Connecticut Chapter

Association of Energy Engineers

Next Connecticut Energy Code

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Empowering you to make smart energy choices

EVERSOURCE ENERGY

UIL HOLDINGS COMPANIES

Next Connecticut

State Building Code

- 2012 International Building Code
- 2012 International Existing Building Code
- 2012 International Plumbing Code
- 2012 International Mechanical Code
- 2012 International Energy Conservation Code
- 2012 International Residential Code
- 2014 National Electrical Code (NFPA 70)

Anticipated Adoption Schedule

- Codes and Standards Committee approval
- Department of Administrative Services approval
  (1 month)
- Governor's Office and Office of Policy and Management for preliminary approval (3 to 5 months)
- Notification & public hearing (2 months)
- Revisions and notifications as required (1 to 4 months)
- Attorney General's Office (1 month)
- Legislator's Regulation Review Committee
  (2 to 4 months)
- Filing with Secretary of State

IECC - Buildings

Residential building (definition for this code)

- Detached one- and two-family dwellings
- Multiple single-family dwellings (townhouses)
- R-2, R-3 and R-4 buildings three stories or less in height above grade plane

Commercial building (definition for this code)

- All not included in residential building definition

Intent: This code regulates the design and construction of buildings for the effective use and conservation of energy over the useful life of each building.

Utility Efficiency Programs

- Code based projects
  - New construction
  - Renovations
  - Equipment replacement at end of useful life
  - Utility to define baseline
- Efficiency improvement projects
  - Comply with code
  - Utility review and approval of savings calculations

Residential Energy Efficiency

- Increased thermal envelope requirements
- Air leakage
  - ≤3 air changes per hour (ach)
  - CT Supplement:
    - ≤5 ach for multi dwelling unit buildings
    - ≤6.5 ach for multi dwelling units ≤850 sf
  - Testing
- Air handling system
  - Insulation & sealing
  - Testing

Residential Energy Efficiency

- Service hot water systems
  - R-3 Pipe insulation
    - By application
    - For exceeding lengths for nominal diameter
  - Circulating hot water system control
- Mechanical ventilation
  - Automatic or gravity dampers
  - System fan efficiency

Commercial Energy Efficiency

- Application: comply with ONE of:
  1. ANSI/ASHRAE/IESNA Standard 90.1-2010
  2. All IECC Section requirements and with one of Additional Efficiency Package Options, or
  3. Total Building Performance and all mandatory requirements. Building energy cost shall be ≤85% of standard reference design building.
- Application to existing building

  Additions, alterations and repairs shall comply with ONE of:
  1. Individual applicable sections, or
  2. ANSI/ASHRAE/IESNA Standard 90.1-2010

Commercial

Additional Efficiency Package Options

- Buildings comply with at least one of
  - Efficient HVAC performance
  - Efficient lighting system
  - On-site supply of renewable energy
- Individual tenant spaces comply with either
  - Efficient HVAC performance or
  - Efficient lighting system
  - Unless documented compliance with on-site supply of renewable energy for entire building

Commercial

Fenestration

- Maximum vertical fenestration area:
  - 30%
  - 40% if
    1. ≥50% of conditioned floor area in daylight zone;
    2. Automatic daylighting controls are installed in daylight zones; and
    3. Visible transmittance (VT) of vertical fenestration ≥0.44 (1.1 times SHGC of 0.40)

       Exception: Fenestration outside scope of NFRC 200 not required to comply with item 3
- Maximum skylight area:
  - 3%
  - 5% if automatic daylighting controls are installed in daylight zones under skylights
- Increased skylight SHGC and U-factor when
  - located above daylight zone provided with automatic daylighting controls

Commercial

Minimum Skylight Fenestration

- Above enclosed space
  - >10,000 sq. ft. directly under a roof
  - >15 feet ceiling height
  - Used as office, lobby, atrium, concourse, corridor, storage, gymnasium/exercise center, convention center, automotive service, manufacturing, non-refrigerated warehouse, retail store, distribution/ sorting area, transportation, or workshop
  - Lighting controls in daylight zones under skylights
    - All lighting in daylight zone shall be controlled by multilevel lighting controls

Commercial

Mechanical Equipment

- Package equipment
  - Full load efficiencies – generally same
  - Integrated part load efficiencies – increased
- Chillers
  - Efficiency requirements – generally same
- Package terminal units
  - New construction EERs – increased
- Boilers
  - Efficiency requirements - increased

Commercial

Mechanical Systems

- Controls
  - Optimum start
  - Zone exception for off hour controls with full load load demand ≤6,800 Btu/h
- VAV fan motors ≥7.5 hp
  - Speed control
  - Vane-axial fan with variable-pitch blades or
  - Other control or device
- Maximum leakage rates for dampers

Commercial

Energy Recovery Systems

- Required for fans systems in Climate Zone 5A when

Table C403.2.6	
Energy Recovery Requirement	
Percentage Outdoor Air at Full Design Airflow Rate	Design Supply Airflow Rate (cfm)
≥30% and <40%	≥5,500
≥40% and <50%	≥4,500
≥50% and <60%	≥3,500
≥60% and <70%	≥2,000
≥70% and <80%	≥1,000
≥80%	>0

- Capability to:
  - Provide change in enthalpy ≥50% of difference between outdoor and return air, and
  - Permit cooling with outdoor air where required

Commercial
Economizers

- On fan systems ≥33,000 Btu/h
- Either air or water side
  - Air economizer
    - Provide outside air up to 100% of design supply air
  - Water side economizer
    - Serving up to 100% cooling load when outdoor air 50° db & 45° wb
- Total system capacity without economizers
  - ≤300,000 Btu/h per building or
  - ≤20% of air economizer capacity

Commercial

Lighting System Controls

- ≥1 interior lighting control for each enclosed area
- Bi-level switching for each area requiring manual control
- Automatic time switch control in all areas of building
- Occupancy sensors
  - Required in classrooms, conference/meeting rooms, employee lunch & break rooms, private offices, restrooms, storage rooms, janitorial closets, and other spaces ≤300 sq. ft.
  - Automatic off within 30 minutes
  - Manual on or automatic on to ≤50% power

Commercial

Daylight Zone Lighting Control

- Independent of general area lighting
- Manual controls
- Automatic controls
  - Required for increased vertical fenestration area and increased skylight area, U-factor, SHGC
  - Continuous dimming to <35% rated power
  - Stepped dimming with one control step between 50% & 70% and one step ≤35% of design power
- Multi-level lighting controls
  - Required for minimum skylight area spaces
  - Reduces lighting in response to available daylight in space
  - When daylight illuminance > design general illuminance, automatically reduces general lighting to ≤35% of design power

Commercial

System Commissioning

- Covers commissioning of:
  - Building mechanical systems
  - Electrical power and lighting systems
- Definition

  Building commissioning. A process that verifies and documents that the selected building systems have been designed, installed and function according to the owner's project requirements and construction documents, and to minimum code requirements.

System Commissioning

- Mechanical systems commissioning and completion requirements
  - Prior to passing final mechanical inspection
    - Registered design professional shall provide
      - Evidence of mechanical system commissioning
      - Evidence of completion
  - Clearly indicated on construction documents
  - Documents
    - Given to owner
    - Available to building official

Commercial

System Commissioning

- Mechanical systems commissioning and completion requirements
  - Exception:
    1. Total mechanical equipment capacity in building:
       - <480,000 Btu/h cooling capacity, and
       - <600,000 Btu/h heating capacity
    2. Systems serving
       - Dwelling units
       - Sleeping units in hotels, motels, boarding houses, or similar units

Commercial

Mechanical System Commissioning

- Preliminary commissioning report
  - Completed & certified by registered design professional or approved agency
  - Identifies:
    - Itemization of deficiencies that have not been corrected
    - Deferred tests because of climate conditions
    - Climate conditions for deferred tests
  - Acceptance of report
    - Letter from building owner acknowledging receipt
  - Copy of report

Commercial

Mechanical System Completion

- Documentation requirements

  Provided to building owner within 90 days of receipt of CO

  - Drawings
  - Manuals
    - Submittal data
    - Manufacturer's operation manuals and maintenance manuals
    - Name and address of service agency
    - HVAC controls system maintenance and calibration information
    - Narrative of how each system is intended to operate
  - System balancing report
  - Final commissioning report
    - Functional performance tests results
    - Disposition of deficiencies including used or proposed corrective measures
    - Functional performance test procedures

Commercial

Lighting System Commissioning

- Lighting system functional testing
  - Construction documents define who will conduct required test
  - Procedures for installed controls:
    - Confirm placement, sensitivity and time-out adjustments for occupant sensors
    - Confirm time switches and programmable schedule controls are programmed to turn lights off
    - Confirm placement and sensitivity adjustments for photosensor controls

Questions

Thank You!

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