but not greater than~~ ~~$0.03 \times CFA + 7.5 \times (N_{br} + 1)$~~ ~~where:~~ ~~*CFA = conditioned floor area*, ft^2.~~ ~~N_{br} = number of bedrooms.~~ ~~Energy recovery shall not be assumed for mechanical *ventilation*.~~ For detached one-family dwellings that are 1,500 ft^2 (139.4 m2) or smaller and attached *dwelling units* or *sleeping units*, the *air leakage* rate at a pressure of 0.2 inch water gauge (50 Pa) shall be 0.27 cfm/ft^2 of the *testing unit enclosure area*.	The measured air ~~exchange~~ leakage rate.[a] ~~The mechanical ventilation rate[b] shall be in addition to the air leakage rate and shall be as proposed~~
Mechanical ventilation rate	~~Where mechanical *ventilation* is not specified in the *proposed design*: None~~ ~~Where mechanical *ventilation* is specified in the *proposed design*, the annual vent fan energy use, in units of kWh/yr, shall equal:~~ ~~$(1/e_f) \times [0.0876 \times CFA + 65.7 \times (N_{br} + 1)]$~~ ~~where:~~ ~~$e_f$ = the minimum exhaust fan efficacy, as specified in Table R403.6.1, corresponding to a flow rate of $0.03 \times CFA + 7.5 \times (N_{br}+1)$~~ ~~CFA = *conditioned floor area*, ft^2.~~ ~~N_{br} = number of bedrooms.~~ The mechanical *ventilation* rate shall be in addition to the air leakage rate and shall be the same as in the *proposed design*, but not greater than B x M, where: B = $0.03 \times CFA + 7.5 \times (N_{br} + 1)$, cfm. M = 1.0 where the measured air leakage rate is ≥ 3.0 air changes per hour at 50 Pascals, and otherwise, M = minimum (1.7, Q/B) Q = the proposed mechanical *ventilation* rate, cfm. *CFA = conditioned floor area*, ft^2. N_{br} = number of bedrooms.	~~As proposed~~. The measured mechanical *ventilation* rate[b], Q, shall be in addition to the measured air leakage rate.
Mechanical ventilation fan energy	The *mechanical ventilation* system type shall be the same as in the *proposed design*. Heat recovery or energy recovery shall be modeled for *mechanical ventilation* where required by Section R403.6.1. Heat recovery or energy recovery shall not be modeled for *mechanical ventilation* where not required by Section R403.6.1. Where *mechanical ventilation* is not specified in the *proposed design*: None	As proposed

DRAFT

	Where mechanical *ventilation* is specified in the *proposed design*, the annual vent fan energy use, in units of kWh/yr, shall equal: $(8.76 \times B \times M)/e_f$ where: B and M are determined in accordance with the "mechanical ventilation rate" row of this table. e_f = the minimum fan efficacy, as specified in Table R403.6.2, corresponding to the system type at a flow rate of B x M	
Internal gains	IGain, in units of Btu/day per *dwelling unit*, shall equal: $17{,}900 + 23.8 \times CFA + 4{,}104 \times Nbr$ where: CFA = *conditioned floor area*, ft^2. N_{br} = number of bedrooms.	Same as *standard reference design*.
Internal mass	Internal mass for furniture and contents: 8 pounds per square foot of floor area.	Same as *standard reference design*, plus any additional mass specifically designed as a thermal storage element[c] but not integral to the *building thermal envelope* or structure.
Structural mass	For masonry floor slabs: 80 percent of floor area covered by R-2 carpet and pad, and 20 percent of floor directly exposed to room air.	As proposed
	For masonry basement walls: as proposed, but with insulation as specified in Table R402.1.4, located on the interior side of the walls.	As proposed
	For other walls, ceilings, floors, and interior walls: wood frame construction.	As proposed
Heating systems[d, e, j, k]	~~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 the IECC – Commercial Provisions.~~ ~~Capacity: sized in accordance with Section R403.7.~~	~~As proposed~~
	Fuel Type/Capacity: Same as *proposed design*	As proposed
	Product class: Same as *proposed design*	As proposed
	Efficiencies:	As proposed
	Heat pump: Complying with 10 CFR §430.32	As proposed
	Fuel gas and *liquid fuel* furnaces: Complying with 10 CFR §430.32	As proposed
	Fuel gas and *liquid fuel* boilers: Complying with 10 CFR §430.32	As proposed
Cooling systems[d, f, k]	~~As proposed. Capacity: sized in accordance with Section R403.7.~~	~~As proposed~~
	Fuel Type: Electric Capacity: Same as *proposed design*	As proposed
	Efficiencies: Complying with 10 CFR §430.32	As proposed
Service water heating[d, ~~e, f,~~ g, k]	~~As proposed.~~ ~~Use: same as *proposed design.*~~ Use, in units of gal/day = $25.5+(8.5\times N_{br})$ where: N_{br} = number of bedrooms.	As proposed Use, in units of gal/day = ~~30~~25.5 + (~~10~~8.5 × N_{br}) × (1-*HWDS*

DRAFT

<table>
<tr><td></td><td></td><td>where:
N_{br} = number of bedrooms.

HWDS = factor for the compactness of the hot water distribution system.

<table><tr><th colspan="2">Compactness ratio[i] factor</th><th>HWDS</th></tr><tr><td>1 story</td><td>2 or more stories</td><td></td></tr><tr><td>> 60%</td><td>> 30%</td><td>0</td></tr><tr><td>> 30% to ≤ 60%</td><td>> 15% to ≤ 30%</td><td>0.05</td></tr><tr><td>> 15% to ≤ 30%</td><td>> 7.5% to ≤ 15%</td><td>0.10</td></tr><tr><td>< 15%</td><td>< 7.5%</td><td>0.15</td></tr></table></td></tr>
<tr><td></td><td>Fuel Type: Same as proposed design</td><td>As proposed</td></tr>
<tr><td></td><td>Rated Storage Volume: Same as proposed design</td><td>As proposed</td></tr>
<tr><td></td><td>Draw Pattern: Same as proposed design</td><td>As proposed</td></tr>
<tr><td></td><td>Efficiencies: Uniform Energy Factor complying with 10 CFR §430.32</td><td>As proposed</td></tr>
<tr><td></td><td>Tank Temperature: 120° F (48.9° C)</td><td>As proposed</td></tr>
<tr><td>Thermal distribution systems</td><td>Duct location: ~~same as proposed design.~~

<table><tr><td>Foundation Type</td><td>Slab on grade</td><td>Unconditioned crawl space</td><td>Basement or conditioned crawl space</td></tr><tr><td>Duct location (supply and return)</td><td>One-story building:
100% in unconditioned attic
All other:
75% in unconditioned attic and 25% inside conditioned space</td><td>One-story building:
100% in unconditioned crawlspace
All other:
75% in unconditioned crawlspace and 25% inside conditioned space</td><td>50% inside conditioned space 50% unconditioned attic</td></tr></table>
Duct insulation: in accordance with Section R403.3.1.</td><td>Duct location: as proposed.</td></tr>
<tr><td></td><td>~~Duct insulation: in accordance with Section R403.3.1.~~ Duct system leakage to outside:

For duct systems serving > 1,000ft2 of conditioned floor area, the duct leakage to outside rate shall be 4 cfm (113.3 L/min) per 100 ft2 (9.29 m2) of conditioned floor area.

For duct systems serving ≤ 1,000ft2 of conditioned floor area, the duct leakage to outside rate shall be 40 cfm (1132.7 L/min).</td><td>Duct System Leakage to Outside: The measure total duct system leakage rate shall be entered into the software as the duct system leakage to outside rate.

Exceptions:

1. Where duct system leakage to outside is tested in accordance ANSI/RESNET/ICC 380 or ASTM E1554, the measured value shall be permitted to be entered.

2. Where total duct system leakage is measured without the space conditioning equipment installed,</td></tr>
</table>

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		the simulation value shall be 4 cfm (113.3 L/min) per 100 ft^2 (9.29 m2) of conditioned floor area.
	~~A~~ *Distribution System Efficiency* (DSE): For hydronic systems and ductless systems a thermal *distribution system efficiency* (DSE) of 0.88 shall be applied to both the heating and cooling system efficiencies ~~for all systems other than tested *duct systems*.~~ ~~**Exception:** For nonducted heating and cooling systems that do not have a fan, the *standard reference design* thermal distribution system efficiency (DSE) shall be 1.~~ ~~For tested *duct systems*, the leakage rate shall be 4 cfm (113.3 L/min) per 100 ft^2 (9.29 m^2) of *conditioned floor area* at a pressure of differential of 0.1 inch w.g. (25 Pa).~~	~~As tested or, where not tested,~~ Distribution System Efficiency (DSE): For hydronic systems and ductless systems, DSE shall be as specified in Table R405.5.2(2)
	Type: Manual, cooling temperature setpoint = 75°F; heating temperature setpoint = 72°F.	
Thermostat	Where a mechanical ventilation system with latent heat recovery is not specified in the *proposed design:* None. Where the *proposed design* utilizes a mechanical ventilation system with latent heat recovery: Dehumidistat type: manual, setpoint = 60% relative humidity. Dehumidifier: whole-house with integrated energy factor = 1.77 liters/kWh.	Same as *standard reference design*.
Dehumidistat		Same as standard reference design.

For SI: 1 square foot = 0.93 m^2, 1 British thermal unit = 1055 J, 1 pound per square foot = 4.88 kg/m^2, 1 gallon (US) = 3.785 L, °C = (°F - 32)/1.8, 1 degree = 0.79 rad.

a. ~~Where required by the *building official*, testing shall be conducted by an approved party.~~ Hourly calculations as specified in the ASHRAE *Handbook of Fundamentals*, or the equivalent, shall be used to determine the energy loads resulting from *infiltration*.

b. The combined air exchange rate for *infiltration* and mechanical *ventilation* shall be determined in accordance with Equation ~~43~~40 of ~~2001~~2021 ASHRAE *Handbook of Fundamentals*, ~~page 26.24~~ and the "Whole-house *Ventilation*" provisions of ~~2001~~2021 ASHRAE *Handbook of Fundamentals*, ~~page 26.19~~ for intermittent mechanical *ventilation*.

c. Thermal storage element shall mean a component that is not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element shall be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or shall be connected to such a room with pipes or ducts that allow the element to be actively charged.

d. For a *proposed design* with multiple heating, cooling or water heating systems using different fuel types, the applicable *standard reference design* system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.

e. For a *proposed design* without a proposed heating system, a heating system having the prevailing federal minimum efficiency shall be assumed for both the *standard reference design* and *proposed design*.

f. For a *proposed design* ~~home~~ without a proposed cooling system, an electric air conditioner having the prevailing federal minimum efficiency shall be assumed for both the *standard reference design* and the *proposed design*.

g. For a *proposed design* ~~with a nonstorage-type water heater, a 40-gallon storage-type water heater having the prevailing federal minimum energy factor for the same fuel as the predominant heating fuel type shall be assumed. For a *proposed design* without a proposed water heater, a 40-gallon storage-type water heater having the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed~~ without a proposed water heater, the following assumptions shall be made for both the *proposed design* and *standard reference design*. For a *proposed design* with a heat pump water heater, the following assumptions shall be made for the *standard reference design*, except the fuel type shall be electric.
Fuel Type: Same as the predominant heating fuel type
Rated Storage Volume: 40 Gallons
Draw Pattern: Medium

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Efficiency: Uniform Energy Factor complying with 10 CFR §430.32

h. For residences with conditioned basements, R-2 and R-4 residences, and for ~~*townhouses*~~ townhouse units, the following formula shall be used to determine glazing area:

$$AF = A_s \times FA \times F$$

where:

AF = Total glazing area.

A_s = *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.

i. The factor for the compactness of the hot water distribution system is the ratio of the area of the rectangle that bounds the source of hot water and the fixtures that it serves (the "hot water rectangle") divided by the floor area of the dwelling.

1. Sources of hot water include water heaters, or in multifamily buildings with central water heating systems, circulation loops or electric heat traced pipes.
2. The hot water rectangle shall include the source of hot water and the points of termination of all hot water fixture supply piping.
3. The hot water rectangle shall be shown on the floor plans and the area shall be computed to the nearest square foot.
4. Where there is more than one water heater and each water heater serves different plumbing fixtures and appliances, it is permissible to establish a separate hot water rectangle for each hot water distribution system and add the area of these rectangles together to determine the compactness ratio.
5. The basement or attic shall be counted as a story when it contains the water heater.
6. Compliance shall be demonstrated by providing a drawing on the plans that shows the hot water distribution system rectangle(s), comparing the area of the rectangle(s) to the area of the dwelling and identifying the appropriate compactness ratio and *HWDS* factor.

j. For a *proposed design* with electric resistance heating, a split system heat pump complying with 10 CFR §430.32 (2021) shall be assumed modeled in the standard reference design.

k. For heating systems, cooling systems, or water heating systems not included in Table R405.4.2(1), the standard reference design shall be the same as *proposed design*.

l. Only sections of *ductwork* that are installed in accordance with Section R403.3.4(1) and R403.3.4(2), are assumed to be located completely inside *conditioned space*. All other sections of *ductwork* are not assumed to be located completely inside *conditioned space*.

m. Sections of *ductwork* installed in accordance with Section R403.3.5.1, are assumed to have an effective duct insulation R-value of R-25.

TABLE ~~R405.5.2(2)~~R405.4.2(2)

DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS[a]

DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION	FORCED AIR SYSTEMS	HYDRONIC SYSTEMS[b]
Distribution system components located in unconditioned space	~~—~~NA	0.95
~~Untested distribution systems~~ Distribution system components entirely located in conditioned space[c]	~~0.88~~NA	1
"Ductless" systems[d]	1	~~—~~NA

For SI: 1 cubic foot per minute = 0.47 L/s, 1 square foot = 0.093 m^2, 1 pound per square inch = 6895 Pa, 1 inch water gauge = 1250 Pa.

a. Default values in this table are for untested distribution systems, which must still ~~meet minimum requirements for *duct system* insulation~~ comply with Section R403.

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b. Hydronic systems ~~shall mean~~ means those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed-loop piping and that do not depend on ducted, forced airflow to maintain space temperatures.
c. Entire system in conditioned space ~~shall mean~~means that no component of the distribution system, ~~including the air handler unit,~~ is located outside of the *conditioned space.*
d. Ductless systems ~~shall be~~ are allowed to have forced airflow across a coil but ~~shall~~ must not have ~~any~~ ducted airflow external to the ~~manufacturer's air handler enclosure~~ *space conditioning equipment*.

EC 07-0250

Revise as follows:

~~**R405.6 Calculation software tools.** Calculation software, where used, shall be in accordance with Sections R405.6.1 through R405.6.3~~

~~**R405.6.2 Specific Approval.**~~ **R405.5 Calculation software tools.** Performance analysis tools meeting the applicable provisions of ~~Section R405~~ Sections R405.5.1 through R405.5.4 shall be permitted to be *approved*. Tools are permitted to be *approved* based on meeting a specified threshold for a jurisdiction. The *building official* shall be permitted to approve such tools for a specified application or limited scope.

~~**R405.6 Calculation software tools.** Calculation software, where used, shall be in accordance with Sections R405.6.1 through R405.6.3.~~

~~**R405.6.1**~~ **R405.5.1 Minimum capabilities.** ~~Calculation procedures used to comply with this section shall be software tools capable of calculating the annual energy consumption of all building elements that differ between the *standard reference design* and the *proposed design* and~~ *Approved* software tools shall include the following capabilities:

1. Computer generation of the *standard reference design* using only the input for the *proposed design.* The calculation procedure shall not allow the user to directly modify the building component characteristics of the *standard reference design.*
2. Calculation of whole ~~building~~ *dwelling unit* (as a single *zone*) sizing for the heating and cooling equipment in the *standard reference design* residence in accordance with Section ~~R403.6~~R403.7.
3. Hourly calculations of building operation for a full calendar year (8760 hours).
4. Calculations that account for ~~the effects~~ hourly variations of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilating and air-conditioning equipment based on climate and equipment sizing.
5. Printed *building official* inspection checklist listing each of the *proposed design* component characteristics from Table R405.5.2(1) determined by the analysis to provide compliance, along with their respective performance ratings such as *R-value*, *U-factor*, SHGC, HSPF2, AFUE, SEER2 and UEF.

EC 07-0251

Revise as follows:

~~**R405.4.1 Compliance software tools.** Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the *building official.*~~

R405.5.2 Testing required by software vendors. Prior to approval, software tools shall be tested by the software vendor in accordance with ANSI/ASHRAE Standard 140 Class II, Tier 1 test procedures. During testing, hidden inputs that are not normally available to the user shall be permitted to avoid introducing source code changes strictly used for testing. Software vendors shall publish, on a publicly available website, the following ANSI/ASHRAE Standard 140 test results, input files, and modeler reports for each tested version of a software tool:

1. Test results demonstrating the software tool was tested in accordance with ANSI/ ASHRAE Standard 140.
2. The modeler report in ANSI/ASHRAE Standard 140, Annex A2, Attachment A2.7.

R405.5.3 Algorithms not tested. Algorithms not tested in accordance with Section R405.5.2 shall be permitted in accordance with ANSI/RESNET/ICC 301. Numerical settings not tested, such as timestep duration and tolerances shall be permitted when they represent a higher resolution than the numerical settings used for testing.

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EC 07-0252

Revise as follows:

~~**R405.4.2**~~ **R405.5.4 Compliance ~~report~~ reports.** ~~Compliance~~ *Approved* software tools shall generate ~~a report that documents that the *proposed design* complies with Section R405.3. A compliance report on the *proposed design* shall be submitted with the application for the *building* permit. Upon completion of the *building*, a compliance report based on the as-built condition of the *building* shall be submitted to the *building official* before a certificate of occupancy is issued. Batch sampling of *buildings* to determine *Energy Code* compliance shall only be allowed for stacked multiple-family units. Compliance~~ compliance reports ~~shall include information~~ in accordance with Sections ~~R405.4.2.1~~ R405.5.4.1 and ~~R405.4.2.2~~ R405.5.4.2. ~~Where the *proposed design* of a *building* could be built on different sites where the cardinal orientation of the building on each site is different, compliance of the *proposed design* for the purposes of the application for the building permit shall be based on the worst-case orientation, worst-case configuration, worst-case *building* air leakage and worst-case duct leakage. Such worst-case parameters shall be used as inputs to the compliance software for *energy analysis*.~~

~~**R405.4.2.1**~~ **R405.5.4.1 Compliance report for permit application.** A compliance report ~~submitted~~ generated for submission with the application for building permit shall include the following:

1. *Building* street address, or other *building site* identification.

~~5.~~ 2. The name of the individual performing the analysis and generating the compliance report.

~~6.~~ 3. The name and version of the compliance software tool.

4. Documentation of all inputs entered into the software used to produce the results for the *standard reference design* and the *proposed design*.

~~2.~~ 5. A certificate ~~statement~~ indicating that the proposed design complies with Section ~~R405.3.~~ R405.2. The certificate shall document the *building* components' energy specifications that are included in the calculation including: component-level insulation R-values or U-factors; *duct system* and *building thermal envelope* air leakage testing assumptions; and the type and rated efficiencies of proposed heating, cooling, mechanical *ventilation* and service water-heating equipment to be installed. If *on-site renewable energy systems* will be installed, the certificate shall report the type and production size of the proposed system.

~~3. An inspection checklist documenting the building component characteristics of the *proposed design* as indicated in Table R405.5.2(1). The inspection checklist shall show results for both the *standard reference design* and the *proposed design* with user inputs to the compliance software to generate the results.~~

~~4.~~ 6.~~A~~ Where a site-specific ~~energy analysis~~ report ~~that is in compliance with Section R405.3.~~ is not generated, the *proposed design* shall be based on the worst-case orientation and configuration of the rated *dwelling unit*.

~~**R405.4.2.2**~~ **R405.5.4.2 Compliance report for certificate of occupancy.** A compliance report ~~submitted for~~ generated for submission prior to obtaining the *certificate of occupancy* shall include the following:

1. *Building* street address, or other *building site* identification.

2. Declaration of the *simulated building performance* path on the title page of the energy report and the title page of the *building plans*.

~~2.~~3. A statement, bearing the name of the individual performing the analysis and generating the report, indicating that the as-built *building* complies with Section ~~R405.3~~ R405.2.

~~5. The name of the individual performing the analysis and generating the report.~~

~~6.~~4. The name and version of the compliance software tool.

~~4.~~5. A site-specific *energy analysis* report that is in compliance with the requirements of Section ~~R405.3~~ R405.4, where all inputs for the *proposed design* have been replaced in the simulation with confirmed energy features of the as-built *dwelling unit*.

~~3.~~6. A final confirmed ~~A~~ certificate indicating ~~that the building passes the performance matrix for code~~ compliance based on inspection, and a statement indicating that the as-built building complies with Section R405.2. The certificate shall report the energy ~~saving~~ features ~~of~~ that were confirmed to be in the *building*~~.~~, including

DRAFT

component level insulation R-values or U-factors; results from any required *duct system* and *building thermal envelope* air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical *ventilation* and service water-heating equipment installed.

~~6.~~7. When *on-site renewable energy* systems have been installed, the certificate shall report the type and production size of the installed system.

SECTION R406 ENERGY RATING INDEX COMPLIANCE ALTERNATIVE

EC 07-0253

Revise as follows:

[NY] R406.1 Scope. This section establishes criteria for compliance using an Energy Rating Index (ERI) analysis. Such analysis shall be limited to *dwelling units* or *sleeping units*. *Common areas* in *residential buildings* shall comply with Sections R402 through R404. *Common areas* in *commercial buildings* shall comply with Sections C402 through C405, and Section C408.

EC 07- 0254

Revise as follows:

R406.2 ERI compliance. Compliance based on the ERI requires that the *rated design* and as-built *dwelling unit* or *sleeping unit* meet all the following:

1. The requirements of the sections indicated within Table R406.2.
2. Maximum ERI values indicated in Table R406.5.

[NY] TABLE R406.2
REQUIREMENTS FOR ENERGY RATING INDEX

SECTION[a]	TITLE
General	
R401.3	Certificate
Building Thermal Envelope	
R402.1.1	Vapor retarder
R402.2.3	Eave baffle
R402.2.5.1	Access hatches and door insulation and retention
R402.2.10	Slab-on-grade floors
R402.2.11	Crawl space walls
R402.5.1.1	Installation
R402.5.1.2	Air leakage testing
R402.5.1.3	Maximum air leakage rate
R402.5.2	Fireplaces
R402.5.3	Fenestration air leakage
R402.1.6	Rooms containing fuel burning appliances
R402.5.4	Recessed lighting
R402.5.5	Air-sealed electrical and communication outlet boxes

DRAFT

R406.3	Building thermal envelope
Mechanical	
R403.1	Controls
R403.2	Hot water boiler temperature reset
R403.3	Duct systems
R403.4	Mechanical system piping insulation
R403.5	Service hot water systems
R403.6	Mechanical ventilation
R403.7, except Section R403.7.1	Equipment sizing and efficiency rating
R403.8	Systems serving multiple dwelling units
R403.9.2	Snow melt and ice system controls
R403.10	Energy consumption of pools and spas
R403.11	Portable spas
R403.12	Residential pools and permanent residential spas
R403.13	Gas fireplaces
Electrical Power and Lighting Systems	
R404.1	Lighting equipment
R404.2	Interior lighting controls
R404.5	Electric readiness
R404.8	Dwelling electrical meter

a. Reference to a code section includes all of the relative subsections except as indicated in the table.

EC 07-0255

Revise as follows:

[NY] R406.3 ~~R406.2 Mandatory requirements.~~ Building thermal envelope. ~~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 proposed total *building thermal envelope* thermal conductance TC shall be ~~greater~~ less than or equal to ~~levels of efficiency and Solar Heat Gain Coefficients in~~ the required total *building thermal envelope* thermal conductance TC using the prescriptive *U*- factors and *F*-factors from Table ~~402.1.1 or 402.1.3 of the 2010 Energy Conservation Code of New York State.~~ R402.1.2 multiplied by 1.15 in accordance with Equation 4-3 and R402.1.5.

For Climate Zones 4-6: $UA_{\text{Proposed design}} \leq 1.15 \times UA_{\text{Prescriptive reference design}}$ **(Equation 4-3)**

~~**Exception:** Supply and return ducts not completely inside the *building thermal envelope* shall be insulated to an *R-value* of not less than R-6.~~

EC 07-0256

Revise as follows:

~~**R406.3**~~ **R406.4 Energy Rating Index.** The Energy Rating Index (ERI) shall be determined in accordance with ANSI/RESNET/ICC 301 ~~except for buildings covered by the Residential Code of New York State, the ERI Reference Design Ventilation rate shall be in accordance with Equation 4-1~~. The mechanical ventilation rates used for the purpose of determining the ERI shall not be construed to establish minimum ventilation requirements for compliance with this code.

DRAFT

~~*Ventilation* rate, CFM = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)]~~ **~~(Equation 4-1)~~**

Energy used to recharge or refuel a vehicle used for transportation on roads that are not on the building site shall not be included in the *ERI reference design* or the *rated design*.

~~**R406.4**~~ **R406.5 ERI-based compliance.** Compliance based on an ERI analysis requires that the *rated design* and each confirmed as-built *dwelling unit* be shown to have an ERI less than or equal to the ~~appropriate~~ applicable value indicated in Table ~~R406.4~~ R406.5 ~~when~~ where compared to the *ERI reference design* as follows:

1. Where on-site renewables are not installed, the maximum ENERGY RATING INDEX NOT INCLUDING OPP applies.
2. Where on-site renewables are installed, the maximum ENERGY RATING INDEX INCLUDING OPP applies.

Exceptions:

1. Where the ERI analysis excludes OPP, the maximum ENERGY RATING INDEX NOT INCLUDING OPP shall be permitted.
2. For *buildings* with twenty or more *dwelling units*, where *approved* by the *building official*, compliance shall be permitted using the Average *Dwelling Unit Energy Rating Index*, as calculated in accordance with ANSI/RESNET/ICC 301.

[NY] TABLE ~~R406.4~~ R406.5
MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX[a] NOT INCLUDING OPP	ENERGY RATING INDEX WITH OPP
4	~~62~~53	40
5	~~61~~54	43
6	~~61~~53	43

~~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 2015 *International Energy Conservation Code*.~~

EC 07- 0257

Revise as follows:

~~**R406.6.1**~~ **R406.7.1 Compliance software tools.** Software tools used for determining ERI shall be ~~A~~ *approved* ~~S~~ software ~~R~~ rating ~~T~~ tools ~~in accordance with~~ as defined by ANSI/RESNET/ICC 301. Software vendors shall publish, on a publicly available website, documentation that the software tool has been validated using the Class II, Tier 1 test procedure in ANSI/ASHRAE Standard 140.

~~**R406.6.2**~~ **R406.7.2 Compliance report.** Compliance software tools shall generate a report that documents that the ERI of the *rated design* and as-built *dwelling unit* complies with Sections R406.2, R406.3, ~~and~~ R406.4, and R406.5. ~~The compliance~~ Compliance documentation shall ~~include the following information:~~ be created for the *proposed design* and shall be submitted with the application for the building permit. Confirmed compliance documents of the as-built *dwelling unit* shall be created and submitted to the *building official* for review before a *certificate of occupancy* is issued. Compliance reports shall include information in accordance with Sections R406.7.2.1 and R406.7.2.2.

R406.7.2.1 Proposed compliance report for permit application. Compliance reports submitted with the application for a building permit shall include the following:

1. Building street address, ~~Address~~ or other *building site* identification. ~~of the *residential building*.~~
2. ~~An inspection checklist documenting the building component characteristics of the *rated design*. The inspection checklist shall show results for both the *ERI reference design* and the *rated design* and shall document all inputs entered by the user necessary to reproduce the results.~~ Declare ERI on title page and building plans.

DRAFT

3. ~~Name~~ The name of the individual performing the analysis and generating ~~completing~~ the compliance report.
4. Name and version of the compliance software tool.
5. Documentation of all inputs entered into the software used to produce the results for the ERI reference design and the *rated design*.
6. A certificate indicating that the proposed design has an ERI less than or equal to the appropriate score indicated in Table R406.5 when compared to the ERI reference design. The certificate shall document the building component energy specifications that are included in the calculation, including: component level insulation *R*-values or *U*-factors; assumed *duct system* and *building thermal envelope* air leakage testing results; and the type and rated efficiencies of proposed heating, cooling, mechanical ventilation, and service water-heating equipment to be installed. If on-site renewable energy systems will be installed, the certificate shall report the type and production size of the proposed system.
7. When a site-specific report is not generated, the proposed design shall be based on the worst-case orientation and configuration of the rated *dwelling unit*.

~~**Exception:** Where an otherwise identical building model is offered in multiple orientations, compliance for any orientation shall be permitted by documenting that the building meets the performance requirements in each of the four (north, east, south and west) cardinal orientations.~~

R406.7.2.2 Confirmed compliance report for a certificate of occupancy. A confirmed compliance report submitted for obtaining the certificate of occupancy shall be made site and address specific and include the following:

1. Building street address or other *building site* identification.
2. Declaration of ERI on title page and on building plans.
3. The name of the individual performing the analysis and generating the report.
4. The name and version of the compliance software tool.
5. Documentation of all inputs entered into the software used to produce the results for the *ERI* reference design and the as-built *dwelling unit*.
6. A final confirmed certificate indicating that the as-built *building* complies with Sections R406.2, R406.4, and R406.5. The certificate shall report the energy features that were confirmed to be in the *building*, including: component-level insulation *R*-values or *U*-factors; results from any required *duct system* and *building thermal envelope* air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation, and service water-heating equipment installed. Where on-site renewable energy systems have been installed on or in the *building*, the certificate shall report the type and production size of the installed system.

R406.7.3 Renewable energy certificate (REC) documentation. Where renewable energy power production is included in the calculation of an ERI, documentation shall comply with Section R404.4.

EC 07- 0245

SECTION R407

~~TROPICAL CLIMATE REGION COMPLIANCE PATH~~

[Reserved]

EC 07- 0258

Add new:

SECTION R408
ADDITIONAL EFFICIENCY REQUIREMENTS

R408.1 Scope. This section provides additional efficiency measures and credits required to comply with Section R401.2.1.

DRAFT

R408.2 Additional energy efficiency credit requirements. *Residential buildings* shall earn not less than ten credits from not less than two measures specified in Table R408.2. Five additional credits shall be earned for *dwelling units* with more than 5,000 ft^2 (465 m2) of *living space* located above *grade plane*. To earn credit as specified in Table R408.2 for the applicable *Climate Zone*, each measure selected for compliance shall comply with the applicable subsections of Section R408. Each *dwelling unit* or *sleeping unit* shall comply with the selected measure to earn credit. Interpolation of credits between measures shall not be permitted.

[NY] TABLE R408.2
CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

Measure Number	Measure Description	Credit Value		
		Climate Zone 4	Climate Zone 5	Climate Zone 6
R408.2.1.1(1)	≥2.5% Reduction in total TC	1	1	1
R408.2.1.1(2)	≥5% reduction in total TC	2	2	2
R408.2.1.1(3)	>7.5% reduction in total TC	2	2	3
R408.2.1.1(4)	>10% reduction in total TC	3	4	4
R408.2.1.1(5)	>15% reduction in total TC	4	5	6
R408.2.1.1(6)	>20% reduction in total TC	5	7	8
R408.2.1.1(7)	>30% reduction in total TC	8	11	12
R408.2.1.2(1)	U-factor and SHGC for vertical fenestration per Table R408.2.1	2	1	1
R408.2.1.4	Reduced air leakage	2	3	NA
R408.2.2(1) [b]	Ground source heat pump	15	15	17
R408.2.2(2) [b]	High Performance Cooling (Option 1)	2	1	1
R408.2.2(3) [b]	High Performance Cooling (Option 2)	2	1	1
R408.2.2(4) [b]	High Performance Gas furnace (Option 1)	5	6	7
R408.2.2(5) [b]	High Performance Gas furnace (Option 2)	4	5	6
R408.2.2(6) [b]	High Performance Gas furnace (Option 3)	NA	NA	NA
R408.2.2(7) [b]	High Performance Gas furnace and cooling (Option 1)	NA	NA	NA
R408.2.2(8) [b]	High Performance Gas furnace and cooling (Option 2)	NA	NA	NA
R408.2.2(9) [b]	High Performance Gas furnace and heat pump (Option 1)	NA [e]	NA	NA
R408.2.2(10) [b]	High Performance Heat pump with electric resistance backup (Option1)	12	NA	NA
R408.2.2(11) [b]	High Performance Gas furnace and cooling (Option 3)	5	6	7
R408.2.2(12) [b]	High Performance Gas furnace and cooling (Option 4)	6	7	8
R408.2.2(13) [b]	High Performance Gas furnace and heat pump (Option 2)	12	11	11

DRAFT

R408.2.2(14) [b]	High Performance Heat pump with electric resistance backup (Option2)	12	12	13
R408.2.3(1)(a) [d]	Gas-fired storage water heaters (Option 1)	5	4	4
R408.2.3(1)(b) [d]	Gas fired storage water heaters (Option 2)	6	5	4
R408.2.3(2)(a) [d]	Gas-fired instantaneous water heaters(Option 1)	6	5	4
R408.2.3(2)(b) [d]	Gas-fired instantaneous water heaters (Option 2)	6	6	5
R408.2.3(3) [d]	Electric water heaters (Option 1)	7	4	3
R408.2.3(4) [d]	Electric water heaters (Option 2)	6	4	3
R408.2.3(5)(a) [d]	Electric water heaters (Option 3)	6	5	4
R408.2.3(5)(b) [d]	Electric water heaters (Option 4)	7	5	5
R408.2.3(6) [d]	Electric water heaters (Option 5)	7	4	3
R408.2.3(7)(a) [d]	Solar hot water heating system (Option 1)	9	5	4
R408.2.3(7)(b) [d]	Solar hot water heating system (Option 2)	6	6	5
R408.2.3(8) [c]	Compact hot water distribution	2	2	2
R408.2.4(1) [c]	Ductless or hydronic thermal distribution	7	10	10
R408.2.4(2) [c]	100% of *duct systems* in *conditioned space*	6	9	9
R408.2.4(3) [c]	≥80% of ductwork inside *conditioned space*	5	7	7
R408.2.4(4) [c]	Reduced total *duct system* leakage	1	1	2
R408.2.5(1) [c]	ERV or HRV installed	0	3	2
R408.2.5(2) [c]	≤2.0 ACH50 with ERV or HRV installed	4	8	5
R408.2.5(3) [c]	≤2.0 ACH50 with a *balanced ventilation system*	0	0	4
R408.2.5(4) [c]	≤1.5 ACH50 with ERV or HRV installed	6	10	9
R408.2.5(5) [c]	≤1.0 ACH50 with ERV or HRV installed	7	12	12
R408.2.6 [a]	Energy efficient appliances	1	1	0
R408.2.7	On-site renewable energy measures	11	9	8
R408.2.8 [c]	Demand responsive thermostat	1	1	1
R408.2.10	Whole home lighting control	0	0	0
R408.2.11	Higher efficacy lighting	0	0	0

a. Where the measure is selected, each dwelling unit, sleeping unit, and *common area* where the measure is applicable must have the measure installed.

b. Where multiple heating or cooling systems are installed, credits shall be determined using a weighted average of the square footage served by each system.

c. Where the measure is selected, each dwelling unit and sleeping unit must comply with the measure.

d. Where the measure is selected, each dwelling unit shall be served by a water heater meeting the applicable requirements. Where multiple service water heating systems are installed, credits shall be determined using a weighted average of the square footage served by each system.

e. 11 credits are available for climate zone 4 where the following measure is used: Gas Furnace and Heat Pump (Option 3): greater than or equal to 95% AFUE fuel gas furnace and 7.8 HSPF2, 15.2 SEER2 and 10.0 EER2 air source heat pump.

R408.2.1 Enhanced building thermal envelope options. The *building thermal envelope* shall comply with one or more of the following:

1. Either Section R408.2.1.1 or R408.2.1.2. Credit shall only be permitted from one measure.
2. Section R408.2.1.3.
3. Section R408.2.1.4.

DRAFT

R408.2.1.1 Enhanced envelope performance. The total *building thermal envelope* thermal conductance TC shall be calculated for the proposed *building* in accordance with Section R402.1.5 and it shall be reduced by not less than the percentage indicated in Table R408.2 in comparison to the reference *building*.

R408.2.1.2 Improved fenestration. The area weighted average U-factor and SHGC of all vertical *fenestration* shall be equal to or less than values specified in Table R408.2.1.2.

[NY] TABLE R408.2.1.2

IMPROVED FENESTRATION

Climate Zone	U-factor	SHGC
4	0.25	0.40
5	0.25	NR
6	0.25	NR

R408.2.1.3 Roof solar reflectance index. *Low slope* roofs in Climate Zones 0 through 2 shall earn credit for Table R408.2 measure numbers R408.2.1.3(1) and R408.2.1.3(2) where the three-year aged solar reflectance index (SRI) is greater than or equal to 75. To earn credit, not less than 95 percent of the roof area shall comply. The combined area of the following portions of roof shall not be greater than 5 percent of the roof area:

1. Portions that include or are covered by the following:
   - 1.1 Photovoltaic systems or components.
   - 1.2 Solar air or water-heating systems or components.
   - 1.3 Vegetative roofs or landscaped roofs.
   - 1.4 Above-roof decks or walkways.
   - 1.5 Skylights.
   - 1.6 HVAC systems and components, and other opaque objects mounted above the roof.
2. Portions shaded during the peak sun angle on the summer solstice by permanent features of the *building*, permanent features of adjacent buildings or natural objects.
3. Portions that are ballasted with a minimum stone ballast of 17 pounds per square foot (74 kg/m2) or 23 psf (117 kg/m2) pavers.

The three-year aged SRI shall be determined in accordance with ASTM E1980 using a convection coefficient of 2.1 Btu/h x ft2 x °F (12 W/m2 x K). Calculation of aged SRI shall be based on three-year aged solar reflectance values tested in accordance with ASTM C1549, ASTM E903, ASTM E1918, or CRRC S100 and three-year aged thermal emittance values tested in accordance with ASTM C1371, ASTM E408, or CRRC S100.

R408.2.1.3.1 Aged solar reflectance Where a tested 3-year aged solar reflectance value is not available, an assigned value shall be determined in accordance with Equation 4-4.

$$R_{aged} = [0.2 + 0.7(R_{initial} - 0.2)] \quad \textbf{(Equation 4-4)}$$

Where:
R_{aged} = The aged solar reflectance
$R_{initial}$ = The initial solar reflectance determined in accordance ASTM C1549, ASTM E903, ASTM E1918, or with CRRC-S100

R408.2.1.4 Reduced air leakage. The *building* shall have a measured air leakage rate no less than 2.0 ACH50 and no greater than 2.5 ACH50 or the *dwelling units* in the *building* shall have an average measured *air leakage* rate no greater than 0.24 cfm/ft^2 [1.2 L/(s x m2)] .

[NY] R408.2.2 More efficient HVAC equipment performance options. Heating and cooling equipment shall meet one of the following measures as applicable for the *climate zone,* where heating and cooling efficiencies are represented by *Annual Fuel Utilization Efficiency (AFUE), Coefficient of Performance (COP), Energy Efficiency Ratio (EER and EER2), Heating Season Performance Factor (HSPF2), and Seasonal Energy Efficiency Ratio (SEER2)*. Where multiple heating or cooling systems are installed serving different *zones*, credits shall be earned based on the weighted average of square footage of the *zone* served by the system.

DRAFT

1. Ground source Heat Pump - Greater than or equal to 16.1 EER and 3.1 COP ground source heat pump.
2. Cooling (Option 1) - Greater than or equal to 15.2 SEER2 and 12.0 EER2 air conditioner.
3. Cooling (Option 2) - Greater than or equal to 16.0 SEER2 and 12.0 EER2 air conditioner.
4. Gas Furnace (Option 1) - Greater than or equal to 97 % AFUE *fuel gas* furnace.
5. Gas Furnace (Option 2) - Greater than or equal to 95% AFUE *fuel gas* furnace.
6. Gas Furnace and Cooling (Option 3) - Greater than or equal to 95% AFUE *fuel gas* furnace and 15.2 SEER2 and 12.0 EER2 air conditioner.
7. Gas Furnace and Cooling (Option 4) - Greater than or equal to 97% AFUE *fuel gas* furnace and 16.0 SEER2 and 12.0 EER2 air conditioner.
8. Gas Furnace and Heat Pump (Option 2) - Greater than or equal to 95% AFUE *fuel gas* furnace and 8.1 HSPF2 and 15.2 SEER2 air source heat pump capable of meeting a capacity ratio ≥ 70% of heating capacity at 5 °F versus rated heating capacity at 47 °F.
9. Heat Pump (Option 2) - Greater than or equal to 8.1 HSPF2 and 15.2 SEER2 air source heat pump capable of meeting a capacity ratio ≥ 70% of heating capacity at 5 °F versus rated heating capacity at 47 °F.

R408.2.2.1 More efficient HVAC equipment for Climate Zone 4. For Climate Zone 4, the following HVAC options shall also apply:

1. Gas Furnace and Heat Pump (Option 3) - Greater than or equal to 95% AFUE fuel gas furnace and 7.8 HSPF2, 15.2 SEER2 and 10.0 EER2 air source heat pump.
2. Heat Pump (Option 1)–Greater than or equal to 7.8 HSPF2, 15.2 SEER2, and 11.7 EER2 air source heat pump.

R408.2.3 Reduced energy use in service water-heating options. For measure numbers R408.2.3 (1) through R408.2.3(7), the installed hot water system shall meet one of the Uniform Energy Factors (UEF) or Solar Uniform Energy Factors (SUEF) in Table R408.2.3. For measure number R408.2.3(8), the hot water distribution system shall comply with R408.2.3.1.

TABLE R408.2.3
SERVICE WATER-HEATING EFFICIENCIES

Measure Number	Water Heater	Size and Draw Pattern	Type	Efficiency
R408.2.3(1)(a)	Gas-fired storage water heaters (option 1)	All storage volumes, all draw patterns		UEF ≥0.81
R408.2.3(1)(b)	Gas-fired storage water heaters (option 2)	≤ 55 gallons, High		UEF ≥0.86
		>55 gallons, Medium or High		UEF ≥0.86
		Rated input capacity > 75,000 Btu/h		UEF ≥0.86 or E_t ≥94%
R408.2.3 (2)(a)	Gas-fired instantaneous water heaters (option 1)	All storage volumes, Medium or High		UEF ≥0.92
R408.2.3(2)(b)	Gas-fired instantaneous water heaters (option 2)	All storage volumes, Medium or High		UEF ≥0.95
R408.2.3 (3)	Electric water heaters(option 1)	All storage volumes, Low, Medium, or High	Integrated HPWH	UEF ≥ 3.30
R408.2.3 (4)	Electric water heaters(option 2)	All storage volumes, Low, Medium, or High	Integrated HPWH, 120 Volt/15 Amp Circuit	UEF ≥ 2.20
R408.2.3(5)(a)	Electric water heaters(option 3)	All storage volumes, Low, Medium, or High	Split-system HPWH	UEF ≥ 2.20
R408.2.3(5)(b)	Electric water heaters(option 4)	All storage volumes, Low, Medium, or High	Split-system HPWH	UEF ≥ 3.75

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R408.2.3(6)	Electric water heaters (option 5)	Rated input capacity >12 kW		COP≥3.00
R408.2.3(7)(a)	Solar water heaters (option 1)	All storage volumes, all draw patterns	Electric backup	SUEF ≥ 3.00
R408.2.3(7)(b)	Solar water heaters (option 2)	All storage volumes, all draw patterns	Gas backup	SUEF ≥ 1.80

UEF = Uniform Energy Factor, Et = Thermal Efficiency, COP = Coefficient of Performance

R408.2.3.1 Compact hot water distribution system option. The pipe shall store not more than 16 ounces (29.6 mL) of water between the nearest source of heated water and the termination of the fixture supply pipe when calculated using section R408.2.3.1.1. Where the source of heated water is a circulation loop, the loop shall be primed with a *demand recirculation water system* that complies with R403.5.1.1.1. There shall be a dedicated return line for the loop that begins after the branch to the last fixture on the supply portion of the loop and runs back to the water heater.

TABLE R408.2.3.1
INTERNAL VOLUME OF VARIOUS WATER DISTRIBUTION TUBING

OUNCES OF WATER PER FOOT OF TUBE									
NOMINAL SIZE (inches)	**COPPER TYPE M**	**COPPER TYPE L**	**COPPER TYPE K**	**CPVC CTS SDR 11**	**CPVC SCH 40**	**CPVC SCH 80**	**PERT SDR 9**	**COMPOSITE ASTM F1281**	**PEX CTS SDR 9**
3/8	1.06	0.97	0.84	N/A	1.17	-	0.64	0.63	0.64
1/2	1.69	1.55	1.45	1.25	1.89	1.46	1.18	1.31	1.18
3/4	3.43	3.22	2.90	2.67	3.38	2.74	2.35	3.39	2.35
1	5.81	5.49	5.17	4.43	5.53	4.57	3.91	5.56	3.91
1 1/4	8.70	8.36	8.09	6.61	9.66	8.24	5.81	8.49	5.81
1 1/2	12.18	11.83	11.45	9.22	13.20	11.38	8.09	13.88	8.09
2	21.08	20.58	20.04	15.79	21.88	19.11	13.86	21.48	13.86

For SI: 1 foot = 304.8 mm, 1 inch = 25.4 mm, 1 liquid ounce = 0.030L, 1 oz/ft2 = 305.15 g/m2.

N/A = Not available.

R408.2.3.1.1 Water volume determination. The water volume in the piping between a source of heated water and the termination of a fixture supply shall be calculated in accordance with this section. Water heaters, circulating water systems and heat trace temperature maintenance systems shall be considered to be sources of heated water. The volume shall be the sum of the internal volumes of pipe, fittings, valves, meters and manifolds between the nearest source of heated water and the termination of the fixture supply pipe. The volume in the piping shall be determined from Table R408.2.3.1. The volume contained within fixture shutoff valves, within flexible water supply connectors to a fixture fitting and within a fixture fitting shall not be included in the water volume determination. Where heated water is supplied by a recirculating system or heat-traced piping, the volume shall include the portion of the fitting on the branch pipe that supplies water to the fixture.

R408.2.4 More efficient duct thermal distribution system options. The thermal distribution system shall comply with one of the following efficiencies:

1. The ductless thermal distribution system or hydronic thermal distribution system located completely inside the building thermal envelope.

2. The *space conditioning* equipment is located inside conditioned space. In addition, 100 percent of the *ductwork* is located in conditioned space as defined by Section R403.3.2.

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3. The *space conditioning equipment* is located inside *conditioned space* and no less than 80 percent of *ductwork* is located completely inside conditioned space as defined by Section R403.3.4(1) and R403.3.4(2). In addition, no more than 20 percent of *ductwork* is contained within building assemblies separating unconditioned from *conditioned space* as defined by Section R403.3.4(3).

4. Where *ductwork* is located outside conditioned space, the total leakage, of the *duct system* measured in accordance with R403.3.7 is one of the following:

4.1 Where the *space conditioning equipment* is installed at the time of testing, total leakage is not greater than 2.0 cfm (0.94 L/s) per 100 ft^2 (9.29 m2) of conditioned floor area.

4.2 Where the *space conditioning equipment* is not installed at the time of testing, total leakage is not greater than 1.75 cfm (0.83 L/s) per 100 ft^2 (9.29 m2) of conditioned floor area.

[NY] R408.2.5 Improved air sealing and efficient ventilation system options. The measured air leakage rate and *ventilation* system shall meet one of the following:

1. Either an Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) installed.

2. Less than or equal to 2.0 ACH50, with either an ERV or HRV installed.

3. Less than or equal to 2.0 ACH50, with balanced ventilation *system*.

4. Less than or equal to 1.5 ACH50, with either an ERV or HRV installed.

5. Less than or equal to 1.0 ACH50, with either an ERV or HRV installed.

In addition, for measures requiring either an ERV or HRV, HRV and ERV Sensible Recovery Efficiency (SRE) shall be no less than 75 percent at 32°F (0°C), at the lowest listed net airflow. ERV Latent Recovery/Moisture Transfer (LRMT) shall be no less than 50 percent, at the lowest listed net airflow.

R408.2.6 Energy efficient appliances. Each appliance of a type listed in Table R408.2.6 installed in a *residential building* shall comply with the efficiency requirements specified in that table. Each appliance specified in Table R408.2.6 shall be installed. A clothes washer shall be installed at each location plumbed for a clothes washer.

Exception: In *dwelling units* of Group R-2 occupancies where a dishwasher is not installed in each unit, not less than two appliance types complying with Table R408.2.6 shall be installed.

TABLE R408.2.6
MINIMUM EFFICIENCY REQUIREMENTS: APPLIANCES

APPLIANCE TYPES	EFFICIENCY IMPROVEMENT	TEST PROCEDURE
Refrigerator	Maximum Annual Energy Consumption (AEC), no greater than 620 kWh/yr	10 CFR 430, Subpart B, Appendix A
Dishwasher	Maximum Annual Energy Consumption (AEC), no greater than 240 kWh/yr	10 CFR 430, Subpart B, Appendix C1
Clothes washer and Clothes dryer	Clothes washer located within *dwelling units*: Maximum Annual Energy Consumption (AEC), no greater than 130 kWh/yr, and Integrated Modified Energy Factor (IMEF) > 1.84 cu.ft/kWh/ cycle Clothes washer not located within *dwelling units* and where *dwelling units* are not provided with rough-in plumbing for washers: Modified Energy Factor (MEF)>2.0 cu.ft/kWh/cycle	10 CFR 430 Subpart B, Appendix J2 and 10 CFR 430, Subpart B, Appendices D1 and D2

[NY] R408.2.7 Renewable energy. *Renewable energy resources* shall be permanently installed on-site that have the rated capacity to produce a minimum of 1.0 watt of *on-site renewable energy* per square foot of *conditioned floor area*. To qualify for this option, documentation of renewable energy certificate (REC), if used, shall meet the requirements of Section R404.4.

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R408.2.8 Demand response. The *thermostat* controlling the primary heating or cooling system of each *dwelling unit* shall be provided with a *demand responsive control* capable of communicating with the Virtual End Node (VEN) using a wired or wireless bi-directional communication pathway that provides the occupant the ability to voluntarily participate in utility demand response programs, where available. The *thermostat* shall be capable of executing the following actions in response to a *demand response signal* :

1. Automatically increasing the *zone* operating cooling set point by the following values: 1°F (0.5°C), 2°F (1°C), 3°F (1.5°C), and 4°F (2°C).
2. Automatically decreasing the *zone* operating heating set point by the following values: 1°F (0.5°C), 2°F (1°C), 3°F (1.5°C), and 4°F (2°C).

Thermostats controlling single stage HVAC systems shall comply with Section R408.2.8.1. Thermostats controlling variable capacity systems shall comply with Section R408.2.8.2. Thermostats controlling multi-stage HVAC systems shall comply with either Section R408.2.8.1 or R408.2.8.2. Where a *demand response signal* is not available the *thermostat* shall be capable of performing all other functions.

R408.2.8.1 Single stage HVAC system controls. Thermostats controlling single stage HVAC systems shall be provided with a *demand responsive control* that complies with one of the following:

1. Certified OpenADR 2.0a VEN, as specified under Clause 11, Conformance
2. Certified OpenADR 2.0b VEN, as specified under Clause 11, Conformance
3. Certified by the manufacturer as being capable of responding to a *demand response signal* from a certified OpenADR 2.0b VEN by automatically implementing the control functions requested by the VEN for the equipment it controls
4. IEC 62746-10-1
5. The communication protocol required by a controlling entity, such as a utility or service provider, to participate in an automated demand response program
6. The physical configuration and communication protocol of CTA 2045-A or CTA-2045-B

R408.2.8.2 Variable capacity and two stage HVAC system controls. Thermostats controlling variable capacity and two stage HVAC systems shall be provided with *demand responsive control* that complies with the communication and performance requirements of AHRI 1380.

R408.2.9 Opaque walls. For buildings in climate zones 4 and 5, the maximum U-factor of 0.060 shall be permitted to be used for wood frame walls for compliance with Table R402.1.2 where complying with one or more of the following:

1. Primary space heating is provided by a heat pump that meets one of the efficiencies in R408.2.2.
2. All installed water heaters are heat pumps that meet one of the efficiencies in R408.2.3.
3. In addition to the number of credits required by Section R408.2, three additional credits are achieved.
4. *Renewable energy resources* are installed to meet the requirements of R408.2.7.

R408.2.10 Whole home lighting control. The *dwelling unit* shall have a manual control by the main entrance that turns off all the permanently installed interior lighting or have a lighting control system that has the capability to turn off all permanently installed interior lighting from remote locations.

Exceptions:

1. Up to 5 percent of the total lighting power may remain uncontrolled.
2. Spaces where lighting is controlled by a count-down timer or *occupant sensor control*.

R408.2.11 Higher efficacy lighting. All spaces shall be provided with hard wired lighting with a lamp efficacy of 90 lm/W or a luminaire efficacy of 55 lm/W.

Exception: Closets and other storage spaces.

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Chapter R5. Existing Buildings

EC 07- 0018

Revise as follows:

[NY] ~~**R501.6**~~ **R501.5 Historic buildings.** The provisions ~~Provisions~~ of this ~~code~~ chapter shall control ~~relating to~~ the ~~construction,~~ *repair, alteration*, restoration and ~~movement~~ relocation of structures, and *change of occupancy* ~~shall not be mandatory~~ for *historic buildings*.

> **Exception:** Compliance with the provisions of this code shall not be required for features of *historic buildings* where a *historic building* report, prepared in accordance with Section R501.6.1, has been submitted and *approved* by the *building official.*

[NY] R501.5.1 Historic building report. Written *historic building* reports shall be signed by a *registered design professional* or a representative of the State Historic Preservation Office or the historic preservation authority having jurisdiction. Such report shall identify each feature that is a *character-defining feature* of the historic form, fabric, or function of such *historic building* or historic district and shall demonstrate that compliance with a specific provision or provisions of this code would threaten, degrade or destroy the historic form, fabric or function of the *building* or historic district.

EC 07- 0259

Revise as follows:

~~**[NY] R502.1.1.1**~~ **R502.2.1 Building thermal envelope.** New *building thermal envelope* assemblies that are part of the *addition* shall comply with Sections R402.1, R402.2, ~~R402.3.1~~ R402.4.1 through ~~R402.3.5~~ R402.4.5, and R402.5.

> **Exception:** ~~Where unconditioned space is changed to *conditioned space*, the *building* envelope of the *addition* shall comply where the Total UA, as determined in Section R402.1.5, of the existing *building* and the *addition*, and any *alterations* that are part of the project, is less than or equal to the Total UA generated for the existing *building*.~~ New *building thermal envelope* assemblies are exempt from the requirements of Section R402.5.1.2.

~~**R502.1.1.2**~~ **R502.2.2 Heating and cooling systems.** ~~New heating, cooling and *duct systems* that are~~ HVAC *ductwork* newly installed as part of ~~the~~ an *addition* shall comply with Section R403.

> **Exception:** Where ~~ducts~~ *ductwork* from an existing heating and cooling system ~~are~~ is extended to an *addition*~~, *duct systems* with less than 40 linear feet (12.19 m) in unconditioned spaces shall not be required to be tested in accordance with Section R403.3.3.~~ Section R403.3.7 and Section R403.3.8 shall not be required.

EC 07- 0260

Add new:

R502.2.5 Additional efficiency credit requirements for additions. *Additions* shall comply with sufficient measures from Table R408.2 to achieve not less than 5 credits. *Alterations* to the *existing building* that are not part of the *addition*, but permitted with the *addition*, shall be permitted to be used to achieve this requirement.

> **Exceptions:**
>
> 1. *Additions* that increase the *building* 's total *conditioned floor area* by less than 25 percent.
>
> 2. *Additions* that do not include the *addition* or replacement of equipment covered in Sections R403.5 or R403.7.
>
> 3. *Additions* that do not increase *conditioned space*.
>
> 4. Where the *addition* alone or the existing *building* and *addition* together comply with Section R405 or R406.

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EC 07- 0019

Revise as follows:

[NY] R503.1.1 Building thermal envelope. Alterations of existing ~~*Building* envelope~~ *building thermal envelope* assemblies ~~that are part of the *alteration*~~ shall comply with ~~Section R402.1.2 or R402.1.4, Sections R402.2.1 through R402.2.13, R402.3.1, R402.3.2, R402.4.3 and R402.4.5~~ this section. New building thermal envelope assemblies that are part of the alteration shall comply with Section R402. The R-value of insulation shall not be reduced, nor the U-factor of a building thermal envelope assembly increased as part of a building thermal envelope alteration except where the building after the alteration complies with Section R405 or R406.

Exception: The following ~~*alterations*~~ types of work shall not be required to comply with the requirements of this chapter, ~~for new construction~~ provided that the energy use of the *building* is not increased:

1. Storm windows installed over existing ~~fenestration~~ *fenestration*.
2. ~~Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.~~
3. ~~Construction where the existing roof, wall or floor cavity is not exposed.~~
4. ~~4.~~2. ~~Roof re-cover~~ *Roof recover*.
5. ~~5 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. ~~6~~3. Surface-applied window film installed on existing single-pane ~~fenestration~~ *fenestration* assemblies to reduce solar heat gain provided that the code does not require the glazing or ~~fenestration~~ *fenestration* assembly to be replaced.
7. ~~*Alterations* that replace less than fifty percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.~~
4. Glass only replacements in an existing sash and frame.
5. *Air barriers* shall not be required for *roof recover* and *roof replacement* where the *alterations* or renovations to the *building* do not include *alterations*, renovations or *repairs* to the remainder of the *building thermal envelope*.
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 such *conditioned space* from the exterior shall not be removed.

EC 07- 0261

Add new:

[NY] R503.1.1.2 Roof, ceiling, and attic alterations. Where replacement of ceiling finishes exposes cavities of the roof-ceiling construction, that is part of the *building thermal envelope*, the cavities shall be insulated to full depth with new or existing insulation that complies with Section C303.1.4. and having a minimum nominal value of R-3 per inch. Insulation shall comply with Section R402.1 for new cavities created and the following alterations.

1. An *alteration* to roof-ceiling construction other than *reroofing* where existing insulation located below the roof deck or an attic floor above *conditioned space* does not comply with Table R402.1.3.
2. Roof replacements or a roof *alteration* that includes removing and replacing the *roof covering* where the *roof assembly* includes insulation entirely above the roof deck.
3. Conversion of an unconditioned attic space into *conditioned space*.

[NY] R503.1.1.3 Above-grade wall alterations *Above-grade wall* alterations shall comply with the following as applicable:

1. Where wall cavities are exposed, the exposed cavities shall be insulated to full depth with new or existing insulation that complies with Section R303.1.4 and having a minimum nominal value of R-3 per inch. New cavities created shall be insulated in accordance with Section R402.1. An interior vapor retarder shall be provided where required in accordance with Section R702.7 of the *Residential Code of New York State* or Section 1404.3 of the *Building Code of New York State*, as applicable.

2. Where *exterior wall* coverings and *fenestration* are added or replaced for the full extent of any exterior, facade of one or more elevations of the *building*, continuous insulation shall be provided where required in accordance with

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Section R402.1. Where specified, the continuous insulation requirement also shall comply with Section R702.7 of the *Residential Code of New York State*. Replacement exterior wall coverings shall comply with the water resistance requirements of Section R703.1.1 of the *Residential Code of New York State* or Section 1402.2 of the *Building Code of New York State*, as applicable, *and manufacturers' instructions.*

3. Where new interior finishes or *exterior wall* coverings are applied to the full extent of any exterior wall assembly of mass construction, insulation shall be provided in accordance with Section R402.1.

[NY] R503.1.1.4 Floor alterations. Where cavities in a floor or floor overhang are exposed and the floor or floor overhang is part of the *building thermal envelope*, the cavities shall be insulated to full depth with new or existing insulation that complies with Section C303.1.4. and having a minimum nominal value of R-3 per inch. New cavities created in the floor or floor overhang shall comply with Section R402.1. Where an unconditioned below-grade space is changed to *conditioned space,* floors that are part of the *building thermal envelope* enclosing such space shall comply with Section R502.

Exception: Where the installation of insulation would require either alteration to an existing floor concrete slab or a reduction of minimum ceiling height required by the *Residential Code of New York State*.

[NY] R503.1.1.5 Below-grade wall alterations. Where an unconditioned below-grade space is changed to *conditioned space,* the *building thermal envelope* walls enclosing such space shall comply with Section R502. Where the below-grade space is *conditioned space* and where *building thermal envelope* walls enclosing such space are altered they shall be insulated in accordance with Section R402.1.

R503.1.1.6 Air barrier. Altered *building thermal envelope* assemblies shall be provided with an *air barrier* in accordance with Section R402.5. Such *air barrier* need not be continuous with unaltered portions of the *building thermal envelope.* Testing requirements of Section R402.5.1.2 shall not be required.

EC 07- 0262

Revise as follows:

R503.1.2 Heating and cooling systems. ~~New heating, cooling and duct systems that are part of the~~ New heating and cooling systems and *ductwork* that are part of the *alteration* shall comply with Section R403 and this section. Alterations to existing heating, and cooling systems and *ductwork* shall comply with this section.

Exception: Where ~~ducts~~ *ductwork* from an existing heating and cooling system ~~are~~ is extended~~, *duct systems* with less than 40 linear feet (12.19 m) in unconditioned spaces shall not be required to be tested in accordance with Section R403.3.3~~.

R503.1.2.1 Ductwork. HVAC *ductwork* newly installed as part of an alteration shall comply with Section R403.

Exception: Where *ductwork* from an existing heating and cooling system is extended.

R503.1.2.2 System sizing. New heating and cooling equipment that is part of an *alteration* shall be sized in accordance with Section R403.7 based on the existing *building* features as modified by the *alteration*.

Exception: Where it has been demonstrated to the *building official* that compliance with this section would result in heating or cooling equipment that is incompatible with the remaining portions of the existing heating or cooling system.

R503.1.2.3 Duct system leakage Where an *alteration* includes any of the following, *duct systems* shall be tested in accordance with Section R403.3.5 and shall have a total leakage less than or equal to 12.0 cfm (339.9 L/min) per 100 ft^2 (9.29 m2) of *conditioned floor area*:

1. Where 25 percent or more of the registers that are part of the *duct system* are relocated.

2. Where 25 percent or more of the total length of all *ductwork* in the *duct* system are relocated.

3. Where the total length of all *ductwork* in the *duct system* is increased by 25 percent or more.

Exception: *Duct systems* located entirely inside a *conditioned space* in accordance with Section R403.3.2.

R503.1.2.4 Controls. New heating and cooling equipment that are part of the *alteration* shall comply with Sections R403.1 and R403.2.

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EC 07- 0020

Revise as follows:

[NY] R503.1.4 Lighting. New lighting systems that are part of the *alteration* shall comply with Section R404.1.

Exception~~s~~:

~~1.~~ *Alterations* that replace less than ~~50~~ 10 percent of the luminaires in a space, provided that such *alterations* do not increase the installed interior lighting power.

~~2. *Alterations* that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.~~

EC 07- 0263

Add new:

R503.1.5 Additional efficiency credit requirements for substantial improvements. *Substantial improvements* shall comply with sufficient measures from Table R408.2 to achieve not less than 3 credits.

Exceptions:

1. *Alterations* that are permitted with an *addition* complying with Section R502.2.5.

2. *Alterations* that comply with Section R405 or R406.

3. *Substantial improvements* that do not include the addition or replacement of equipment covered in either Section R403.5 or Section R403.7.

EC 07- 0264

Add new:

APPENDIX RF ALTERNATIVE BUILDING THERMAL ENVELOPE INSULATION R-VALUE -OPTIONS

RF101

GENERAL

RF101.1 General This appendix shall be used as a basis to determine alternative building assembly and insulation component R-value solutions that comply with the maximum U-factors and F-factors in Table R402.1.2 of this standard. Alternative building assembly insulation solutions determined in accordance with this appendix also shall comply with the requirements of Section R702.7 of the *International Residential Code*.

RF102

ABOVE-GRADE WALL ASSEMBLIES

RF102.1 Wood frame walls. Wood frame *above-grade wall* assemblies shall comply with both the *cavity insulation* and continuous insulation R-values and framing conditions specified by Table RF102.1 where the tabulated U-factors are less than or equal to those needed for compliance with Section R402.1.2. For assemblies not addressed by the conditions of Table RF102.1, U-factors shall be determined by using accepted engineering practice or by testing in accordance with ASTM C1363 and shall be subject to *approval* by the *building official* in accordance with Section R104.1. Use of a lesser framing fraction than the indicated maximums in Table RF102.1 shall require wall framing layout details for each *above-grade wall* elevation to be included on *approved construction documents* and shall be inspected for compliance.

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TABLE RF102.1
ASSEMBLY U-FACTORS FOR WOOD FRAME WALLS[a,b,c,d,e]

Wood Stud Size and Spacing	Cavity Insulation Installed R-value	Continuous Insulation R-Value																		
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	20	25	30
2x4 (12 inches o.c)	0	0.324	0.239	0.190	0.158	0.136	0.119	0.106	0.096	0.087	0.080	0.074	0.069	0.064	0.060	0.057	0.054	0.042	0.035	0.030
	11	0.094	0.085	0.078	0.072	0.067	0.062	0.059	0.055	0.052	0.050	0.047	0.045	0.043	0.041	0.040	0.038	0.032	0.027	0.024
	12	0.090	0.082	0.075	0.069	0.064	0.060	0.057	0.054	0.051	0.048	0.046	0.044	0.042	0.040	0.039	0.037	0.031	0.027	0.024
	13	0.087	0.079	0.072	0.067	0.063	0.059	0.055	0.052	0.049	0.047	0.045	0.043	0.041	0.039	0.038	0.036	0.031	0.027	0.023
	14	0.084	0.076	0.070	0.065	0.061	0.057	0.054	0.051	0.048	0.046	0.044	0.042	0.040	0.038	0.037	0.036	0.030	0.026	0.023
	15	0.082	0.074	0.068	0.063	0.059	0.055	0.052	0.049	0.047	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.030	0.026	0.023
	16	0.079	0.072	0.066	0.062	0.058	0.054	0.051	0.048	0.046	0.044	0.042	0.040	0.038	0.037	0.036	0.034	0.029	0.025	0.022
	17	0.077	0.070	0.065	0.060	0.056	0.053	0.050	0.047	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.029	0.025	0.022
	18	0.076	0.069	0.063	0.059	0.055	0.052	0.049	0.046	0.044	0.042	0.040	0.038	0.037	0.036	0.034	0.033	0.028	0.025	0.022
	19	0.074	0.067	0.062	0.058	0.054	0.051	0.048	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.032	0.028	0.024	0.022
	20	0.072	0.066	0.061	0.056	0.053	0.050	0.047	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.032	0.027	0.024	0.021
2x6 (12 inches o.c.)	0	0.0313	0.230	0.183	0.153	0.131	0.115	0.102	0.093	0.084	0.078	0.072	0.067	0.063	0.059	0.055	0.053	0.041	0.034	0.029
	18	0.065	0.060	0.056	0.053	0.050	0.048	0.045	0.043	0.041	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.027	0.024	0.021
	19	0.063	0.059	0.055	0.052	0.049	0.047	0.044	0.042	0.040	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.027	0.024	0.021
	20	0.062	0.057	0.054	0.051	0.048	0.046	0.043	0.041	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.026	0.023	0.021
	21	0.060	0.056	0.053	0.050	0.047	0.045	0.043	0.041	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.030	0.026	0.023	0.021
	22	0.059	0.055	0.052	0.049	0.046	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.026	0.023	0.020
	23	0.058	0.054	0.051	0.048	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	24	0.057	0.053	0.050	0.047	0.044	0.042	0.040	0.039	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	25	0.056	0.052	0.049	0.046	0.044	0.042	0.040	0.038	0.036	0.035	0.034	0.032	0.031	0.030	0.029	0.028	0.025	0.022	0.020
	30	0.052	0.048	0.045	0.043	0.041	0.039	0.037	0.035	0.034	0.033	0.031	0.030	0.029	0.028	0.027	0.027	0.023	0.021	0.019
	35	0.049	0.046	0.043	0.040	0.038	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.025	0.022	0.020	0.018
2x8 (12 inches o.c.)	0	0.308	0.226	0.179	0.149	0.128	0.112	0.100	0.091	0.083	0.076	0.070	0.066	0.061	0.058	0.054	0.052	0.041	0.034	0.029
	20	0.056	0.053	0.050	0.047	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.033	0.032	0.031	0.030	0.026	0.023	0.020
	21	0.055	0.052	0.049	0.046	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	22	0.053	0.050	0.048	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	23	0.052	0.049	0.047	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.025	0.022	0.020
	24	0.051	0.048	0.046	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.024	0.022	0.019
	25	0.050	0.047	0.045	0.043	0.041	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.024	0.021	0.019
	30	0.046	0.044	0.041	0.039	0.038	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.026	0.023	0.020	0.018
	35	0.043	0.041	0.039	0.037	0.035	0.034	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.026	0.025	0.024	0.021	0.019	0.017
	40	0.041	0.039	0.037	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.025	0.024	0.024	0.023	0.020	0.018	0.017
2x4 (16 inches o.c.)	0	0.331	0.243	0.193	0.161	0.138	0.120	0.107	0.097	0.088	0.081	0.075	0.069	0.065	0.061	0.057	0.054	0.043	0.035	0.030
	11	0.092	0.083	0.076	0.071	0.066	0.061	0.058	0.054	0.052	0.049	0.047	0.045	0.043	0.041	0.039	0.038	0.032	0.027	0.024
	12	0.088	0.080	0.073	0.068	0.063	0.059	0.056	0.053	0.050	0.048	0.045	0.043	0.041	0.040	0.038	0.037	0.031	0.027	0.024
	13	0.084	0.077	0.071	0.066	0.061	0.057	0.054	0.051	0.049	0.046	0.044	0.042	0.040	0.039	0.037	0.036	0.030	0.026	0.023
	14	0.081	0.074	0.068	0.064	0.059	0.056	0.053	0.050	0.047	0.045	0.043	0.041	0.039	0.038	0.037	0.035	0.030	0.026	0.023
	15	0.079	0.072	0.066	0.062	0.058	0.054	0.051	0.049	0.046	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.029	0.025	0.023
	16	0.077	0.070	0.065	0.060	0.056	0.053	0.050	0.047	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.029	0.025	0.022
	17	0.075	0.068	0.063	0.058	0.055	0.052	0.049	0.046	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.028	0.025	0.022
	18	0.073	0.066	0.061	0.057	0.053	0.050	0.048	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.033	0.028	0.024	0.022
	19	0.071	0.065	0.060	0.056	0.052	0.049	0.047	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.032	0.027	0.024	0.021
	20	0.069	0.063	0.059	0.055	0.051	0.048	0.046	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.032	0.031	0.027	0.024	0.021
2x6 (16 inches o.c.)	0	0.322	0.236	0.187	0.156	0.133	0.117	0.104	0.094	0.086	0.079	0.073	0.068	0.063	0.059	0.056	0.053	0.042	0.034	0.029
	18	0.063	0.059	0.055	0.052	0.049	0.047	0.044	0.042	0.041	0.039	0.037	0.036	0.035	0.034	0.032	0.031	0.027	0.024	0.021
	19	0.061	0.057	0.054	0.051	0.048	0.046	0.043	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.027	0.023	0.021
	20	0.060	0.056	0.052	0.050	0.047	0.045	0.042	0.041	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.030	0.026	0.023	0.021
	21	0.058	0.055	0.051	0.048	0.046	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.026	0.023	0.020

	22	0.057	0.053	0.050	0.047	0.045	0.043	0.041	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	23	0.056	0.052	0.049	0.046	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	24	0.055	0.051	0.048	0.046	0.043	0.041	0.039	0.038	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.025	0.022	0.020
	25	0.054	0.050	0.047	0.045	0.042	0.040	0.039	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.024	0.022	0.019
	30	0.050	0.046	0.044	0.041	0.039	0.037	0.036	0.034	0.033	0.032	0.031	0.029	0.029	0.028	0.027	0.026	0.023	0.020	0.018
	35	0.047	0.043	0.041	0.039	0.037	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.025	0.025	0.022	0.019	0.017
2x8 (16 inches o.c.)	0	0.317	0.232	0.184	0.152	0.131	0.115	0.102	0.092	0.084	0.077	0.071	0.066	0.062	0.058	0.055	0.052	0.041	0.034	0.029
	20	0.055	0.052	0.049	0.046	0.044	0.042	0.040	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.026	0.023	0.020
	21	0.053	0.050	0.048	0.045	0.043	0.041	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	22	0.052	0.049	0.047	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.025	0.022	0.020
	23	0.051	0.048	0.046	0.043	0.041	0.040	0.038	0.036	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.024	0.022	0.020
	24	0.050	0.047	0.045	0.043	0.041	0.039	0.037	0.036	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.024	0.021	0.019
	25	0.049	0.046	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.024	0.021	0.019
	30	0.045	0.042	0.040	0.038	0.037	0.035	0.034	0.032	0.031	0.030	0.029	0.028	0.027	0.027	0.026	0.025	0.022	0.020	0.018
	35	0.042	0.039	0.037	0.036	0.034	0.033	0.031	0.030	0.029	0.028	0.027	0.027	0.026	0.025	0.024	0.024	0.021	0.019	0.017
	40	0.039	0.037	0.035	0.034	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.025	0.024	0.024	0.023	0.022	0.020	0.018	0.016
2x4 (24 inches o.c.)	0	0.339	0.248	0.196	0.163	0.139	0.122	0.108	0.098	0.089	0.081	0.075	0.070	0.065	0.061	0.058	0.055	0.043	0.035	0.030
	11	0.089	0.081	0.075	0.069	0.065	0.061	0.057	0.054	0.051	0.048	0.046	0.044	0.042	0.040	0.039	0.037	0.031	0.027	0.024
	12	0.085	0.078	0.072	0.067	0.062	0.058	0.055	0.052	0.049	0.047	0.045	0.043	0.041	0.039	0.038	0.036	0.031	0.027	0.023
	13	0.082	0.075	0.069	0.064	0.060	0.056	0.053	0.050	0.048	0.046	0.044	0.042	0.040	0.038	0.037	0.036	0.030	0.026	0.023
	14	0.079	0.072	0.067	0.062	0.058	0.055	0.052	0.049	0.047	0.044	0.042	0.041	0.039	0.037	0.036	0.035	0.030	0.026	0.023
	15	0.076	0.070	0.065	0.060	0.056	0.053	0.050	0.048	0.045	0.043	0.041	0.040	0.038	0.037	0.035	0.034	0.029	0.025	0.022
	16	0.074	0.068	0.063	0.058	0.055	0.052	0.049	0.046	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.028	0.025	0.022
	17	0.072	0.066	0.061	0.057	0.053	0.050	0.048	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.033	0.028	0.024	0.022
	18	0.070	0.064	0.059	0.055	0.052	0.049	0.046	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.032	0.027	0.024	0.021
	19	0.068	0.062	0.058	0.054	0.051	0.048	0.045	0.043	0.041	0.039	0.038	0.036	0.035	0.034	0.032	0.031	0.027	0.024	0.021
	20	0.066	0.061	0.056	0.053	0.050	0.047	0.044	0.042	0.040	0.039	0.037	0.036	0.034	0.033	0.032	0.031	0.027	0.023	0.021
2x6 (24 inches o.c.)	0	0.330	0.241	0.191	0.159	0.136	0.119	0.106	0.095	0.087	0.080	0.074	0.068	0.064	0.060	0.057	0.053	0.042	0.035	0.030
	18	0.061	0.057	0.054	0.051	0.048	0.046	0.044	0.042	0.040	0.038	0.037	0.036	0.034	0.033	0.032	0.031	0.027	0.024	0.021
	19	0.060	0.056	0.052	0.050	0.047	0.045	0.043	0.041	0.039	0.037	0.036	0.035	0.034	0.032	0.031	0.030	0.026	0.023	0.021
	20	0.058	0.054	0.051	0.048	0.046	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.026	0.023	0.020
	21	0.057	0.053	0.050	0.047	0.045	0.043	0.041	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	22	0.055	0.052	0.049	0.046	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	23	0.054	0.051	0.048	0.045	0.043	0.041	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.025	0.022	0.020
	24	0.053	0.049	0.047	0.044	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.024	0.022	0.019
	25	0.052	0.048	0.046	0.043	0.041	0.039	0.038	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.024	0.021	0.019
	30	0.047	0.044	0.042	0.040	0.038	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.025	0.022	0.020	0.018
	35	0.044	0.041	0.039	0.037	0.035	0.034	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.025	0.025	0.024	0.021	0.019	0.017
2x8 (24 inches o.c.)	0	0.326	0.238	0.188	0.156	0.133	0.117	0.104	0.094	0.085	0.078	0.072	0.067	0.063	0.059	0.056	0.053	0.042	0.034	0.029
	20	0.054	0.051	0.048	0.046	0.043	0.042	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.025	0.022	0.020
	21	0.052	0.049	0.047	0.044	0.042	0.041	0.039	0.037	0.036	0.035	0.033	0.032	0.031	0.030	0.029	0.029	0.025	0.022	0.020
	22	0.051	0.048	0.046	0.043	0.041	0.040	0.038	0.037	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.024	0.022	0.020
	23	0.050	0.047	0.044	0.042	0.041	0.039	0.037	0.036	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.028	0.024	0.021	0.019
	24	0.048	0.046	0.044	0.041	0.040	0.038	0.036	0.035	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.024	0.021	0.019
	25	0.047	0.045	0.043	0.041	0.039	0.037	0.036	0.034	0.033	0.032	0.031	0.030	0.029	0.028	0.027	0.027	0.023	0.021	0.019
	30	0.043	0.041	0.039	0.037	0.035	0.034	0.033	0.032	0.030	0.029	0.029	0.028	0.027	0.026	0.025	0.025	0.022	0.020	0.018
	35	0.040	0.038	0.036	0.034	0.033	0.032	0.030	0.029	0.028	0.027	0.027	0.026	0.025	0.024	0.024	0.023	0.021	0.018	0.017
	40	0.037	0.035	0.034	0.032	0.031	0.030	0.029	0.028	0.027	0.026	0.025	0.024	0.024	0.023	0.022	0.022	0.019	0.018	0.016

For SI: 1 W/m^2-K = 0.176 Btu/hr-ft^2-F

a. Linear interpolation of U-factors shall be permitted between continuous insulation and *cavity insulation* R-values. For non-standard stud spacing, use the next lesser stud spacing shown in the table.

b. Table values are based on the parallel path calculation procedure as applicable to wood-frame assemblies and requires compliance with the following assembly conditions:

1. Maximum framing fractions of 28% (assumed for 12”oc studs), 25% (assumed for 16”oc studs), and 22% (assumed for 24”oc studs) with 4% attributed to headers in all cases. The framing fraction is the percentage of overall opaque wall area occupied by framing members.
2. Wood framing materials or species with a minimum thermal resistivity of R-1.25 per inch.
3. Exterior sheathing with a minimum R-value of R-0.62 as based on wood structural panel. For walls having no exterior sheathing or sheathing of lesser R-value, footnote d shall be used to adjust the tabulated U-factor.

4. Siding of a minimum R-0.62 as based on the assumption of vinyl siding. For walls with siding having a lower R-value, footnote d shall be used to adjust the tabulated U-factor.
5. Interior finish of a minimum R-0.45 based on 1/2" gypsum. For walls having no interior finish or a finish of lesser R-value, footnote d shall be used to adjust the tabulated U-factor.
6. *Cavity insulation* with a rated R-value installed as required by the manufacturer's installation instructions to satisfy the indicated installed R-value, considering a reduced R-value for compression in an enclosed cavity where applicable.
7. Continuous insulation specified in accordance with the indicated rated R-value and installed continuously over all exterior wood framing, including studs, plates, headers, and rim joists.
8. Indoor air film R-value of 0.68 and outdoor air-film R-value of 0.17.

c. Where any of the building materials that are continuous over the interior or *exterior wall* surface vary from those stated in footnote b, it is permissible to adjust the U-factor as follows: Uadj = 1/ [1/U + Rd] where U is the U-factor from the table and Rd is the increase (positive) or decrease (negative) in the cumulative R-value of building material layers on the outside and inside faces of the wall, excluding the continuous insulation R-value if present.

d. For a specific continuous insulation R-value not addressed in this table, the U-factor of the assembly shall be permitted to be determined as follows: Uadj = 1/[1/Unci + Rci]
where Unci is the U-factor from the table for no continuous insulation (0 R-value column) and Rci is the specific rated R-value of continuous insulation added to the assembly.

e. For double wall framing, the U-factor shall be permitted to be determined by combining the U-factors for single wall framing from the table as follows: Ucombined = 1/[1/U1 + 1/U2]
where U1 and U2 are the U factors from the table for each of the adjacent parallel walls in the double wall assembly.

f. The use of insulation in accordance with this table does not supersede requirements in Section R702.7 of the International Residential Code for use of insulation and water vapor retarders to control water vapor.

RF102.2 Mass walls. Reserved.

RF102.3 Cold-formed steel frame walls. Reserved.

RF103
ROOF AND CEILING ASSEMBLIES. Reserved.

RF104
FLOOR ASSEMBLIES. Reserved.

RF105
BASEMENT AND CRAWL SPACE WALLS

RF105.1 Basement and crawl space walls. U-factors for basement and *crawl space walls* shall be as specified in accordance with Table RF105.1. Effective U-factors for the proposed and reference foundation wall design must be used to demonstrate compliance with Section R402.1.5. Effective U-factors shall not be used for other compliance methods referenced in Section R401.2.1.

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TABLE RF105.1
U-FACTORS FOR BASEMENT AND CRAWL SPACE WALLS[a]

Insulation Configurations[b]	Wall U-factor[c] (Btu/hr-ft^2-F)	Wall Effective U-factor[d] by Percentage of Wall Height Projecting Above Grade (Btu/hr-ft^2-F) for Use Only with Section R402.1.5	-	-	-
-	-	50%	35%	20%	5%
BASEMENT WALLS					
Uninsulated and unfinished basement wall	0.360	0.324	0.288	0.252	0.216
Continuous insulation	-	-	-	-	-
R-5ci	0.122	0.109	0.097	0.085	0.073
R-7.5ci	0.093	0.084	0.075	0.065	0.056
R-10ci	0.076	0.068	0.060	0.053	0.045
R-15ci	0.055	0.049	0.044	0.038	0.033
R-20ci	0.043	0.039	0.034	0.030	0.026
R-25ci	0.035	0.032	0.028	0.025	0.021
Cavity insulation	-	-	-	-	-
R-11	0.076	0.068	0.060	0.053	0.045
R-13	0.067	0.060	0.054	0.047	0.040
R-15	0.060	0.054	0.048	0.042	0.036
R-19	0.050	0.045	0.040	0.035	0.030
R-21	0.045	0.041	0.036	0.032	0.027
Cavity + continuous insulation	-	-	-	-	-
R-13 + R-5ci	0.050	0.045	0.040	0.035	0.030
R-13 + R-7.5ci	0.045	0.040	0.036	0.031	0.027
R-13 + R-10ci	0.040	0.036	0.032	0.028	0.024
R-19 + R-5ci	0.040	0.036	0.032	0.028	0.024
R-19 + R-7.5ci	0.036	0.033	0.029	0.025	0.022
R-19 + R-10ci	0.033	0.030	0.027	0.023	0.020
CRAWL SPACE WALLS					
Uninsulated crawl space wall	0.477	0.429	0.382	0.334	n/a

Continuous insulation	-	-	-	-	-
R-5ci	0.141	0.127	0.113	0.099	n/a
R-7.5ci	0.104	0.094	0.083	0.073	-
R-10ci	0.083	0.074	0.066	0.058	-
R-15ci	0.058	0.053	0.047	0.041	-
R-20ci	0.045	0.041	0.036	0.032	-
R-25ci	0.037	0.033	0.030	0.026	-
Cavity insulation	-	-	-	-	-
R-11	0.083	0.074	0.066	0.058	n/a
R-13	0.072	0.065	0.058	0.051	-
R-15	0.065	0.058	0.052	0.045	-
R-19	0.054	0.049	0.043	0.038	-
R-21	0.048	0.043	0.038	0.033	-
Cavity + continuous insulation	-	-	-	-	-
R-13 + R-5ci	0.053	0.048	0.043	0.037	n/a
R-13 + R-7.5ci	0.047	0.042	0.038	0.033	-
R-13 + R-10ci	0.042	0.038	0.034	0.029	-
R-19 + R-5ci	0.043	0.038	0.034	0.030	-
R-19 + R-7.5ci	0.039	0.035	0.031	0.027	-
R-19 + R-10ci	0.035	0.032	0.028	0.025	-

n/a = not applicable

a. The wall U-factor excludes exterior air-film R-value and, for insulated assemblies, includes the following: 0.68 R for interior air film, 0.45 R for ½" gypsum panel finish (insulated basement walls only), and 2.1 R for 12" block *basement wall* or 1.4 R for 8" block crawl space wall, both with empty cells. Where *cavity insulation* is included between 2x4 or 2x6 framing on the interior side of a foundation wall, wood stud material with thermal resistivity of R-1.25/in is assumed to be spaced at not less than 16-inches on center with an assumed framing factor not greater than 0.15.

b. All insulation configurations extend from top of foundation wall to floor of basement or crawlspace. Extrapolation to partial height insulation shall not be permitted; U-factors for such insulation configurations shall be determined by accepted engineering practice for modeling of thermal bridging and ground-coupled assemblies.

c. All insulation configurations extend from top of foundation wall to floor of basement or crawlspace. Extrapolation to partial height insulation shall not be permitted; U-factors for such insulation configurations shall be determined by accepted engineering practice for modeling of thermal bridging and ground-coupled assemblies with results converted to an equivalent air-to-air annual heat transfer basis to determine effective U-factors.

d. Applicable to Sections R402.1.2, R405 and R406.

e. Effective U-factors are adjusted to account for ground-coupling effects to provide equivalency to U-factors used for above-grade *building thermal envelope* assemblies. The Effective U-factors are provided for use with Section R402.1.5 for evaluation of trade-offs with above-grade assemblies and other components of the *building thermal envelope*. The effective U-factor shall apply to the foundation wall area from interior floor or ground surface to top of wall. Interpolation between R-values and percentage of wall height projecting above grade within a given insulation configuration type is permitted.

RF106
SLABS-ON-GRADE.

RF106.1 Slabs-on-grade F-factors for unheated and heated slabs-on-grade shall be as specified in Table RF106.1. All applicable adjustment factors in the table footnotes shall apply. F-factors for basement floor slabs and crawl space ground surface located below exterior grade shall be adjusted in accordance footnote "f" as applicable.

TABLE RF106.1
F-FACTORS FOR SLABS-ON-GRADE[a,b,c,d,e,f]

Unheated Slabs-on-Grade – Insulation Configurations	F-FACTOR (Btu/hr-ft-F)
Uninsulated slab	-
Horizontal Insulation Under Slab at Slab Perimeter – Slab Edge Not Insulated	-
≥R-5 for 2 ft	0.70
R-5 for 4 ft	0.67
≥R-10 for 4 ft	0.64
Vertical Insulation on Exterior Faceg – Slab Edge Insulated[h]	-
R-2.5 for 2 ft	0.66
R-5 for 2 ft	0.58
R-7.5 for 2 ft	0.56
R-10 for 2 ft	0.54
R-15 for 3 ft	0.52
R-5 for 3 ft	0.56
R-7.5 for 3 ft	0.54
R-10 for 3 ft	0.51
R-15 for 3 ft	0.49
R-5 for 4 ft	0.54
R-7.5 for 4 ft	0.51
R-10 for 4 ft	0.48
R-15 for 4 ft	0.45
Fully Insulated Slab – Full Slab Area and Slab Edge Continuously Insulated	-
R-5 entire slab area and R-3.5 edge	0.48
R-5 entire slab area and edge	0.46
R-7.5 entire slab area and R-3.5 edge	0.45
R-7.5 entire slab area and edge	0.41
R-10 entire slab area and R-5 edge	0.40
R-10 entire slab area and edge	0.36
R-15 entire slab area and R-5 edge	0.35
R-15 entire slab area and edge	0.30
R-10 slab edge and under slab perimeter inward 4 ft; R-5 remaining slab area	0.42

R-15 slab edge and under slab perimeter inward 4 ft; R-5 remaining slab area	0.40
R-15 slab edge and under slab perimeter inward 4 ft; R-10 remaining slab area	0.34
Heated Slabs-on-Grade – Insulation Configurations	F-FACTOR (Btu/hr-ft-F)
Uninsulated	1.35
Fully Insulated Slab – Full Slab Area and Slab Edge Continuously Insulated	-
R-5 entire slab area and R-3.5 edge	0.77
R-5 entire slab area and edge	0.74
R-7.5 entire slab area and R-3.5 edge	0.71
R-7.5 entire slab area and edge	0.64
R-10 entire slab area and R-5 edge	0.62
R-10 entire slab area and edge	0.55
R-15 entire slab area and R-5 edge	0.54
R-15 entire slab area and edge	0.44
R-20 entire slab area and R-7.5 edge	0.44
R-20 entire slab area and edge	0.37
R-5 entire slab area and R-10 slab edge extending downward for minimum 3 ft	0.66
R-10 slab edge and under slab perimeter inward 4 ft; R-5 remaining slab area	0.66
R-15 slab edge and under slab perimeter inward 4 ft; R-5 remaining slab area	0.62
R-15 slab edge and under slab perimeter inward 4 ft; R-10 remaining slab area	0.51

a. For alternative slab-on-grade insulation configurations, F-factors shall be determined in accordance with accepted engineering practice for modeling three-dimensional ground coupled building assemblies using project-specific building and site conditions to estimate annual energy use attributed to foundation heat transfer and converting the result to an equivalent air-to-air F-factor basis.

b. Interpolation between R-values for a given insulation configuration type is permitted.

c. Tabulated F-factors are based on a typical soil thermal conductivity of 0.75 Btu/hr-ft-F and shall be multiplied by one of the following adjustment factors as applicable to site soil conditions: (1) rock or any soil on sites with poor drainage or high water table - 1.2; (2) sandy soils - 1.1; (3) loam or clay soils on well-drained sites in dry *climate zones* - 0.85; and (3) for all other soil or site conditions - 1.00. Where soil conditions are unknown, use of 1.00 is permitted.

d. Tabulated F-factors are based on a slab area to perimeter length ratio of 9:1 and shall be multiplied by one of the following adjustment factors as applicable to a slab's area to perimeter length ratio: 5:1 - 0.7; 6:1 - 0.8; 7:1 - 0.9; 8:1 - 0.95; 9:1 - 1.0; 10:1 - 1.05; 15:1 - 1.2; 20:1 - 1.35; 30:1 - 1.5; and for ≥ 40:1 - 1.7.

e. Tabulated F-factors are based on a slab perimeter edge projection above exterior finish grade of 6 inches. For portions of slab perimeter projecting 12 inches or more above grade, multiply the tabulated F-factors by one of the following adjustment factors as applicable: less than 12 inches - 1.0; 12 inches - 1.05; 18 inches - 1.1; 24 inches - 1.15; and 30 inches - 1.2.

f. For basement floor slabs and crawlspaces slabs or gravel floors, the tabulated F-factors shall be multiplied by one of the following adjustment factors based on the depth of the floor surface below exterior finish grade: less than 1ft - 1.0; 1 ft - 0.95; 3 ft - 0.9; and 6 ft or more - 0.8.

g. Vertical insulation on the exterior shall extend for the indicated depth below finish grade and above grade to the top of slab or stem wall. Where insulation is placed on the interior side of a foundation stem wall, it shall extend from the top of slab to the indicated depth below the exterior finish grade and the applicable tabulated F-factor shall be multiplied by 1.05.

h. The R-value of the vertical insulation located on the interior side of a stem wall shall be permitted to be reduced to R-2.5 at the slab edge, not exceeding 6 inches thick, provided the applicable F-factor is multiplied by 1.15 where R-5 vertical insulation is specified, 1.2 where R-10 vertical insulation is specified, or 1.25 where R-15 vertical insulation is specified.

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