

Attachments to Proposed Changes

April 13, 2018

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P034 – Chapter 11 Rewrite

Guide to Edits:

In order to save space, only Section number and titles are shown. If only the section number and title are shown, no edits were performed to that section. If a new section was added to Chapter 11 and only the section number and title are shown, then that section was copied verbatim from corresponding section in previous chapter. All other edits shown in red.

Black Text – Original Text

Red Text – Modified or Added Text.

Edits to Chapter 3:

304 GREEN MULTIFAMILY BUILDINGS

304.1 Multifamily buildings.

305 GREEN REMODELING

305.1 Compliance.

~~305.2 Compliance options. The criteria for existing buildings shall be in accordance with Section 305.3 for whole-building ratings or Section 305.4 for compliance designations of building functional areas.~~

305.3 Whole-building rating criteria

305.3.1 Applicability. The provisions of Section 305.3 shall apply to remodeling of existing buildings. In addition to the foundation, at least 50 percent of the structural systems of the existing building shall remain in place after the remodel for the building to be eligible for compliance under Section 305.3. Recent new construction projects are not eligible for verification under the remodel path. The Certificate of Occupancy date must be at least five years prior to the registration of a remodel project.

305.3.1.1 Additions.

305.3.2 Rating scope.

305.3.3 Mandatory practices. ~~The building, including any additions and common areas, shall satisfy all practices designated as mandatory in Chapter 11. Additions, alterations or repairs to an existing building, building system or portion thereof shall comply with the Mandatory requirements in Chapter 11. Unaltered portions of the existing building or building supply system shall not be required to meet Mandatory requirements except when life safety or apparent moisture issues exist.~~

305.3.4 Rating level

305.3.5 Energy Efficiency. ~~The energy efficiency rating level shall be based on the reduction in energy consumption resulting from the remodel in accordance with Table 305.3.5. The building shall comply with Section 11.305.3.5.1 or 11.305.3.5.2:~~

305.3.5.1 Energy Consumption Reduction Path: The energy efficiency rating level shall be based on the reduction in energy consumption resulting from the remodel in accordance with Table 305.3.5.1

Table 305.3.5.1
Energy Rating Reduction Level Thresholds

	Rating Level			
	BRONZE	SILVER	GOLD	EMERALD
Reduction in energy consumption	15%	25%	35%	45%

The reduction in energy consumption resulting from the remodel shall be based on the estimated annual energy cost savings or source energy savings as determined by a third-party energy audit and analysis or utility consumption data. The reduction shall be the percentage difference between the consumption per square foot before and after the remodel calculated as follows:

$$[(\text{consumption per square foot before remodel} - \text{consumption per square foot after remodel}) / \text{consumption per square foot before remodel}] * 100$$

The occupancy and lifestyle assumed and the method of making the energy consumption estimates shall be the same for estimates before and after the remodel. The building configuration for the after-remodel estimate shall include any additions to the building or other changes to the configuration of the conditioned space. For multifamily buildings, the energy consumption shall be based on the entire building including all dwelling units and common areas.

If a building can demonstrate through documentation approved by the Adopting Entity that the remodel activities started prior to project registration, the energy baseline (consumption per square foot before remodel) can be calculated based on data and building systems that existed in the building up to 3 years prior project registration.

305.3.5.2 Prescriptive Path: The building shall comply with Table 305.3.5.2 (Energy Rating Prescriptive Point Thresholds). Any practice listed in Section.11.703 shall be eligible for contributing points toward Table 305.3.5.2 (Energy Rating Prescriptive Point Thresholds). The attributes of the existing building that were in compliance with the prescriptive practices of in Section.11.703 prior to the remodel and remain in compliance after the remodel shall be eligible for contributing points to this section.

**Table 305.3.5.2
Energy Rating Prescriptive Point Thresholds**

	Rating Level			
	BRONZE	SILVER	GOLD	EMERALD
<u>Section 11.703 prescriptive thresholds</u>	<u>30</u>	<u>45</u>	<u>60</u>	<u>70</u>

Points from Section 11.703 and 11.705 do not count towards the total points for section 11.305.3.7

~~**305.3.6 Water efficiency.** The water efficiency rating level shall be based on the reduction in water consumption resulting from the remodel in accordance with Table 305.3.6. The building shall comply with Section 11.305.3.6.1 or 11.305.3.6.2:~~

305.3.6.1 Water Consumption Reduction Path: The water efficiency rating level shall be based on the reduction in water consumption resulting from the remodel in accordance with Table 305.3.6.1

**Table 305.3.6.1
Water Rating Reduction Level Thresholds**

	Rating Level			
	BRONZE	SILVER	GOLD	EMERALD
Reduction in water consumption	20%	30%	40%	50%

Water consumption shall be based on the estimated annual use as determined by a third-party audit and analysis or use of utility consumption data. The reduction shall be the percentage difference between the consumption before and after the remodel calculated as follows:

$$[(\text{consumption before remodel} - \text{consumption after remodel}) / \text{consumption before remodel}] * 100\%$$

The occupancy and lifestyle assumed and the method of making the water consumption estimates shall be the same for estimates before and after the remodel. The building configuration for the after-remodel estimate shall include any changes to the configuration of the building such as additions or new points of water use. For multifamily buildings, the water consumption shall be based on the entire building including all dwelling units and common areas.

If a building can demonstrate through documentation approved by the Adopting Entity that the remodel activities started prior to project registration, the water baseline (consumption before remodel) can be calculated based on data and building systems that existed in the building up to 3 years prior project registration

305.3.6.2. Prescriptive Path: The building shall comply with Table 305.3.6.2 (Water Rating Prescriptive Point Thresholds). Any practice listed in Section.11.801 shall be eligible for contributing points toward Table 305.3.6.2 (Water Rating Prescriptive Point Thresholds). The attributes of the existing building that were in compliance with the prescriptive practices of in Section.11.801 prior to the remodel and remain in compliance after the remodel shall be eligible for contributing points to this section.

**Table 305.3.6.2
Water Rating Prescriptive Point Thresholds**

	Rating Level			
	<u>BRONZE</u>	<u>SILVER</u>	<u>GOLD</u>	<u>EMERALD</u>
<u>Section 11.800 prescriptive thresholds</u>	<u>25</u>	<u>39</u>	<u>67</u>	<u>92</u>

305.3.7 Prescriptive practices. The point thresholds for the environmental rating levels based on compliance with the Chapter 11 prescriptive practices shall be in accordance with Table 305.3.7. Any practice listed in Chapter 11, except for 11.700 and 11.800, shall be eligible for contributing points to the prescriptive threshold ratings. The attributes of the existing building that were in compliance with the prescriptive practices of Chapter 11 prior to the remodel and remain in compliance after the remodel shall be eligible for contributing points to the prescriptive threshold ratings.

**Table 305.3.7
Prescriptive Threshold Point Ratings**

	Rating Level			
	<u>BRONZE</u>	<u>SILVER</u>	<u>GOLD</u>	<u>EMERALD</u>
Chapter 11 prescriptive thresholds	88	125	181	225

Delete Section 305.4 entirely

305.4.1 Applicability.

305.4.1.1 Additions.

305.4.2 Compliant.

305.4.3 Designation.

305.4.4 Additions.

305.4.5 Mandatory

305.4.6 Existing attributes.

306 GREEN ACCESSORY STRUCTURES

306.1 Applicability.

306.2 Compliance

Edits to Chapter 11:

CHAPTER 11 REMODELING

11.500 LOT DESIGN, PREPARATION, AND DEVELOPMENT

11.500.0 Intent

11.501 LOT SELECTION

11.501.2 Multi-modal transportation

11.502 PROJECT TEAM, MISSION STATEMENT, AND GOALS

11.502.1 Project team, mission statement, and goals

11.503 LOT DESIGN

11.503.0 Intent

11.503.1 Natural resources

11.503.2 Slope disturbance

11.503.3 Soil disturbance and erosion

11.503.4 Stormwater Management

11.503.5 Landscape plan

11.503.6 Wildlife habitat

11.503.7 Environmentally sensitive areas

11.504 LOT CONSTRUCTION

11.504.0 Intent

- 11.504.1 On-site supervision and coordination
- 11.504.2 Trees and vegetation
- 11.504.3 Soil disturbance and erosion implementation
- 11.505 INNOVATIVE PRACTICES**
 - 11.505.0 Intent
 - 11.505.1 Driveways and parking areas
 - 11.505.2 Heat island mitigation
 - 11.505.3 Density
 - 11.505.4 Mixed-use development
 - 11.505.5 Community Garden(s)
 - 11.505.6 Multi-unit plug-in electric vehicle charging
- 11.601 QUALITY OF CONSTRUCTION MATERIALS AND WASTE**
 - 11.601.0 Intent
 - 11.601.1 Conditioned floor area
 - 11.601.2 Material usage
 - 11.601.3 Building dimensions and layouts
 - 11.601.4 Framing and structural plans
 - 11.601.5 Prefabricated components
 - 11.601.6 Stacked stories
 - 11.601.7 Prefinished materials
 - 11.601.8 Foundations
- 11.602 ENHANCED DURABILITY AND REDUCED MAINTENANCE**
 - 11.602.0 Intent
 - 11.602.1 Moisture management – building envelope
 - 11.602.2 Roof surfaces
 - 11.602.3 Roof water discharge
 - 11.602.4 Finished grade
- 11.603 REUSED OR SALVAGED MATERIALS**
 - 11.603.0 Intent
 - 11.603.1 Reuse of existing building
 - 11.603.2 Salvaged materials
 - 11.603.3 Scrap materials
- 11.604 RECYCLED-CONTENT BUILDING MATERIALS**
 - 11.604.1 Recycled content
- 11.605 RECYCLED CONSTRUCTION WASTE**
 - 11.605.0 Intent
 - 11.605.1 Hazardous waste
 - 11.605.2 Construction waste management plan
 - 11.605.3 On-site recycling
 - 11.605.4 Recycled construction materials
- 11.606 RENEWABLE MATERIALS**
 - 11.606.0 Intent
 - 11.606.1 Biobased products
 - 11.606.2 Wood-based products
 - 11.606.3 Manufacturing energy
- 11.607 RECYCLING AND WASTE REDUCTION**
 - 11.607.1 Recycling and composting
 - 11.607.2 Food waste disposers
- 11.608 RESOURCE-EFFICIENT MATERIALS**
 - 11.608.1 Resource-efficient materials
- 11.609 REGIONAL MATERIALS**
 - 11.609.1 Regional materials
- 11.610 LIFE CYCLE ASSESSMENT**
 - 11.610.1 Life cycle assessment
 - 11.610.1.1 Whole-building life cycle assessment
 - 11.610.1.2 Life cycle assessment for a product or assembly
- 11.611 INNOVATIVE PRACTICES**
 - 11.611.1 Manufacturer’s environmental management system concepts

- 11.611.2 Sustainable products
- 11.611.3 Universal design elements
- 11.611.4 Product declarations

11.701 MINIMUM ENERGY EFFICIENCY REQUIREMENTS

- 11.701.4 Mandatory practices
 - 11.701.4.0 Minimum energy efficiency requirements
 - 11.701.4.1 HVAC systems
 - 11.701.4.2 Duct systems
 - 11.701.4.3 Insulation and air sealing

11.701.4.4 High-efficacy lighting Lighting efficacy in dwelling units is in accordance with one of the following:

- 1) A minimum of ~~75~~90 percent of the total hard-wired lighting fixtures or the bulbs in those fixtures qualify as high efficacy or equivalent
- 2) Lighting power density, measured in watts/square foot, is 1.1 or less.

- 11.701.4.5 Boiler supply piping
- 11.701.4.6 Fenestration specifications
- 11.701.4.7 Replacement fenestration

11.703.1 Mandatory Practices

11.703.1.1 UA Compliance The building thermal envelope is in compliance with Section 11.703.1.1.1 or 11.703.1.1.2.

Exception: Section 11.703.1.1 is not required for Tropical Climate Zone.

11.703.1.1.1 Maximum UA. For IECC residential, the total building UA is less than or equal to the total maximum UA as computed by ~~2015~~2018 IECC Section R402.1.5. For IECC commercial, the total UA is less than or equal to the sum of the UA for ~~2015~~2018 IECC Tables C402.1.4 and C402.4, including the U-factor times the area and C-factor or F-factor times the perimeter. The total UA proposed and baseline calculations are documented. REScheck or COMcheck is deemed to provide UA calculation documentation.

11.703.1.1.2 Prescriptive R-value and fenestration requirements. The building thermal envelope is in accordance with the insulation and fenestration requirements of ~~2015~~ 2018 IECC ~~R502.1.1.1~~ Table R402.1.1 or ~~Tables C402.1.3 and C402.4~~. The SHGC is in accordance with the ~~2015~~ 2018 IECC requirements.

11.703.1.2 Building Envelope Leakage. The building thermal envelope is in accordance with ~~2015~~ 2018 IECC ~~R402.4.1.2 or C402.5~~ R502.1.1.1 or R503.1.1 as applicable.

Exception: Section 11.703.1.2 is not required for Tropical Climate Zone.

11.703.1.3 Duct Testing. The duct system is in accordance with ~~2015~~ 2018 IECC R403.3.2 through R403.3.5 as applicable.

11.703.2 Building envelope

11.703.2.1 UA improvement

11.703.2.2 Mass walls

11.702.3

11.703.2.4 Building envelope leakage

11.703.2.5 Fenestration

11.703.2.5.1

11.703.2.5.1.1 Dynamic Glazing

11.703.2.5.2

11.703.2.5.2.1 Dynamic glazing

11.703.3 HVAC equipment efficiency

11.703.3.0 Multiple heating and cooling systems

11.703.3.1

11.703.3.2

11.703.3.3

11.703.3.4

11.703.3.5

11.703.3.6

11.703.3.7

11.703.3.8

11.703.4 Duct Systems

11.703.4.1

11.703.4.2

- 11.703.4.3
- 11.703.4.4 Duct Leakage
- 11.703.5 Water Heating System
 - 11.703.5.1
 - 11.703.5.2
 - 11.703.5.3
 - 11.703.5.4
 - 11.703.5.5 Solar water heater
- 11.703.6 Lighting and appliances
 - 11.703.6.1 Hard-wired lighting
 - 11.703.6.2 appliances
- 11.703.7 Passive Solar Design
 - 11.703.7.1 Sun tempered design
 - 11.703.7.2 window shading
 - 11.703.7.3 passive cooling design
 - 11.703.7.4 passive solar heating design
- 11.705 Additional practices
 - 11.705.1 Application of additional practice points. Points from Section 11.705 can be added to points earned in ~~Section 702 (Performance Path), Section 11.703 (Prescriptive Path), Section 704 (HERS Index Target Path), or Section 701.1.4 (alternative bronze and silver level compliance).~~
 - 11.705.2 Lighting
 - 11.705.2.1 Lighting controls
 - 11.705.2.1.1 Interior lighting
 - 11.705.2.1.2 Exterior lighting
 - 11.705.2.1.3 multifamily common areas
 - 11.705.2.1.4
 - 11.705.2.2 TDDs and skylights
 - 11.705.2.3 lighting outlets
 - 11.705.2.4 recessed luminaires
 - 11.705.3 induction cooktop
 - 11.705.4 return ducts and transfer grilles
 - 11.705.5 HVAC design and installation
 - 11.705.5.1
 - 11.705.5.2
 - 11.705.6 installation and performance verification
 - 11.705.6.1
 - 11.705.6.2 Testing
 - 11.705.6.2.1 air leakage validation of building or dwelling units
 - 11.705.6.2.2 HVAC airflow testing
 - 11.705.6.2.3 HVAC duct leakage testing
 - 11.705.6.3 insulating hot water pipes
 - 11.705.6.4 potable hot water demand re-circulation system
 - 11.705.6.4.1
 - 11.705.6.4.2
 - 11.705.7 submetering system
- 11.706 innovation practices
 - 11.706.1 energy consumption control
 - 11.706.2 renewable energy service plan
 - 11.706.3 smart appliance and systems
 - 11.706.4 pumps
 - 11.706.4.1
 - 11.706.4.2
 - 11.706.5 on-site renewable energy system
 - 11.706.6 parking garage efficiency
 - 11.706.7 grid-interactive electric thermal storage system
 - 11.706.8 electrical vehicle charging station
 - 11.706.9 automatic demand response
- 11.801 Indoor and outdoor water use

- 11.801.0 intent
- 11.801.1 indoor hot water usage
- 11.801.2 water-conserving appliances
- 11.801.3 showerheads
- 11.801.4 lavatory faucets
- 11.801.4.1
- 11.801.4.2
- 11.801.5 water closets and urinals
- 11.801.6 irrigation systems
- 11.801.6.1
- 11.801.6.2
- 11.801.6.3
- 11.801.6.4
- 11.801.6.5
- 11.801.7 rainwater collection and distribution
- 11.801.7.1
- 11.801.7.2
- 11.801.8 sediment filters
- 11.802 innovation practices
- 11.802.1 reclaimed gray, or recycled water
- 11.802.2 reclaimed water, greywater or rainwater pre-piping
- 11.802.3 automatic shutoff water devices
- 11.802.4 engineered biological system or intensive bioremediation system
- 11.802.5 recirculating humidifier
- 11.802.6 advanced wastewater treatment system
- 11.901 POLLUTANT SOURCE CONTROL**
- 11.901.0 Intent
- 11.901.1 Space and water heating options
- 11.901.2 Solid fuel-burning appliances
- 11.901.3 Garages
- 11.901.4 Wood materials
- 11.901.5 Cabinets
- 11.901.6 Carpets
- 11.901.7 Floor materials
- 11.901.8 Wall coverings
- 11.901.9 Interior architectural coatings
- 11.901.10 Interior Adhesives and sealants
- 11.901.11 Insulation
- 11.901.12 Carbon monoxide (CO) alarms
- 11.901.13 Building entrance pollutants control
- 11.901.14 Non-smoking areas
- 11.901.15 Lead-safe work practices
- 11.902 POLLUTANT CONTROL**
- 11.902.0 Intent
- 11.902.1 Spot ventilation
- 11.902.2 Building ventilation systems
- 11.902.3 Radon control
- 11.902.4 HVAC system protection
- 11.902.5 Central vacuum systems
- 11.902.6 Living space contaminants
- 11.903 MOISTURE MANAGEMENT: VAPOR, RAINWATER, PLUMBING, HVAC**
- 11.903.0 Intent
- 11.903.1 Plumbing
- 11.903.2 Duct insulation
- 11.903.3 Relative humidity
- 11.904 INDOOR AIR QUALITY**
- 11.904.0 Intent
- 11.904.1 Indoor Air Quality (IAQ) during construction

- 11.904.2 Indoor Air Quality (IAQ) post completion
- 11.905 INNOVATIVE PRACTICES
 - 11.905.1 Humidity monitoring system
 - 11.905.2 Kitchen exhaust
- 11.1001 HOMEOWNER'S MANUAL AND TRAINING GUIDELINES FOR ONE- AND TWO-FAMILY DWELLINGS
 - 11.1001.0 Intent
 - 11.1001.1 Homeowner's manual
 - 11.1001.2 Training of initial building owners
- 11.1002 CONSTRUCTION, OPERATION, AND MAINTENANCE MANUALS AND TRAINING FOR MULTIFAMILY BUILDINGS
 - 11.1002.0 Intent
 - 11.1002.1 Building construction manual
 - 11.1002.2 Operations manual
 - 11.1002.3 Maintenance manual
 - 11.1002.4 Training of building owners
- 11.1003 PUBLIC EDUCATION
 - 11.1003.0 Intent
 - 11.1003.1 Public Education
- 11.1005 INNOVATIVE PRACTICES

Edits to Chapter 12

Delete Chapter 12 entirely

~~CHAPTER 12 Remodeling of Functional Areas~~

New CHAPTER XX: Alternative Bronze Compliance Path for SF Homes, Townhomes, and Duplexes

303 Green Buildings

303.1 Compliance options. The criteria for new buildings shall be in accordance with Section 303.2 for residential buildings, the residential portion of mixed use buildings, or mixed-use buildings or Section 303.3 for compliance for single family homes, townhomes, and duplexes.

303.2 Green Buildings (*remains the same*)

- (1) Xx
- (2) Xx
- (3) xx

303.3 Green Single-family homes, townhomes, and Duplexes. Single-family homes, townhomes, and duplexes that meet all applicable requirements of Chapter 13 shall earn the Bronze certification level.

13.00 Substitution of practices. The adopting entity shall be permitted to substitute one or more practices with alternatives that achieve the overall intent of this standard. The determination of intent and equivalency is in the purview of the adopting entity.

LOT DEVELOPMENT

Floodplain. Construction shall not occur in a floodplain or construction shall be elevated above the floodplain.

Lot Slope. Finished grade at all sides of a building shall be sloped to provide a minimum of 6 inches (150 mm) of fall within 10 feet (3048 mm) of the edge of the building. Where lot lines, walls, slopes, or other physical barriers prohibit 6 inches (152 mm) of fall within 10 feet (3048 mm), the final grade shall be sloped away from the edge of the building at a minimum slope of 2 percent.

Soil preparation for new plants. Soil shall be tilled or new soil shall be added down 6” for new plants and 12” for new trees. Soil shall be amended with organic matter, such as mulch or compost, as needed. Long acting sources of nutrients shall be added if the soil is deficient.

Regionally Appropriate Vegetation. Where the jurisdiction that has authority has developed a specification for non-invasive vegetation that is native or appropriate for local growing conditions vegetation from that specification is selected for landscaping.

Regionally Appropriate Vegetation. ~~Where the~~ *When an Agency that has jurisdiction that has authority has developed a specification for planting, including for non-invasive vegetation that is native or appropriate for local growing conditions, vegetation from that specification is selected for the landscaping plan and that landscaping is installed.*

Soil preparation for new plants. ~~Soil shall be tilled or new soil shall be added down 6” for new plants and 12” for new trees. Soil shall be amended with organic matter, such as mulch or compost, as needed. Long acting sources of nutrients shall be added if the soil is deficient.~~ *The landscaping plan shall incorporate the jurisdictional Department of Transportation (DOT) specifications (or equal) for soil preparation and amendment for landscape planning. If regional conditions provide an alternative for planting (for instance, in drought or water challenged areas) that alternative shall be REQUIRED as a part of the landscape plan.*

NEW-Protection of Natural Resources: *Any trees or other natural resources that do not conflict with the home construction or finished grading and drainage of the lot and adjacent lots shall be properly protected during construction and all controls shall be removed following construction. The landscape plan shall contain details for the protection and instructions for incorporation of the trees/areas into the final landscape plan.*

RESOURCE EFFICIENCY (Durability)

Capillary Break. A capillary break and vapor retarder shall be installed at concrete slabs in accordance with IRC Sections R506.2.2 and R506.2.3.

Foundation drainage. Where required by the IRC for habitable and usable spaces below grade, exterior drain tile shall be installed.

Dampproof walls shall be provided below finished grade.

Sealed crawlspace. 6-mil polyethylene sheeting, or other Class I vapor retarder shall be installed in accordance with Section 408.3 or Section 506 of the International Residential Code.

Dry Insulation. Insulation in cavities shall be dry in accordance with manufacturer's instructions ~~when enclosed~~ before enclosing (e.g., with drywall).

Water-resistive barrier. ~~Where required by the IRC, or IBC,~~ a water-resistive barrier and/or drainage plane system shall be installed in accordance with IRC requirements behind exterior veneer and/or siding.

Flashing. Flashing shall be provided as follows to minimize water entry into wall and roof assemblies and to direct water to exterior surfaces or exterior water-resistive barriers for drainage. Flashing details shall be provided in the construction documents and shall be in accordance with the fenestration manufacturer's instructions, the flashing manufacturer's instructions, or as detailed by a registered design professional.

Flashing shall be installed at the following locations, as applicable:

- (1) around exterior fenestrations, skylights, and doors
- (2) at roof valleys
- (3) at building-to-deck, -balcony, -porch, and -stair intersections
- (4) at roof-to-wall intersections, at roof-to-chimney intersections, at wall-to-chimney intersections, and at parapets
- (5) at ends of and under masonry, wood, or metal copings and sills
- (6) above projecting wood trim
- (7) at built-in roof gutters
- (8) drip edge shall be installed at eave and rake edges
- (9) window and door head and jamb flashing is either self-adhered flashing complying with AAMA 711-13 or liquid applied flashing complying with AAMA 714-15 and installed in accordance with flashing fenestration or manufacturer's installation instructions
- (10) pan flashing is installed at sills of all exterior windows and doors
- (11) seamless, preformed kickout flashing, or prefabricated metal with soldered seams is provided at all roof-to-wall intersections. The type and thickness of the material used for roof flashing including but not limited to kickout and step flashing is commensurate with the anticipated service life of the roofing material
- (12) through-wall flashing is installed at transitions between wall cladding materials, or wall construction types.

Tile backing materials. Tile backing materials installed under tiled surfaces in wet areas shall be in accordance with ASTM C1178, C1278, C1288, or C1325. Tile shall not be installed over paper-faced drywall in wet areas.

Ice and water shield barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier shall be installed in accordance with the IRC ~~or IBC~~ at roof eaves of pitched roofs and shall extend a minimum of 24 inches (610 mm) inside the exterior wall line of the building.

Architectural features. Horizontal ledgers shall be sloped away to provide gravity drainage as appropriate for the application.

~~**Visible mold.** Building materials with visible mold shall not be installed or shall be cleaned or encapsulated prior to concealment and closing.~~

Visible Suspect Fungal Growth. Building materials with visible suspect fungal growth shall not be installed, or shall be addressed in accordance with industry recognized guidelines such as ANSI/IICRC S520 Mold Remediation or EPA 402-K-01-001 Table 2: Mold Remediation Guidelines, prior to concealment and closing.

Porous and semi-porous building materials should be stored in such a manner as to prevent excessive moisture content prior to installation or use. Relative humidity within the structure shall be controlled during construction so as to prevent the potential for microbial growth.

XX.602.1.10 Exterior doors. At least one entry at an exterior door assembly, inclusive of side lights (if any), are covered by one of the following methods to protect the building from the effects of precipitation and solar radiation. Either a storm door or a projection factor of 0.375 minimum is provided. Eastern- and western-facing entries in Climate Zones 1, 2, and 3, as determined in accordance with Figure 6(1) or Appendix C, have either a storm door or a projection factor of 1.0 minimum, unless protected from direct solar radiation by other means (e.g., screen wall, vegetation).

- (a) installing a porch roof or awning
- (b) extending the roof overhang
- (c) recessing the exterior door
- (d) Installing a storm door

XX.602.1.12 Roof overhangs. Roof overhangs, in accordance with Table ~~44~~.602.1.12, are provided over a minimum of 90 percent of exterior walls to protect the building envelope.

Roof Water Discharge. Gutters shall discharge 5' from building, onto paved surfaces, or into areas designed to infiltrate drainage into the ground or to water vegetation.

ENERGY EFFICIENCY

XX.701.0 Mandatory requirements. The building shall comply with Section 13.701 AND 13.702.0 (Performance Path), Section 13.703.0 (Prescriptive Path), or Section 13.704.0 (HERS Index Target Path).

Sampling is not allowed in air leakage and duct leakage testing for this alternative compliance path. The Energy Star Program referenced in this Chapter is to version 3.0.

XX.701.1 Adopting entity review. A review by the Adopting Entity or approved third party shall be conducted to verify design and compliance with these energy requirements.

XX.701.2 HVAC system sizing. Lot-specific space heating and cooling system is sized according to heating and cooling loads calculated using ACCA Manual J, or equivalent. Equipment is selected using ACCA Manual S and Manual D; or equivalent.

XX.701.3 Duct testing (Mandatory).

Ducts shall be pressure tested to determine air leakage by one of the following methods:

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

A written report of the results of the test shall be signed by the party conducting the test and provided to the code official. *Sampling shall not be permitted for this practice.*

XX.701.4 Radiant and hydronic space heating. Where installed as a primary heat source in the building, radiant or hydronic space heating system is designed, installed, and documented, using industry-approved guidelines and standards (e.g., ACCA Manual J, AHRI I=B=R, ACCA 5 QI-2010, or an accredited design professional's and manufacturer's recommendations).

XX.701.5 Building Thermal Envelope Air Sealing. The building thermal envelope is durably sealed to limit infiltration. The sealing methods between dissimilar materials allow for differential expansion and contraction. The following are caulked, gasketed, weather-stripped or otherwise sealed with an air barrier material, suitable film, or solid material:

- (a) All joints, seams and penetrations.
- (b) Site-built windows, doors, and skylights.
- (c) Openings between window and door assemblies and their respective jambs and framing.
- (d) Utility penetrations.
- (e) Dropped ceilings or chases adjacent to the thermal envelope.
- (f) Knee walls.
- (g) Walls and ceilings separating a garage from conditioned spaces.
- (h) Behind tubs and showers on exterior walls.
- (i) Common walls between dwelling units.
- (j) Attic access openings.
- (k) Rim joist junction.
- (l) Other sources of infiltration.

XX.701.6 Air sealing and insulation. Grade II and Grade III insulation shall not be permitted. Building envelope air tightness and insulation installation shall be verified to be in accordance with Section A and B.

A. Testing. Building envelope tightness shall be tested and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zone 1 or 2 and three air changes per hour in Climate Zones 3 through 8. *Sampling shall not be permitted for this practice.* Testing shall be conducted in accordance with ASTM E-779 or ASTM 1827 or RESNET/ICC 380 using a blower door at a test pressure of 1.04 psf (50 Pa). Testing shall be conducted after rough-in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation, and combustion appliances. Testing shall be conducted under the following conditions:

- a) Exterior windows and doors, fireplace and stove doors are closed, but not sealed;
- b) Dampers are closed, but not sealed, including exhaust, intake, make-up air, backdraft and flue dampers;
- c) Interior doors are open;
- d) Exterior openings for continuous ventilation systems and heat recovery ventilators are closed and sealed;
- e) Heating, cooling, and ventilation systems are turned off;
- f) HVAC duct terminations are not sealed; and
- g) Supply and return registers are not sealed.

B. Visual inspection. The air barrier and insulation items listed in Table 13.701.4.3.2(2) shall be field verified by visual inspection.

**Table 701.4.3.2(2)
Air Barrier and Insulation Installation**

COMPONENT	AIR BARRIER CRITERIA	INSULATION INSTALLATION CRITERIA
General requirements	A continuous air barrier shall be installed in the building envelope. The exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material.
Ceiling/attic	The air barrier in any dropped ceiling/soffit shall be aligned with the insulation and any gaps in the air barrier shall be sealed. Access openings, drop down stairs or knee wall doors to unconditioned attic spaces shall be sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.
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 comers and headers of frame walls shall be insulated by completely filling the cavity with a material having a thermal resistance of R-3 per inch minimum. Exterior thermal envelope insulation for framed walls shall be installed in substantial contact and continuous alignment with the air barrier.
Windows, skylights and doors	The space between window/doorjamb and framing, and skylights and framing shall be sealed.	
Rim joists	Rim joists shall include the air barrier.	Rim joists shall be insulated.
Floors (including above garage and cantilevered floors)	The air barrier shall be installed at any exposed edge of insulation.	Floor framing cavity insulation shall be installed to maintain permanent contact with the underside of subfloor decking, or floor framing cavity insulation shall be permitted to be in contact with the top side of sheathing, or continuous insulation installed on the underside of floor framing and extends from the bottom to the top of all perimeter floor framing members.
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping joints taped.	Where provided instead of floor insulation, insulation shall be permanently attached to the crawlspace walls.
Shafts, penetrations	Duct shafts, utility penetrations, and flue shafts opening to exterior or unconditioned space shall be sealed.	
Narrow cavities		Batts in narrow cavities shall be cut to fit, or narrow cavities shall be filled by insulation that on installation readily conforms to the available cavity space.
Garage separation	Air sealing shall be provided between the garage and conditioned spaces.	
Recessed lighting	Recessed light fixtures installed in the building thermal envelope shall be sealed to the drywall.	Recessed light fixtures installed in the building thermal envelope shall be air tight and IC rated.
Plumbing and wiring		Batt insulation shall be cut neatly to fit around wiring and plumbing in exterior walls, or insulation that on installation readily conforms to available space shall extend behind piping and wiring.
Shower/tub on exterior wall	The air barrier installed at exterior walls adjacent to showers and tubs shall separate them from the showers and tubs.	Exterior walls adjacent to showers and tubs shall be insulated.
Electrical/phone box on exterior walls	The air barrier shall be installed behind electrical or communication boxes or air-sealed boxes shall be installed.	
HVAC register boots	HVAC register boots that penetrate building thermal envelope shall be sealed to the subfloor or drywall.	
Concealed sprinklers	When required to be sealed, concealed fire sprinklers shall only be sealed in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.	

a. In addition, inspection of log walls shall be in accordance with the provisions of ICC-400.

XX.701.7 High-efficacy lighting. A minimum of 90 percent of the total hard-wired lighting fixtures or the bulbs in those fixtures qualify as high efficacy or equivalent.

XX.701.8 Appliances. If installed, refrigerator, dishwasher, and/or washing machine shall be ENERGYSTAR or equivalent.

XX.701.9 Clothes washers. Clothes washers rated with an IWF (integrated water factor), MEF (modified energy factor), or IMEF (integrated modified energy factor), shall be rated as follows:

1. Residential Clothes Washers, Front-loading, > 2.5 cu-ft
maximum IWF 3.2, minimum IMEF 2.76
2. Residential Clothes Washers, Top-loading, > 2.5 cu-ft
maximum 4.3 IWF, minimum IMEF 2.06
3. Residential Clothes Washers (\leq 2.5 cu-ft)
maximum 4.2 IWF, minimum IMEF 2.07

XX.702.0 Energy performance pathway.

XX.702.1 IECC analysis. Energy efficiency features are implemented to achieve energy cost or source energy performance that exceeds the IECC by 7.5 percent. A documented analysis using software in accordance with IECC, Section R405, is required.

XX.702.2 Energy performance analysis. Energy savings levels above the ICC IECC are determined through an analysis that includes improvements in building envelope, air infiltration, heating system efficiencies, cooling system efficiencies, duct sealing, water heating system efficiencies, lighting, and appliances.

XX.703.0 Energy prescriptive pathway

XX.703.1 UA Compliance. The building thermal envelope complies with Section 13.703.1.1 or 13.703.1.2. Exception: 13.703.1 is not required for Tropical Climate Zone

XX.703.1.1 Maximum UA. The total building UA is less than or equal to the total maximum UA as computed by IECC Section R402.1.5. The total UA proposed and baseline calculations are documented. REScheck is deemed to provide UA calculation documentation.

XX.703.1.2 R-values and fenestration requirements. The building thermal envelope is in accordance with the insulation and fenestration requirements of IECC Table R402.1.1. The SHGC is in accordance with the IECC requirements.

**TABLE 402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a**

CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, e}	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMENT ^c WALL U-FACTOR	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R-VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.32	0.55	0.25	38	20 or 13+5 ^h	8/13	19	5/13 ^f	0	5/13
4 except Marine	0.32	0.55	0.40	49	20 or 13+5 ^h	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.30	0.55	NR	49	20 or 13+5 ^h	13/17	30 ^g	15/19	10, 2 ft	15/19
6	0.30	0.55	NR	49	20+5 ^h or 13+10 ^h	15/20	30 ^g	15/19	10, 4 ft	15/19
7 and 8	3.30	0.55	NR	49	20+5 ^h or 13+10 ^h	19/21	38 ^g	15/19	10, 4 ft	15/19

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

- a. *R*-values are minimums. *U*-factors and SHGC are maximums. Where insulation is installed in a cavity that is less than the label or design thickness of the insulation, the installed *R*-value of the insulation shall be not less than the *R*-value specified in the table.
- 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. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation on the interior of the basement wall. "15/19" means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior basement wall. Alternatively, compliance with "15/19" shall be R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.
- d. R-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.
- e. There are not SHGC requirements in the Marine Zone.
- f. 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. 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. 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.

R402.1.4 U-factor alternative.

An assembly with a *U*-factor equal to or less than that specified in Table R402.1.4 shall be an alternative to the *R*-value in Table R402.1.2.

**TABLE R402.1.4
EQUIVALENT *U*-FACTORS^a**

CLIMATE ZONE	FENESTRATION <i>U</i> -FACTOR	SKYLIGHT <i>U</i> -FACTOR	CEILING <i>U</i> -FACTOR	FRAME WALL <i>U</i> -FACTOR	MASS WALL <i>U</i> -FACTOR ^b	FLOOR <i>U</i> -FACTOR	BASEMENT WALL <i>U</i> -FACTOR	CRAWL SPACE WALL <i>U</i> -FACTOR
1	0.50	0.75	0.035	0.084	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.084	0.165	0.064	0.360	0.477
3	0.32	0.55	0.030	0.060	0.098	0.047	0.091 ^c	0.136
4 except Marine	0.32	0.55	0.026	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.30	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.30	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.30	0.55	0.026	0.045	0.057	0.028	0.050	0.055

- a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- b. Mass walls shall be in accordance with Section R402.2.5. Where more than half the insulation is on the interior, the mass wall *U*-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 0.57 in Climate Zones 6 through 8.

XX.703.2 Space Heating and Cooling and Water Heating System Efficiencies. The Space Heating and Cooling and Water Heating systems are in accordance with Table 13.703.2.

Table 13.703.2

Climate Zone	Space Cooling System	Space Heating System - select 1 option from below				Water Heating System - select 1 option from below		
	AC	Gas Furnace	Gas Boiler	ASHP	GSHP or WSHP	Gas Tank WH	Gas Tankless WH	Elec Tank WH <55 gal
	Min. Req.	Min. Req.	Min. Req.	Min. Req.	Min. Req.	Min. Req.	Min. Req.	Min. Req.
1	15 SEER**	NA	85%	NA	Any	<= 55 gal 0.67 > 55 gal 0.77	≥.90	≥.95
2	15 SEER**	NA	85%	NA	Any	same	≥.90	≥.95
3	15 SEER**	92%	85%	≥ 8.5 HSPF*	Any	same	≥.90	≥.95
4	15 SEER**	92%	85%	≥ 8.5 HSPF*	Any	same	≥.90	≥.95
5	14 SEER	95%	85%	≥ 8.5 HSPF*	Any	same	≥.90	≥.95
6	14 SEER	95%	85%	≥ 8.5 HSPF*	Any	same	≥.90	≥.95
7	14 SEER	95%	85%	≥ 8.5 HSPF*	Any	same	≥.90	≥.95
8	14 SEER	95%	85%	≥ 8.5 HSPF*	Any	same	≥.90	≥.95

* ≥ 8.2 HSPF for single package

**zones 1-4 ≥12.5 EER for split; ≥12 EER for single package

XX.703.3 Duct leakage.

The total leakage of the ducts, where measured in accordance with Section R403.3.3, shall be as follows:

1. Rough-in test: The total leakage shall be less than or equal to 4 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m²) 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 cubic feet per minute (85 L/min) per 100 square feet (9.29 m²) of conditioned floor area.
2. Postconstruction test: Total leakage shall be less than or equal to 4 cubic feet per minute (113.3 L/min) per 100 square feet (9.29 m²) of conditioned floor area.

XX.703.4 High-efficacy lighting. A minimum of 95 percent of the total hard-wired lighting fixtures or the bulbs in those fixtures qualify as high efficacy or equivalent.

XX.705.0 HERS Index target pathway

XX.705.1 HERS index target compliance. Energy efficiency features are implemented to achieve a HERS Index performance that is 8 points less than the EPA HERS Index Target Procedure for Energy Star Qualified Homes [version 3.0](#) as computed based on Steps “1a” through “1d” of the EPA HERS Index Target Procedure.

WATER EFFICIENCY

XX.803 Lavatory faucets. Water-efficient lavatory faucets in bathrooms shall have a maximum flow rate of 1.5 gpm (5.68 L/m), tested at 60 psi (414 kPa) in accordance with ASME A112.18.1.

XX.805 Water closets shall have an effective flush volume of 1.28 gallons or less and shall meet a minimum MaP threshold of 350 and/or shall be WaterSense.

Irrigation systems. Where an irrigation system is installed, one of the following is met:

- (1) Drip irrigation is installed for all landscape beds and/or subsurface drip irrigation is installed for all turf grass areas.
- (2) Irrigation zones are organized by plant water needs.
- (3) The irrigation system(s) is controlled by a climate-based controller, soil moisture controller or no irrigation is installed.

Alternative Compliance Path: [Water Rating Index \(WRI\)](#) needs to achieve set level 75.

INDOOR ENVIRONMENTAL QUALITY

XX.901.1.4 Gas-fired fireplaces and direct heating equipment is listed and is installed in accordance with the NFPA 54, ICC IFGC, or the applicable local gas appliance installation code. Gas-fired fireplaces within dwelling units and direct heating equipment are vented to the outdoors.

XX.901.2.1 Solid fuel-burning fireplaces, inserts, stoves and heaters are code compliant and are in accordance with [one or more of](#) the following requirements:

- (1) Site-built masonry wood-burning fireplaces use outside combustion air and include a means of sealing the flue and the combustion air outlets to minimize interior air (heat) loss when not in operation.
- (2) Factory-built, wood-burning fireplaces are in accordance with the certification requirements of UL 127 and are EPA certified or Phase 2 Qualified.
- (3) Wood stove and fireplace inserts, as defined in UL 1482 Section 3.8, are in accordance with the certification requirements of UL 1482 and are in accordance with the emission requirements of the EPA Certification and the State of Washington WAC 173-433-100(3).
- (4) Pellet (biomass) stoves and furnaces are in accordance with ASTM E1509 or are EPA certified.
- (5) Masonry heaters are in accordance with the definitions in ASTM E1602 and ICC IBC Section 2112.1.
- (6) Fireplaces, woodstoves, pellet stoves, or masonry heaters are not installed.

XX.902 Garages. Garages shall be in accordance with “a” or “b”:

- a. Attached garage
 - (1) Doors installed in the common wall between the attached garage and conditioned space are tightly sealed and gasketed and;
 - (2) A continuous air barrier is provided separating the garage space from the conditioned living spaces.
- b. A carport is installed, the garage is detached from the building, or no garage is installed.

XX.903 Carpets. Wall-to-wall carpeting shall not be installed adjacent to

- (a) water closets and bathing fixtures, and
- (b) exterior doors.

Carbon monoxide (CO) alarms. A carbon monoxide (CO) alarm shall be provided in accordance with IRC Section R315 in any dwelling unit with a combustion fueled appliance or an attached garage with an opening that communicates with the dwelling unit.

~~Paint VOC content shall be in accordance with Table 13.901.9.2.~~

Interior Architectural Coatings. A minimum of 85 percent of the interior architectural coatings are in accordance with one or more of the following:

- (1) Zero VOC as determined by EPA method 24 (VOC content is below the detection limit for the method)
- (2) Green Seal GS-11
- (3) CARB *Suggested Control Measure for Architectural Coatings* (see Table 901.9.1)

Spot ventilation shall be in accordance with the following:

- (1) Bathrooms are vented to the outdoors. The minimum tested ventilation rate is 50 cfm (23.6 L/s) for intermittent operation or 20 cfm (9.4 L/s) for continuous operation in bathrooms. Exhaust fans are ENERGY STAR, or equivalent, fans.
- (2) Kitchen exhaust units and/or range hoods are ducted to the outdoors and have a minimum ventilation rate of 100 cfm (47.2 L/s) for intermittent operation or 25 cfm (11.8 L/s) for continuous operation.
- (3) Bathroom and kitchen exhaust ventilation rates are tested to meet minimum ventilation rates or ducts are installed to meet the prescriptive requirements in IRC Table M1504.2

Whole Dwelling Ventilation. One of the following whole dwelling ventilation systems shall be implemented and shall be in accordance with the specifications of Appendix B. An explanation of the operation and importance of the ventilation system shall be included in the homeowner's manual practice.

- (1) exhaust air ventilation system equipped with outdoor air ducts and intake(s) for ventilation air
- (2) exhaust air ventilation system equipped with outdoor air ducts and intake(s) for ventilation air and with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads.
- (3) Supply air ventilation system
- (4) supply air ventilation system equipped with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads
- (5) balanced air ventilation system with exhaust and supply fan(s) with supply intakes located in accordance with the manufacturer's guidelines so as to not introduce polluted air back into the building
- (6) heat-recovery ventilator
- (7) balanced air ventilation system with exhaust and supply fan(s) with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads, and with intakes located in accordance with the manufacturer's guidelines so as to not introduce polluted air back in to the building
- (8) energy-recovery ventilator

Radon control. Radon control measures are installed in accordance with 802.3 for Zone 1 as defined in Figure 9(1).

- (a) a passive radon system is installed, or
- (b) an active radon system is installed

Kitchen exhaust. If a kitchen exhaust unit(s) that equals or exceeds 400 cfm (189 L/s) is installed, make-up air shall be provided

MERV filters. Minimum 8 MERV filters shall be installed on central forced air systems and are accessible.

~~Six months of filters shall be provided to occupant.~~

HVAC system protection. One of the following HVAC system protection measures shall be performed.

- a) HVAC supply registers (boots), return grilles, and rough-ins are covered during construction activities to prevent dust and other pollutants from entering the system.
- b) Prior to owner occupancy, HVAC supply registers (boots), return grilles, and duct terminations are inspected and vacuumed. In addition, the coils are inspected and cleaned and the filter is replaced if necessary.

HOMEOWNER OPERATION AND MAINTAINANCE

Homeowner's manual. A homeowner's manual shall be provided. The homeowner's manual shall include all items below:

- (1) A National Green Building Standard certificate with a web link and completion document.
- (2) List of green building features (can include the National Green Building Standard checklist).
- (3) Product manufacturer's manuals or product data sheet for installed major equipment, fixtures, and appliances. If product data sheet is in the building owners' manual, manufacturer's manual may be attached to the appliance in lieu of inclusion in the building owners' manual.
- (4) Maintenance checklist.
- (5) Information on the importance and operation of the home's fresh air ventilation system.
- (6) Provide information on regionally-appropriate vegetation from the local authority with jurisdiction
- (7) A narrative detailing the importance of maintenance and operation of the green building features from the National Green Building Standard checklist in retaining the attributes of a green-built home.
- (8) Where stormwater management measures are installed on the lot, information on the location, purpose, and upkeep of these measures.

Training of initial homeowners. Initial homeowners shall be familiarized with the role of occupants in achieving green goals. Training is provided to the responsible party(ies) regarding equipment operation and maintenance, control systems, and occupant role. These include:

- (1) HVAC filters.
- (2) Water heater settings.
- (3) Whole-house ventilation systems.

P044 – Commercial Spaces New Construction

101.1 Intent. This chapter shall provide green requirements for the non-residential portion(s) of a mixed-use building.

101.2 Scope. The provisions of this Chapter shall apply to the design, construction, addition, and alteration of non-residential portion(s) of a mixed-use building.

102.1 Compliance. The non-residential portion(s) of a mixed-use building shall comply with all of the provisions of this chapter as applicable. The provisions of this Chapter are mandatory to demonstrate compliance with this Chapter.

102.1.1 Core and Shell compliance. The exterior air barrier, insulation, air sealing, and fenestration, are verified to the requirements of this chapter at the time of certification.

102.1.2 Full mixed-use building compliance. Residential and non-residential spaces are verified to the requirements of this standard at the time of certification. The residential portions of the building are verified to the requirements of Chapters 5 through 10 of this standard. The non-residential portion(s) of the building must comply with the requirements of this chapter.

102.1.3 Additions and alterations. The provisions of this Chapter shall only apply to areas of the building that are exposed or created during the remodel of mixed-use building(s) complying with Section 305, Green Remodeling.

102.1.4 Alternate compliance. Non-residential portions of a building shall comply with Chapters 6 through 10 of the International Green Construction Code.

Exception: Section 6.3.1 of the International Green Construction Code.

103.1 Bicycle Parking. Bicycle parking shall comply with section 103.1.1 through 103.1.2

103.1.1 Minimum number of spaces. The minimum number of required bicycle parking spaces shall be 4 parking spaces.

Exceptions:

- 1) The number of bicycle parking spaces shall be allowed to be reduced subject to Adopting Entity approval,
- 2) Bicycle parking shall **not** be required where the total non-residential conditioned space in the building is less than 1,000 square feet.
- 3) The minimum number of spaces shall be permitted to be reduced by the authority having jurisdiction based on the occupants expected use of public transit or walking to the building.

103.1.2 Location. The bicycle parking must be located on the same building site or within the building. It must be located within 100 ft. of, and visible from the main entrance.

104 Resource efficiency

104.1 Enhanced Durability

104.1.1 Capillary Break. A capillary break and vapor retarder shall be installed under the concrete slabs in accordance with ICC IBC Sections 1907, excluding exception #3 and 1805.2.1.

104.1.2 Foundation drainage. Where required by the ICC IBC for habitable and usable spaces below grade, exterior drain tile is installed.

104.1.3 Dampproof walls. Walls that retain earth, and encloses interior space are required to be dampproof per ICC IBC Section 1805.

104.1.4 Water-resistive barrier. Where required by the ICC IBC, a water-resistive barrier and/or drainage plane system is installed behind exterior cladding.

104.1.5 Flashing. Flashing is provided as follows to minimize water entry into wall and roof assemblies and to direct water to exterior surfaces or exterior water-resistive barriers for drainage. Flashing details are provided in the construction documents and are in accordance with the fenestration manufacturer's instructions, the flashing manufacturer's instructions, or as detailed by a registered design professional.

Flashing is installed at the following locations, as applicable unless in conflict with manufacturer's installation instructions:

- (13) around exterior fenestrations, skylights, and doors
- (14) at roof valleys
- (15) at all building-to-deck, -balcony, -porch, and -stair intersections
- (16) at roof-to-wall intersections, at roof-to-chimney intersections, at wall-to-chimney intersections, and at parapets
- (17) at ends of and under masonry, wood, or metal copings and sills
- (18) above projecting wood trim
- (19) at built-in roof gutters, and
- (20) drip edge is installed at eave and rake edges.
- (21) Window and door head and jamb flashing is either self-adhered or liquid applied.
- (22) Flashing is installed at exterior windows and doors
- (23) Through-wall flashing is installed at transitions between wall cladding materials or wall construction types.
- (24) Flashing is installed at the expansion joint in stucco walls.

104.1.6 Tile backing materials. Tile backing materials installed under tiled surfaces in wet areas are in accordance with ASTM C1178, C1278, C1288, or C1325. Tile shall not be installed over paper-faced gypsum board in wet areas.

104.1.7 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, an ice barrier is installed in accordance with the ICC IBC at roof eaves of pitched roofs and extends a minimum of 24 inches (610 mm) inside the exterior wall line of the building.

104.1.8 Architectural features. Architectural features that increase the potential for water intrusion are avoided, and must comply with the following:

- 1) Horizontal ledgers are sloped away to provide gravity drainage as appropriate for the application.
- 2) No roof configurations that create horizontal valleys in roof design
- 3) No recessed windows and architectural features that trap water on horizontal surfaces.

104.1.10 Moisture control measures. Moisture control measures for newly installed materials are in accordance with the following:

- (1) Building materials with visible mold are not installed or are cleaned or encapsulated prior to concealment and closing.
- (2) Insulation in cavities is dry in accordance with manufacturer's installation instructions when enclosed (e.g., with drywall)

104.2 Construction material and waste management plan. A written construction waste management plan is posted at the jobsite, and implemented.

104.3 Core and shell material selection. The core and shell of the non-residential portion of the building must contain similar green material selections of the residential portion of the building, and must comply with the additional provisions of this section.

104.3.1 Material selection. At least two types of the materials must be used from the following, and must comply with at least one of Sections of this standard that are listed below:

1. Biobased products Section 606.1
2. Wood-based products Section 606.2
3. Manufacturing energy Section 606.3
4. Resource-efficient materials Section 608.1
5. Regional materials Section 609.1
6. Product LCA Section 610.1.2.1
7. Building assemble LCA Section 610.1.2.2
8. Manufacturer's environmental management system concepts Section 611.1
9. Sustainable products Section 611.2
10. Salvaged materials Section 603.2
11. Product declarations Section 611.4 and 611.4.2
12. Recycled content Section 604.1

105 Energy Efficiency

105.1 Building thermal envelope insulation. The non-residential portion of the building must comply with the insulation requirements of Sections C402.1 through C402.3 of the ICC IECC as applicable, and Section 105.1.1. A UA tradeoff ~~that includes both the opaque envelope and fenestration~~ shall be allowed for sections 105.1 and 105.2 is equal to or less than the IECC UA.

Maximum UA. For IECC residential, the total building UA is less than or equal to the total maximum UA as computed by 2015 IECC Section R02.1.5. For IECC commercial, the total UA is less than or equal to the sum of the UA for 2015 IECC Tables C402.1.4 and C402.4, including the U-factor times the area and C-factor or F-factor times the perimeter. The total UA proposed and baseline calculations are documented. REScheck or COMcheck is deemed to provide UA calculation documentation.

105.1.1 Insulation installation. Insulation installed in the thermal envelope shall be visually inspected. Grade II and III insulation installation is not permitted.

105.2 Building thermal envelope fenestration. The non-residential portion of the building ~~must contain the equivalent fenestration values utilized in the residential portion~~ shall be in accordance with the requirements of Section C402.4 of the International Energy Conservation Code as applicable.

105.3 Building thermal envelope air sealing. The building thermal envelope is durably sealed to limit infiltration. The sealing methods between dissimilar materials allow for differential expansion and contraction. The following are caulked, gasketed, weather-stripped or otherwise sealed with an air barrier material, suitable film, or solid material:

1. All joints, seams and penetrations.
2. Site-built windows, doors and skylights.
3. Openings between window and door assemblies and their respective jambs and framing.
4. Utility penetrations.

5. Dropped ceilings or chases adjacent to the thermal envelope.
6. Knee walls.
7. Walls and ceilings separating the garage from conditioned spaces.
8. Behind tubs and showers on exterior walls.
9. Cantilevers.
10. Attic access openings.
11. Rim joists junction.
12. Other sources of infiltration.

105.3.1 Air barrier verification. The air barrier shall be visually inspected to demonstrate compliance with Table 701.4.3.2(2) of this standard or [the building thermal envelope shall be tested in accordance with ASTM E 779 at a pressure differential of 0.3 inch water gauge \(75 Pa\) or an equivalent method approved by the code official and deemed to comply with the provisions of this section when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/ft² \(2.0 L/s • m²\).](#)

105.4 Energy metering. Energy metering shall be provided for each tenant individually for the non-residential portions of the building.
Exception: non-residential spaces under 10,000 square feet.

105.5 Efficiency of HVAC equipment. HVAC equipment shall meet the minimum efficiency requirements listed in Tables C403.3.2(1) through C403.3.2(7) of the International Energy Conservation Code.

105.6 Efficiency of Service Water Heating equipment. Service Water Heating equipment shall meet the minimum efficiency requirements listed in ICC IECC Table C404.2

105.7 Lighting. The total interior lighting power allowance shall be less than the total lighting power allowance in accordance with Section C405.3.2 of the International Energy Conservation Code.

105.8 Commissioning.

105.8.1 Mechanical and service water heating systems. Mechanical and service water heating systems shall comply with ICC IECC Section C408.2.

105.9 Calculation of heating and cooling loads. Design loads associated with heating, ventilating and air conditioning of the building shall be determined in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure and using the design parameters specified in Chapter 3 of the ICC IECC. Heating and cooling loads shall be adjusted to account for load reductions that are achieved where energy recovery systems are utilized in the HVAC system in accordance with the ASHRAE HVAC Systems and Equipment Handbook or an approved equivalent computational procedure.

105.10 Duct air sealing. Ductwork shall be constructed in accordance with the ICC IMC.

105.11 Heated-water circulation and temperature maintenance. Where installed, heated- water circulation systems shall be in accordance with Section 105.11.1. Heat trace temperature maintenance systems shall be in accordance with Section 105.11.2. Controls for hot water storage shall be in accordance with Section 105.11.3. Automatic controls, temperature sensors, and pumps shall be in a location that is accessible. Manual controls shall be in a location with ready access.

105.11.1 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 shall be prohibited. Controls for circulation hot water system pumps shall start the pump based on the identification of a demand for hot water. The controls shall automatically turn off the pump when the water in the circulation loop is at the desired temperature and when there is not a demand for hot water.

105.11.2 Heat trace systems. Electric heat trace systems shall comply with IECC 505.1. Controls for such systems shall be able to automatically adjust the energy input to the heat tracing to maintain the desired water temperature in the piping in accordance with the times when heated water is used in the occupancy. Heat trace shall be arranged to be turned off automatically when there is not a demand for hot water.

105.11.3 Controls for hot water storage. The controls on pumps that circulate water between a water heater and a heated water storage tank shall limit the operation of the pump from the heating cycle startup to not greater than 5 minutes at the end of the cycle.

105.12 Energy options. Non-residential portions of the building shall comply with one of the three options below:

105.12.1 Energy requirements shall be met if modeling in accordance with C407 shows a 10% reduction in energy from the IECC.

105.12.2 Energy requirements shall be met if modeling in accordance with ASHRAE 90.1 Appendix G shows a 10% reduction in energy cost from the prescribed levels.

105.12.3 Energy requirements shall be met if at least two options in IECC Section C406 are met.

106 Water efficiency and conservation.

106.1 Fitting and fixture consumption. Plumbing fixtures and fixture fittings shall comply with the maximum flow rates specified in Table 106.1. Plumbing fixtures and fixture fittings in Table 106.1 shall have a manufacturer's designation for flow rate.

Exceptions: The following fixtures and devices shall not be required to comply with the reduced flow rates in Table 106.1.

1. Clinical sinks having a maximum water consumption of 4.5 gallons (17 L) per flush.
2. Service sinks, bath valves, pot fillers, laboratory faucets, utility faucets, and other fittings designed primarily for filling operations.
3. Fixtures, fittings, and devices whose primary purpose is safety.

**TABLE 106.1 MAXIMUM FLOW RATES AND FLUSH VOLUMES
FIXTURE OR FIXTURE FITTING TYPE MAXIMUM FLOW RATE OR FLUSH VOLUME**

FIXTURE OR FIXTURE FITTING TYPE	MAXIMUM FLOW RATE OR FLUSH VOLUME
Showerhead ^a	2.0 gpm at 80 psi
Lavatory faucet and bar sink-private	1.5 gpm at 60 psi
Lavatory faucet-public (metering)	0.25 gpc ^b at 60 psi
Lavatory faucet-public (non-metering)	0.5 gpm at 60 psi
Kitchen faucet-private	1.8 gpm at 60 psi
Kitchen and bar sink faucets in other than dwelling units and guest rooms	2.2 gpm at 60 psi
Urinal	0.5 gpf or nonwater urinal
Water closet	1.28 gpf ^{c,d}
Prerinse Spray Valves	1.3 gpm
Drinking Fountains (manual)	0.7 gpm ^e
Drinking Fountains (metered)	0.25 gpc ^{b,e}

a. Includes hand showers, body sprays, rainfall panels and jets.
 b. Gallons per cycle.
 c. Dual flush water closets in public bathrooms shall have a

maximum full flush of 1.28.

- d. The flush volume for water closets that are located at least 30 feet upstream of other drain line connections or fixtures and having less than 1.5 fixture units upstream of the water closet's connection to the drain line shall be not more than 1.5 gpf.
- e. Bottle filling stations associated with drinking fountains shall not have limitations for flow rate.

106.2 Once-through cooling for appliances and equipment. Once-through or single-pass cooling with potable or municipal reclaimed water is prohibited.

106.3 Clothes washers. Clothes washers rated with an IWF (integrated water factor), MEF (modified energy factor), or IMEF (integrated modified energy factor), shall be rated as follows:

4. Residential Clothes Washers, Front-loading, > 2.5 cu-ft maximum IWF 3.2 minimum IMEF 2.76
5. Residential Clothes Washers, Top-loading, > 2.5 cu-ft maximum 4.3 IWF, minimum IMEF 2.06
6. Residential Clothes Washers (≤ 2.5 cu-ft) maximum 4.2 IWF, minimum IMEF 2.07
7. Commercial Clothes Washers maximum 4.0 IWF, minimum MEF 2.20

106.4 Food Service.

106.4.1 Dipper wells. The water supply to a dipper well shall have a shutoff valve and flow control valve. The maximum flow shall not exceed 1 gpm (3.78 lpm) at a supply pressure of 60 psi (413.7 kPa). The dipper well shall have a manufacturer's designation of flow rate.

106.4.2 Food waste disposal. The disposal of food wastes that are collected as part of preparing ware for one or more of the following shall accomplish washing:

1. A food strainer (scraper) basket that is emptied into a trash can.
2. A garbage grinder where the water flow into the food waste disposer is controlled by a load sensing device such that the water flow does not exceed 1 gpm under no-load operating conditions and 8 gpm under full-load operating conditions
3. A pulper or mechanical strainer that uses not more than 2 gpm of potable water.

106.4.3 Pre-rinse spray heads. Food service pre-rinse spray heads shall have a manufacturers

designation of flow rate, shall comply with the maximum flow rate in Table 1305.1, and shall shut off *automatically* when released.

106.4.4 Hand washing faucets. Faucets for hand washing sinks in food service preparation and serving areas shall be of the self-closing type.

106.5. Water softeners. Water softeners shall comply with Sections 106.5.1 through 106.5.3.

106.5.1 Demand initiated regeneration. Water softeners shall be equipped with demand- initiated regeneration control systems. Such control systems shall automatically initiate the regeneration cycle after determining the depletion, or impending depletion of softening capacity.

106.5.2 Water consumption. Water softeners shall have a maximum water consumption during regeneration of 5 gal (18.9 L) per 1000 grains of hardness removed as measured in accordance with NSF 44.

106.5.3 Waste connections. Waste water from water softener regeneration shall not discharge to *reclaimed, gray water* or rainwater *water* collection systems and shall discharge in accordance with the *International Plumbing Code*.

106.6 Heat exchangers. Once-through or single-pass cooling with potable or municipal reclaimed water is prohibited. Heat exchangers shall be connected to a recirculating water system such as a chilled water loop, cooling tower loop, or similar recirculating system.

107 Indoor air quality

107.1 Carpets. Carpeting is not installed adjacent to water closets and bathing and or shower fixtures.

107.1.1 Entry. The primary entryway from the outdoors shall include one of the following:

1. Permanent walk-off mat that ~~is at least 4 feet (1.2 meters) long and~~ allows access for cleaning (e.g., grating with catch basin); or
2. Roll-out mat that ~~is at least 6 feet (1.8 meters) long and~~ will be maintained on a weekly basis by a contracted service.

107.2 Prohibited materials. The use of the following materials shall be prohibited:

1. Asbestos-containing materials
2. Urea-formaldehyde foam insulation

107.3 Pollutant source control products or material selection. At least two types of the materials must be used from the following, and must comply with at least one of the Sections of this standard that are listed below:

1. Wood materials Section 901.4
2. Cabinets Section 901.5
3. Floor materials Section 901.7
4. Wall coverings Section 901.8
5. Interior architectural coatings Section 901.9
6. Interior adhesives and sealants Section 901.10
7. Insulation Section 901.11

107.4 Fireplaces and appliances. Where located within buildings, fireplaces, solid fuel-burning appliances, vented decorative gas appliances, vented gas fireplace heaters and decorative gas appliances for installation in fireplaces shall comply with Sections 107.4.1 through 107.4.5.

107.4.1 Venting and combustion air. Fireplaces and fuel-burning appliances shall be vented to the outdoors and shall be provided with combustion air provided from the outdoors in accordance with the International Mechanical Code and the International Fuel Gas Code. Solid-fuel-burning fireplaces shall be provided with a means to tightly close off the chimney flue and combustion air openings when the fireplace is not in use.

107.4.2 Wood-fired appliances. Wood stoves and wood-burning fireplace inserts shall be listed and, additionally, shall be labeled in accordance with these requirements.

1. Site-built masonry wood-burning fireplaces use outside combustion air and include a means of sealing the flue and the combustion air outlets to minimize interior air (heat) loss when not in operation.
2. Factory-built, wood-burning fireplaces are in accordance with the certification requirements of UL 127.
3. Wood stove and fireplace inserts, as defined in UL 1482 Section 3.8, are in accordance with the certification requirements of UL 1482.

107.4.3 Biomass appliances. Biomass fireplaces, stoves and inserts shall be listed and labeled in accordance with ASTM E 1509 or UL 1482. Biomass furnaces shall be listed and labeled in accordance with CSA B366.1 or UL 391. Biomass boilers shall be listed and labeled in accordance with CSA B366.1 or UL 2523.

107.4.4 Gas-fireplaces. Gas-fired fireplaces and direct heating equipment is listed and is installed in accordance with the NFPA 54, ICC IFGC, or the applicable local gas appliance installation code. Gas-fired fireplaces within dwelling units and direct heating equipment are vented to the outdoors.

107.4.5 Unvented. Unvented room heaters and unvented decorative appliances, including alcohol burning, shall be prohibited.

107.5 Protection of HVAC system openings. HVAC supply and return duct and equipment openings shall be protected during dust-producing operations of construction.

107.6 Garages. Attached garages are in accordance with the following:

1. Doors installed in the common wall between the attached garage and conditioned space are tightly sealed and gasketed.
2. A continuous air barrier is provided separating the garage space from the conditioned spaces.

107.7 Spot Ventilation. Exhaust systems shall be provided in accordance with Chapter 5 of the ICC IMC or ASHRAE 62.1.

107.8 Building Ventilation Systems.

107.8.1 Building Ventilation. Ventilation shall be provided to non-residential spaces in accordance with Chapter 4 of the ICC IMC or ASHRAE 62.1.

107.8.2 Air filters. Air filters with a minimum MERV rating of 6 are installed on central forced air systems and are accessible.

107.9 Radon system. [SAME AS RESIDENTIAL SECTION]

~~**107.9 Radon testing.** Section x shall apply to radon zone 1 as defined in Figure 9(1).~~

~~Exceptions: Section x shall not be required where the authority having jurisdiction has defined the radon zone as Zone 2 or 3. Section x shall not be required where the occupied has no ground contact.~~

~~Radon testing shall be performed as specified in (a) through (j). This section does not require a specific test result, rather it requires the test be performed and the results provided to the registered design professional or owner.~~

~~(a) Testing is performed after the building meets its air tightness requirements.~~

~~(b) If there is a radon control system, testing is performed after the radon control system installation is complete. If the system has an active fan the building shall be tested with the fan operating.~~

~~(c) Testing is performed at the lowest level that will be occupied, even if the space is not finished. Spaces that are physically separated and covered by different HVAC systems shall be tested separately.~~

~~Exception - Section x shall not be required where the occupied space has no ground contact.~~

~~(d) Testing is not performed in a closet, hallway, stairway, laundry room, furnace room, bathroom or kitchen.~~

~~(e) Testing is performed with a commercially available test kit or with a continuous radon monitor that can be calibrated. Testing with test kits shall include two tests, which are averaged. Testing shall be in accordance with the testing device manufacturer's instructions.~~

~~(f) Testing shall be performed by the builder, a registered design professional or approved third party.~~

~~(g) Testing shall extend at least 48 hours or to the minimum specified by the testing device manufacturer, which ever is longer. This initial testing shall be permitted to extend past occupancy.~~

~~(h) Test results shall be provided directly to the owner by the test lab or testing party. The test results shall be delivered before or after occupancy.~~

~~(i) An additional pre-paid test kit shall be provided to the owner to use when they choose. The test kit shall include mailing, or emailing the results from the testing lab to the owner. The builder shall also be permitted to receive the test results.~~

~~(j) The registered design professional or owner shall be informed prior to occupancy and in writing that "A radon test result of 4 pCi/L or above is the 'action level' set by EPA. EPA recommends radon reduction measures to lower radon levels below 4 pCi/L." Or "For a radon test result of 4 pCi/L or above [name of builder or jurisdiction having authority] recommends radon reduction measures to lower radon levels below 4 pCi/L."~~

108 Operation, maintenance, and building owner education

108.1 OPERATION AND MAINTENANCE MANUALS FOR TENANTS. Manuals are provided to the initial tenants of the non-residential space regarding the operation, and maintenance of the building. Paper or digital format manuals are to include information

regarding those aspects of the building's maintenance, and operation that are within the area of responsibilities of the respective tenant. One or more responsible parties are to receive a copy of all documentation for archival purposes.

- 1) A narrative detailing the importance of operating in a green building. This narrative is included in all responsible parties' manuals.
- 2) A list of practices to conserve water and energy which require maintenance.
- 3) Information on opportunities to purchase renewable energy from local utilities or national green power providers.
- 4) Information on local and on-site recycling and hazardous waste disposal programs.
- 5) Local public transportation options for employees.
- 7) ~~Information on organic pest control and green cleaning products.~~

108.2 TENANT FINISH_OUT MANUAL. Manuals are provided to the tenants of the non-residential space prior to the start of construction regarding the design and construction of the non-residential portion of the building. Paper or digital format manuals are to include information regarding those aspects of the design and construction that are within the area of responsibilities of the respective tenant. One or more responsible parties are to receive a copy of all documentation for archival purposes.

- 1) Provisions of this Chapter verified at the time of building Certification for the respective space that shall be maintained as part of the Tenant Finish Out.
- 2) Provisions of this Chapter NOT verified at the time of building Certification for the respective space that shall be included in the Tenant Finish Out Construction Documents.
- 3) A list of minimum green building material specifications that are to be included in the Tenant Finish Out Construction Documents based on the materials that were installed in the residential portion of the building.

SECTION 202 DEFINITIONS

ADD Definition

VENTILATION AIR. That portion of supply air that comes from the outside (outdoors), plus any recirculated air that has been treated to maintain the desired quality of air within a designation space.

BALANCED AIR VENTILATION SYSTEM. two or more fans that simultaneously supply outdoor air and exhaust air at substantially equal rates such that both the total supply and total exhaust flow rates meet the required fan flow rate.

902.2 Building ventilation systems

902.2.1 One of the following whole building dwelling ventilation systems is implemented and is in accordance with the specifications of Appendix B and an explanation of the operation and importance of the ventilation system is included in either 1001.1 or 1002.2. Mandatory where the maximum air infiltration rate is less than 5.0 ACH50

- (1) exhaust air ventilation system equipped with outdoor air ducts and/or intake(s) for ventilation air 1
- (2) exhaust air ventilation system equipped with outdoor air ducts and/or intake(s) for ventilation air and with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads. 3
- (3) Supply air ventilation system 3
- (4) supply air ventilation system equipped with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads 5
- (5) balanced air ventilation system with exhaust and supply fan(s) with supply intakes located in accordance with the manufacturer's guidelines so as to not introduce polluted air back into the building 6
- (6) heat-recovery ventilator 7 8
- (7) balanced air ventilation system with exhaust and supply fan(s) with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads, and with intakes located in accordance with the manufacturer's guidelines so as to not introduce polluted air back in to the building 8 7
- (8) energy-recovery ventilator 8 9

11.902.2 Building ventilation systems

11.902.2.1 One of the following whole building dwelling ventilation systems is implemented and is in accordance with the specifications of Appendix B and an explanation of the operation and importance of the ventilation system is included in either 11.1001.1 or 11.1002.2. Mandatory where the maximum air infiltration rate is less than 5.0 ACH50

- (1) exhaust air ventilation system equipped with outdoor air ducts and intake(s) for ventilation air 1

- (2) exhaust air ventilation system equipped with outdoor air ducts and intake(s) for ventilation air and with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads. 3
- (3) Supply air ventilation system 3
- (4) supply air ventilation system equipped with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads 5
- (5) balanced air ventilation system with exhaust and supply fan(s) with supply intakes located in accordance with the manufacturer's guidelines so as to not introduce polluted air back into the building 6
- (6) heat-recovery ventilator 7
- (7) balanced air ventilation system with exhaust and supply fan(s) with automatic ventilation controls to limit ventilation air during periods of extreme temperature, extreme humidity and/or during times of peak utility loads, and with intakes located in accordance with the manufacturer's guidelines so as to not introduce polluted air back in to the building 8
- (8) energy-recovery ventilator 8

APPENDIX B

WHOLE DWELLING VENTILATION SYSTEM SPECIFICATIONS

B100

SCOPE AND APPLICABILITY

B101.1 Applicability of Appendix B. Appendix B is part of this Standard.

B101.2 Scope. The provisions contained in Appendix B provide the specifications necessary for complying with Section 902.2.1 for the installation of whole dwelling ventilation systems. To receive points for implementing Practice 902.2.1 or 11.902.1, the chosen whole dwelling ventilation system is to be in accordance with the applicable specifications of Appendix B.

Exceptions:

Whole-dwelling ventilation systems complying with ASHRAE 62.2-2016, Ventilation and Acceptable Indoor Air Quality in Residential, Sections 4 (except 4.3), 6 (except 6.3-6.6), 7 (except 7.2) and Appendix C shall also be deemed in compliance with Appendix B.

Multifamily buildings four or more stories in height complying with ICC IMC Section 403 shall also be deemed in compliance with Appendix B.

B101.3 Acknowledgment. Portions of the text of Appendix B, Section B200 and related Tables are extracted from ICC IRC and ,ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) Standard 62.2 Ventilation and Acceptable Indoor Air Quality in Residential Buildings, Section 4, and is used with the permission of ICC and ASHRAE. The referenced Section and Table numbers within the extracted text are modified to be applicable to Appendix B of this Standard. "*" indicates added reference to ICC or ASHRAE 62.2 to provide clarity.

B200

WHOLE-BUILDING VENTILATION

B201.1 Mechanical Ventilation Rate. A whole-dwelling mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Tables B201.1a and B201.1b or, equivalently, Equations B201.1a and B201.1b, based on the floor area of the conditioned space and number of bedrooms.

Exceptions: The whole-dwelling mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25-percent of each 4-hour segment and the average ventilation rate during each 4-hour segment meets or exceeds the continuous ventilation rate prescribed in Tables B201.1(1a) and B201.1(1b) or, equivalently, Equations B201.1a and B201.1b:

B201.1.1 Different Occupant Density. Tables B201.1a and B201.1b and Equations B201.1a and B201.1b assume two persons in a studio or one-bedroom dwelling unit and an additional person for each additional bedroom. Where higher occupant densities are known, the rate shall be increased by 7.5 cfm (3.5 L/s) for each additional person. When approved by the authority having jurisdiction, lower occupant densities may be used.

B201.1.2 Alternative Ventilation. Other methods may be used to provide the required ventilation rates (of Tables B201.1a and B201.1b) when approved by a licensed design professional.

Equation B201.1a

$$Q_{fan} = 0.01A_{floor} + 7.5(N_{br} + 1)$$

where

- Q_{fan} = fan flow rate, cfm
- A_{floor} = floor area, ft²
- N_{br} = number of bedrooms; not to be less than one

Equation B201.1b

$$Q_{fan} = 0.05A_{floor} + 3.5(N_{br} + 1)$$

where

- Q_{fan} = fan flow rate, L/s
- A_{floor} = floor area, m²
- N_{br} = number of bedrooms; not to be less than one

TABLE B201.1a (I-P)
Ventilation Air Requirements, cfm

Floor Area (ft ²)	Bedrooms				
	0-1	2-3	4-5	6-7	>7
<1500	30	45	60	75	90
1501-3000	45	60	75	90	105
3001-4500	60	75	90	105	120
4501-6000	75	90	105	120	135
6001-7500	90	105	120	135	150
>7500	105	120	135	150	165

TABLE B201.1b (SI)

Ventilation Air Requirements, L/s

Floor Area (m2)	Bedrooms					
	0-1	2-3	4-5	6-7	>7	
<139	14	21	28	35	42	
139.1-279		21	28	35	42	50
279.1-418		28	35	42	50	57
418.1-557		35	42	50	57	64
557.1-697		42	50	57	64	71
>697	50	57	64	71	78	

B201.1.3 Reduced Minimum Ventilation Requirement. The minimum continuous ventilation rate shall be reduced by 25%, provided the following criteria are met:

- 1) a ducted system supplies ventilation air directly to each bedroom and the largest common area.
- 2) not less than 70% of the whole building air volume is recirculated each hour. For intermittent systems, an equivalent mixing is provided over a four-hour period.
- 3) the whole-dwelling ventilation is provided by a balanced ventilation system.
- 4) the fans providing supply ventilation air and exhaust ventilation air shall be interlocked or communicate in such a way that they turn on/off concurrently.

B201.2 System Type. The whole-dwelling ventilation system shall consist of one or more supply or exhaust fans and associated ducts and controls. Local exhaust fans shall be permitted to be part of a mechanical exhaust system. Outdoor air ducts connected to the return side of an air handler shall be permitted as supply ventilation if manufacturers' requirements for return air temperature are met.

B201.3 Ventilation Airflow Measurement. The airflow required by this section is the quantity of outdoor ventilation air supplied and/or indoor air exhausted by the ventilation system as installed and shall be measured in accordance with Section 5 of RESNET/ICC 380 or other approved method.

B201.4 Restrictions on System Type. Use of certain ventilation strategies is restricted as follows.

B201.4.1 Exhaust Air Ventilation Systems. Exhaust air ventilation systems must specify how outside air is delivered at the flow rate required. Systems that rely on ventilation air through the building envelope or ventilation air from multifamily common areas, adjacent dwelling units, attics, basements, etc. are prohibited.