



Board of Building Standards

SPECIAL CODE COMMITTEE MEETING AGENDA

DATE: SEPTEMBER 17, 2021
TIME: 9:00 AM
LOCATION: TRAINING ROOM 3, 6606 TUSSING RD., REYNOLDSBURG, OH 43068

Call to Order

Approval of Minutes

Petitions

Recommendations of the Residential Construction Advisory Committee

Old Business

New Business

[NB-1](#) 2021 IECC-C Presentation - Guest Presenter, Shaunna Mozingo

Adjourn

File Attachments for Item:

NB-1 2021 IECC-C Presentation - Guest Presenter, Shaunna Mozingo

Significant changes 2018-2021 IECC Commercial Provisions

[Sources: IECC 2021]

- Changes climate zone maps resulting in 15 Ohio counties moving from Climate Zone 5 to Climate Zone 4
- Requires an insulation certificate identifying the installed R-value of insulation when the insulation of the manufacturer is not readily observable upon inspection
- Requires that a Thermal Envelope Certificate be posted in an approved location
- Clarifies and relocates all “Mandatory” and “Prescriptive” labels to a table

Definitions

- Adds or modifies definitions of “Biogas”, “Biomass”, “Data Center”, “Data Center Systems”, “Direct Digital Control”, “Enthalpy Recovery Ratio”, “Embedded Fan”, “Fan Array”, “Fan Energy Index (FEI)”, “Fan Nameplate Electrical Input Power”, “Fan System Electrical Input Power”, “Fault Detection and Diagnostics (FDD) System”, “Information Technology Equipment (ITE)”, “Internal Curtain System”, “Large Diameter Ceiling Fan”, “On-Site Renewable Energy”, “Renewable Energy Resources”, “Testing Unit Enclosure Area”, “Thermal Distribution Efficiency (TDE)”, “Vegetative Roof”, “Visible Transmittance, Annual”, and “Wall, Above-Grade”

Building Envelope

- Increased envelope stringency and clarity for conditioned greenhouses [C402.1.1.1]
- Allows certain electric equipment buildings up to 1200 ft² to be exempt from envelope requirements [C402.1.2]
- Recognizes and provides guidance for layered cavity insulation [C402.1.3]
- Increased stringency requirements for attic insulation, above-grade and below-grade walls, and unheated slabs [Tables C402.1.3 and C402.1.4]
- Clarifies U-factor and R-factor insulation requirements at roofs, particularly tapered above-deck insulation [C402.1.4.1 & C402.2.1]
- Adds limit of maximum of 25% glazing area for garage door [Table C402.1.4, note i]
- Increases stringency of U-values and SHGC for fenestration in CZ 4 and CZ 5 [Table C402.4]
- Clarifies skylight requirements [C402.4.2]
- Removes R-values for doors and prescribes maximum U-factors and glazing area for non-swinging doors [C402.4.5]
- Requires either air barrier inspection and commissioning or enclosure testing to verify envelope performance of buildings and provides testing methodologies [C402.5]
- Requires HVAC interlock with operable openings that are greater than 40 ft² and provides a few exceptions (separately zoned commercial kitchens, warehouses, and outside vestibule doors) [C402.5.11]

Mechanical

- Exempts data center systems from control and economizer requirements [C403.1]
- Requires that data center systems comply with ASHRAE 90.4 (with a few modifications) [C403.1.2]
- Requires large HVAC systems (serving $\geq 100,000$ ft²) in new buildings to provide a fault detection and diagnostics system [C403.2.3]
- Updates HVAC equipment efficiency tables (some efficiencies to go into effect on January 1, 2023) for air conditioners, heat pumps, furnaces, boilers, chillers, cooling towers, condensers, and computer room AC [Tables C403.3.2(1) - C403.3.2(16)]
- Clarifies heat pump control requirements [C403.4.1.1]

- Clarifies that automatic stop controls are also required for HVAC systems [C403.4.2.3]
- Requires two-position valve for hydronic heat pump systems to be automatic and interlocked [C403.4.3.3.3]
- Adds a Variable Refrigerant Flow (VRF) exception to economizer requirements [C403.5]
- Requires Demand Control Ventilation (DCV) whenever economizers are required [C403.7.1]
- Increases number of enclosed parking garages that will require detection and controls [C403.7.2]
- Prescribes specific enthalpy recovery ratios for dwelling unit energy recovery systems [C403.7.4.1]
- Differentiates control requirements for hotel and motels (Group R-1) based upon occupancy status of rooms and changes time-out time from 30 minutes to 20 minutes [C403.7.6]
- Requires fans and fan arrays to have a Fan Energy Index (FEI) certified IAW AMCA 208 [C403.8.3]
- Prescribes minimum efficiencies of low-capacity residential-type fans [C403.8.5]
- Recognizes Large-diameter ceiling fans [C403.9]
- Adds performance requirements for commercial refrigerators, freezers, walk-in coolers, walk-in refrigerators and refrigeration equipment [C403.11]
- Clarifies insulation requirements for underground ducts [C403.12.1]
- Prescribes control system operation for operable opening interlocks [C403.14]

Service Water Heating

- Increases minimum efficiency for large (1 M Btu/h input) individual water heating equipment to 92% [C404.2.1]

Lighting

- Clarifies what is meant by “general lighting” [C405.1]
- Requires corridor lighting to be reduced to minimum levels (no more than 50% full power) when unoccupied [C405.2.1.1 & C405.2.1.4]
- Adds a section for “warehouse storage areas” and requires occupant sensor controls [C405.2.1.2]
- Clarifies intent of light reduction control requirements [C405.2.3]
- Adds additional control requirements for the secondary side lit daylight zone [C405.2.4.2]
- Adds control requirements for parking lot luminaires [C405.2.7.3]
- Adds control requirements for parking garage lighting [C405.2.8]
- Clarifies lighting power allowance calculations, especially for projects that involve only a portion of a building and for exterior lighting [C405.3.2 & C405.5.2]
- Interior and exterior lighting power allowance have been modified to reflect new lighting levels in the IES lighting handbook and to recognize LED technology [Tables C405.3.2(1), C405.3.2(2), and C405.4.2(2)]
- Recognizes the high energy use of plant growth lighting and requires 95% of permanent luminaires to have a minimum photon efficiency of 1.6 m mol/J [C405.4]

Power

- Limits the combined voltage drop of customer-owned service conductors, feeder conductors and branch circuits to 5% [C405.10]
- Requires automatic receptacle control of at least 50% of 125V, 15 and 20 amp receptacles in offices, conference rooms, copy/print rooms, breakrooms, classrooms, and modular workstations and 25% of branch circuit feeders for modular furniture not shown on plans [C405.11]
- Requires new buildings with $\geq 25,000$ ft² to be provided with an energy monitoring system [C405.12]

Other Equipment

- Requires that escalators be designed to recover more electrical energy than is consumed when resisting overspeed in the down direction [C405.9.2.1]

Additional Efficiency Requirements [C406]

- Requires at least 10 credits by adding additional energy efficient features to the building. The credits are determined from newly added tables arranged by occupancy classification [C406.1]
- Modifies more efficient HVAC option [C406.2]
- Modifies reduced lighting power option [C406.3]
- Modifies the basic renewable energy option [C406.5]
- Adds options for energy monitoring systems, if not otherwise required [C406.10]
- Adds options for fault detection system, if not otherwise required [C406.11]
- Adds options for efficient kitchen equipment [C406.12]

Total Building Performance

- Provides a new table that outlines the code requirements that must be met when using the Total Building Performance method [Table C407.2]

Commissioning

- Allows an “approved agency” or a qualified commissioning professional to perform the commissioning activities [C408.3.1]

Existing Buildings

- Reorganizes and clarifies requirements
- Clarifies that commissioning is required for new lighting and power systems [C502.3.6]

Significant changes 2015-2018 IECC Commercial Provisions

[Sources: IECC 2018 and PNNL-SA-127543]

- Made several editorial changes to eliminate the use of the word “Accessible” (if not associated with the IBC Chapter 11 meaning of “Accessible”).
- Clarifies that commissioning is mandatory for all mechanical and hot water heating systems
- Adds additional as-built energy code documentation and owner training requirements for all buildings (typically part of the commissioning documents) ...these documents must be submitted to the owner within 90 days of receipt of the Certificate of Occupancy
- Enhanced the section for required energy code inspections

Definitions

- Adds or modifies definitions of “Access (to)”, “Air Barrier”, “Captive Key Override”, “Computer Room”, “Demand Recirculation Water System”, “Group R”, “IEC Design H Motor”, “IEC Design N Motor”, “Isolation Devices”, “Luminaire-level Lighting Controls”, “NEMA Design A Motor”, “NEMA Design B Motor”, “NEMA Design C Motor”, “Networked Guestroom Control System”, “Ready Access (to)”, and “Voltage Drop”

Building Envelope

- Increased stringency requirements for heated slabs [Tables C402.1.3 and C402.1.4]
- Adds maximum U-values for garage door glazing [Table C402.1.4]
- Requires 2 staggered layers of insulation board when continuous roof insulation is installed. Also provides a new exceptions for around roof drains [C402.2.1]
- Clarifies requirements for mass walls and mass floors [C402.2.2 and C402.2.3]
- Restores section on below-grade walls [C402.2.5]
- Adds a section on airspaces [C402.2.7]
- Decreases the SHGC for fenestration in Climates zones 4 and 5 [Table C402.4]
- Raises the allowable skylight area from 5% to 6% with daylight controls [C402.4.1.2]
- Clarified topics such as sliding doors [Table C402.5.2], rooms containing fuel-burning appliances [C402.5.3], loading dock weather seals [C402.5.6]

Mechanical

- Section 403 (Building Mechanical Systems) reorganized for ease of use
- Clarifies that HVAC equipment shall not be oversized [C403.3.1]
- Eliminates outdated federal equipment efficiencies for air conditioners, heat pumps, furnaces, boilers, chillers, cooling towers, and computer room AC [Tables C403.3.2(1) - C403.3.2(10)]
- Clarified that control must be “configured to” meet the requirements, not just be “capable of” meeting the requirements [throughout]
- Clarifies that many controls requirements are “Mandatory” [throughout]
- Adds HVAC control requirements for heated or cooled vestibules [C403.4.1.4]
- Adds pump flow control requirements for chilled and hot water hydronic piping distribution systems [C403.4.3.3.2 and C403.4.4]
- Adds exceptions to economizer requirements [C403.5]
- Adds a section requiring VAV with zone controls for multiple-zone systems [C403.6.1]
- Adds control requirements for parallel-flow fan-powered VAV air terminals [C403.6.7]
- Increases the threshold design airflow rate at which energy recovery is required [Table C403.7.4(2)]
- New HVAC set point and fan control requirements for hotel and motels (Group R-1) with greater than 50 guest rooms [C403.7.6]

- Provides an allowable hp exception for fans less than or equal to 5 hp [C403.8.1]
- Prescribes motor fan speed controls for heat-rejection devices [C403.9]
- Adds federal efficiency requirements for walk-in coolers and freezers to be in effect in 2020 [C403.10.2.1]

Service Water Heating

- Increased federal water heater efficiencies [Table C404.2]

Lighting

- Adds a section for “open plan office areas” and requires occupant sensor controls [C405.2.1.3]
- Adds exceptions for lighting controls for dwelling units [C405.2.4 #3] and patient rooms [C405.2.4 #2]
- Interior and exterior lighting power allowance have been modified (reduced) to reflect new lighting levels in the IES lighting handbook and to recognize LED technology [Tables C405.3.2(1), C405.3.2(2), and C405.4.2(2)]
- Lighting control requirements have been modified to add additional controls in some space types and options to others to allow easier application of advanced controls [C405.2]
 - Reduce exterior lighting power by 30% during periods of inactivity or after business hours [C405.2.6.3]
- Adds a requirement that 90% of permanently installed dwelling unit lighting fixtures use high efficacy lamps [C405.1]

Power

- Limits the combined voltage drop of feeder conductors and branch circuits to 5% [C405.9]

Other Equipment

- Updates electric motor terminology, adds exceptions, and adds efficiency tables consistent with federal regulations [C405.7]
- Adds an exception to allow a variable voltage drive in lieu of automatic speed control for escalators that are not conveying passengers [C405.8.2]

Additional Efficiency Package Options

- Adds options for enhanced envelope performance as determined by UA analysis [C406.8]
- Adds options for reduced air infiltration as determined by whole building air leakage testing [C406.9]

Total Building Performance

- Limits the amount of credit allowed for on-site renewable energy [C407.3]
- Limits the amount of credit allowed for renewable energy purchased from off-site sources [C407.3]

Commissioning

- Requires that building operations and maintenance documents be provided to the owner
- Requires a completed “Commissioning Compliance Checklist” with the “Preliminary Commissioning Report”

Existing Buildings

- Provides exceptions for Changes in Space Conditioning and for Changes of Occupancy

Significant changes 2012→2015 IECC Commercial Provisions

(Sources: PNNL-SA-107200 and ESL-TR-14-11-02 Texas A&M Energy Systems Laboratory)

Definitions

- Adds or modifies definitions of “Air Curtain”, “Alteration”, “Approved Agency”, “Boiler, Modulating”, “Boiler System”, “Bubble Point”, “Circulating Hot Water System”, “Computer Room”, “Condensing Unit”, “Conditioned Space”, “Continuous Insulation”, “Daylight Responsive Control”, “Daylight Zone”, “Fan Efficiency Grade”, “Fenestration”, “Floor Area, Net”, “General Purpose Electric Motor”, “Greenhouse”, “High Speed Door”, “Historic Building”, “Liner System”, “Low Sloped Roof”, “Low-voltage Dry-Type Distribution Transformer”, “Occupant Sensor Control”, “Opaque Door”, “Powered Roof/Wall Ventilator”, “Radiant Heating System”, “Refrigerant Dew Point”, “Refrigerated Warehouse Cooler”, “Refrigerated Warehouse Freezer”, “Refrigeration System”, “Repair”, “Reroofing”, “Roof Recover”, “Roof Replacement”, “Rooftop Monitor”, “Saturated Condensing Temperature”, “Small Electric Motor”, “Time-Switch Control”, “Variable Refrigerant Flow System”, “Walk-in Cooler”, “Walk-in Freezer”, “Wall, Above-grade”, “Wall, Below-Grade”, “Water Heater”

Building Envelope

- Adds an exception for greenhouses [C402.1.1]
- Increased stringency for roof insulation installed entirely above roof deck [Table C402.1.3]
- Increased stringency for SHGC of vertical fenestration [C402.4.3]
- Expanded requirements to calculate U-factors of walls with cold-formed steel, aged roof reflectance and provisions for rooms containing fuel burning appliances [C402.5]
- Mandatory skylight threshold reduced from 10K to 2.5K square feet [C402.4.2]

Mechanical

- Improved efficiency requirements for HVAC equipment performance [Table C403.2.3(1)-C403.2.3(10)]
- Added efficiency requirements for air-conditioning units serving computer rooms [Table C403.2.3(9)]
- Elaborated and added provisions for HVAC system controls which include: requirement for zone isolation [C403.2.4.4]; and requirement of economizer fault detection [C403.2.4.7]
- Added specifications for hot water boiler outdoor temperature setback control [C403.2.5]
- Updated provisions for energy recovery ventilation systems whose requirements are now based on the number of hour’s ventilations systems operate [C403.2.7]
- Introduced specifications for kitchen exhaust systems [C403.2.8]
- Updated requirements for duct and plenum insulation and sealing [C403.2.9]
- Introduced fan efficiency requirements [C403.2.12.3]
- Added specifications for commercial refrigeration equipment [C403.2.15 and C403.5]
- Updated provisions for air and water economizers, which include added requirements for the efficient operation of these systems [C403.3]
- Updated provisions for complex mechanical systems serving multiple zones, which include updated specifications for fan controls, heat rejection equipment and hot gas bypass limitations [C403.4]

Service Water Heating

- Added performance efficiencies for certain categories of service hot water systems [Table C404.2]
- Revises and clarifies the requirements for insulation of piping [C404.4]

- Added information for implementation of efficient heated water supply piping, heated water circulating and temperature maintenance system, demand recirculation controls, drain water heat recovery systems and energy requirements of portable spas [C404.5]
- Improved specifications for energy consumption of pools and permanent spas [C404.9]
- Added commissioning requirements for hot water systems [C404.11]

Lighting and Power

- Additional provisions for lighting controls, which include the added requirement of occupant sensor controls [C405.2.1]
- New exterior and warehouse lighting control requirements [C405.2.1.2]
- Revised daylighting zone controls [C405.2.3]
- New Hotel/motel sleeping and guest suite lighting controls [C405.2.4 #3]
- Updated lighting power densities for different building area types [Tables C405.4.2]
- Specifies non-tradable components of exterior lighting [C405.5.1]
- Requires a separate meter for each Group R-2 dwelling unit [C405.6]
- Adds federal minimum efficiency requirements for electric transformers [C405.7]
- Adds federal minimum efficiency requirements for electric motors [C405.8]
- Regulates elevator cab luminaires, ventilation fans, and controls [C405.9.1]
- Requires automatic speed control and a variable frequency regenerative drive for escalators [C405.9.2]

Other Equipment

Additional Efficiency Package Options

- Adds new options for more efficient HVAC equipment performance, for reduced lighting power densities, for enhanced digital lighting controls, for dedicated outdoor air systems, and for reduced energy use in service water systems [C406.1]

Total Building Performance

- No significant changes made to this section

Commissioning

- Adds commissioning requirements and documentation submittal requirements for lighting control systems including occupant sensor controls, time control switches, and daylight responsive controls [C408.3.1]

Existing Buildings

- Moved all existing building requirements from Chapter [CE] 1 to a new Chapter [CE] 5
- Historic buildings now partially covered [C501.6]
- Replacement fenestration covered [C401.2.1]
- Requires full upgrade of roofing insulation when re-roofing [C503.1]
- Roof replacement exempt from air barrier requirements [C503.1 Exception 6]