International Energy Conservation Code

• Scope
  • Buildings
  • Building sites
  • Associated systems and equipment

• Intent
  • Regulate design and construction
  • Effective use and conservation of energy
  • Over useful life of each building
Responsibilities

- Design professionals / designers
  - Develop construction documents that comply
  - Provide compliance documentation
- Building officials
  - Agree construction documents comply
  - Inspect as built conditions for compliance
- Contractors
  - Complete project in compliance with code

R103.2 Information on Construction Documents

- Insulation material and their R-values
- Fenestration U-factors and SHGCs
- Area-weighted U-factor and SHGC calculations
- Mechanical system design criteria
- Mechanical and service water heating system and equipment types, sizes and efficiencies
- Equipment and system controls
- Duct sealing, duct and pipe insulation and location
- Air sealing details
- Thermal envelope depiction
R401.2 Residential Energy Efficiency

• New construction must comply with one of
  • Sections R401 through R404
  • Simulated performance alternate and “mandatory” provisions of sections R401 through R404
  • Energy Rating Index (ERI) approach in section R406

• Existing buildings covered in Chapter 5

R502 Additions – Existing Buildings

• Prescriptive compliance
  • New envelope assemblies
    • Connecticut amendment for visual inspection
      • Building tightness
      • Insulation installation
    • Exception for conversion to condition space
  • Heating, cooling and duct systems
    • Exception for testing of <40’ new duct extensions
  • New service hot water systems
  • New Lighting systems
R503 Alterations – Existing Buildings

• Altered building envelope assembly compliance
  • Insulation criteria or U-factor alternative
  • Specific insulation requirements
  • Fenestration U-factor requirements
  • Fenestration air leakage rate
• Exceptions:
  • Storm windows over existing fenestration
  • Existing cavities exposed during construction
  • Existing cavities not exposed
  • Roof recover
  • Roofs without cavity insulation exposed during reroofing

R503 Alterations – Existing Buildings

• Compliance with IECC
  • New heating, cooling and duct systems
  • New service hot water systems
  • New lighting systems

• Change in space conditioning
  • Brought into full compliance
R401.3 Certificate

- Predominate insulation R-value
  - Ceiling / roof
  - Walls
  - Foundation
- Fenestration U-factor and SHGC
- Results of required duct system air leakage testing
- Results of building envelope air leakage testing
- Types and efficiencies of equipment

R402 Residential Thermal Envelope

<table>
<thead>
<tr>
<th>Table R402.1.1 Requirements by Component</th>
<th>Table R402.1.3 Equivalent U-factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fenestration U-factor 0.32</td>
<td>Fenestration U-factor 0.32</td>
</tr>
<tr>
<td>Skylight U-factor 0.55</td>
<td>Skylight U-factor 0.55</td>
</tr>
<tr>
<td>Glazed Fenestration SHGC NR</td>
<td>Ceiling U-factor 0.026</td>
</tr>
<tr>
<td>Ceiling R-value 49</td>
<td>Frame Wall U-factor 0.06</td>
</tr>
<tr>
<td>Wood Frame Wall R-value 20 or 13+5</td>
<td>Mass Wall U-factor 0.082</td>
</tr>
<tr>
<td>Mass Wall R-value 13/17</td>
<td>Floor U-factor 0.033</td>
</tr>
<tr>
<td>Floor R-value 30</td>
<td>Basement Wall U-factor 0.050</td>
</tr>
<tr>
<td>Basement Wall R-value 15/19</td>
<td>Crawl Space Wall U-factor 0.055</td>
</tr>
<tr>
<td>Slab R-value &amp; Depth 10, 2 ft</td>
<td>R-15 for heated slab in footnote d</td>
</tr>
<tr>
<td>Crawl Space Wall R-value 15/19</td>
<td>Or R402.1.4 Total UA alternative</td>
</tr>
</tbody>
</table>

Table R402.2.6 Steel-Frame Insulation R-value

<table>
<thead>
<tr>
<th>Steel Truss Ceilings R-49 R-38 + 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel-Framed Wall, 16” O.C. R-20 R-0 + 14.0 or R-13 + 8.9 or R-15 + 8.5 or R-19 + 7.8 or R-21 + 6.2 or R-21 + 7.5</td>
</tr>
<tr>
<td>Steel-Framed Wall, 24” O.C. R-20 R-0 + 14.0 or R-13 + 7.7 or R-15 + 7.1 or R-19 + 6.3 or R-21 + 5.9</td>
</tr>
</tbody>
</table>

Yellow indicates change from 2012 IECC

Continuous insulation (c):
Insulation that is continuous across all structural members without thermal bridges other than fasteners and service openings.
R402.2 Specific Insulation Requirements

• R402.2.1 Ceilings with attic spaces
• R402.2.2 Ceilings without attic spaces
• R402.2.3 Eave baffles
• R402.2.4 Access hatches and doors
• R402.2.5 Mass above grade walls
• R402.2.6 Steel-frame ceilings, walls and floors

• R402.2.7 Walls with partial structural sheathing
• R402.2.8 Floor insulation in permanent contact with underside of sub-floor decking
• R402.2.9 Basement walls
• R402.2.10 Slab-on-grade floors
• R402.2.11 Crawl space walls
R402 Sunrooms

- R402.2.13 Sunroom insulation
  - Code requirements or
  - Exception for thermally isolated sunrooms

- R402.3.5 Sunroom fenestration
  - Code requirements or
  - Exception for thermally isolated sunrooms

Thermal Isolation (definition). Physical and space conditioning separation from conditioned space(s). The conditioned space(s) shall be controlled as separate zones for heating and cooling or conditioned by separate equipment.

R402.4 Air Leakage

<table>
<thead>
<tr>
<th>Component</th>
<th>Insulation Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling/attic</td>
<td>R-24</td>
</tr>
<tr>
<td>Walls</td>
<td>R-15</td>
</tr>
<tr>
<td>Windows, skylights &amp; doors</td>
<td>R-10</td>
</tr>
<tr>
<td>Rim joists</td>
<td>R-10</td>
</tr>
<tr>
<td>Floors (including above garage and cantilevered floors)</td>
<td>R-10</td>
</tr>
<tr>
<td>Crawlspace walls</td>
<td>R-5</td>
</tr>
<tr>
<td>Stairs, penetrations</td>
<td>R-3</td>
</tr>
<tr>
<td>Narrow cavities</td>
<td>R-3</td>
</tr>
<tr>
<td>Garage separation</td>
<td>R-3</td>
</tr>
<tr>
<td>Recessed lighting</td>
<td>R-3</td>
</tr>
<tr>
<td>Plumbing and wiring</td>
<td>R-3</td>
</tr>
<tr>
<td>Shower/tub on exterior wall</td>
<td>R-3</td>
</tr>
<tr>
<td>Electrical/phone box on exterior walls</td>
<td>R-3</td>
</tr>
<tr>
<td>HVAC register boots</td>
<td>R-3</td>
</tr>
<tr>
<td>Concealed sprinklers</td>
<td>R-3</td>
</tr>
</tbody>
</table>

R402.4.1.1
- General requirements
- Ceiling/attic
- Walls
- Windows, skylights & doors
- Rim joists
- Floors (including above garage and cantilevered floors)
- Crawlspace walls
- Stairs, penetrations
- Narrow cavities
- Garage separation
- Recessed lighting
- Plumbing and wiring
- Shower/tub on exterior wall
- Electrical/phone box on exterior walls
- HVAC register boots
- Concealed sprinklers
R402.4 Air Leakage

• R402.4.1.2 Testing
  • Conducted at any time after creation of all penetrations
  • Verified \( \leq 3 \) air changes per hour (ach) @2" wg
    • Connecticut amendment for unguarded tests
      • \( \leq 5 \) ach for multi-family
      • \( \leq 6.5 \) ach for multi-family \( \leq 850 \) sq. ft.
  • Signed written report

R403 Residential Systems

• R403.1 Controls
  • \( \geq 1 \) thermostat for each separate system
  • Programmable thermostat for primary system
  • Heat pump supplementary control

• R403.2 Boiler outdoor temperature setback

• R403.3.1 Duct insulation

• R403.3.5 Building cavities

• R403.3.2 Sealing
R403 Residential Systems

• R403.3.3 Duct testing
• R403.3.4 Duct leakage
  • Rough-in test: total leakage
    • ≤8 cfm per 100 sq. ft across entire system
    • ≤3 cfm per 100 sq. ft if air handler not installed
  • Postconstruction test: total leakage
    • ≤8 cfm per 100 sq. ft across entire system

• R403.4 Pipe insulation

(Red indicates Connecticut amendment)

R403.5 Service Hot Water Systems

• R403.5.1 Circulating hot water systems
  • R403.5.1.1 Circulation systems
  • R403.5.1.2 Heat trace system

• R403.5.3 Demand recirculation systems

• R403.5.3 Pipe insulation: ≥R-3 on piping
  • ≥3/4”
  • Serving more than 1 dwelling unit
  • Located outside conditioned space
  • From water heater to distribution manifold
  • Located under floor slab
  • Buried in piping
  • In recirculating system other than demand recirculation
R403.6 Mechanical Ventilation

• R403.6.1 Whole-house fan efficiency

<table>
<thead>
<tr>
<th>Fan Location</th>
<th>Air Flow Rate Minimum (cfm)</th>
<th>Minimum Efficacy (cfm/watt)</th>
<th>Air Flow Rate Maximum (cfm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range hoods</td>
<td>Any</td>
<td>2.8</td>
<td>Any</td>
</tr>
<tr>
<td>In-line fan</td>
<td>Any</td>
<td>2.8</td>
<td>Any</td>
</tr>
<tr>
<td>Bathroom, utility room</td>
<td>10</td>
<td>1.4</td>
<td>&lt;90</td>
</tr>
<tr>
<td>Bathroom, utility room</td>
<td>90</td>
<td>2.8</td>
<td>Any</td>
</tr>
</tbody>
</table>

Exception: Fans with electronically commutated motors integral to tested and listed HVAC equipment.

R403 Residential Systems

• R403.7 Heating and cooling equipment sizing
  • Sized in accordance with ACCA Manual S
  • Based on loads calculated in accordance with ACCA Manual J

• R403.8 Systems serving multiple dwelling units
  • Comply with sections C403 and C404 of IECC
R406 Energy Rating Index (ERI)

Compliance:
- Meet mandatory requirements in sections R401.2 and R403.5.3
- ERI $\leq 61$ for rated design
  - Meet ERI of 61 without use of renewable credits
  (Red indicates Connecticut amendment)
- Verified by approved agency
- Compliance report
  - Identification of residential project
  - Inspection checklist with results for both reference design and rated design along with all inputs
  - Name of individual completing the report
  - Name and version of compliance software tool

Residential Documents at Completion

- Certificate posted on wall in approved location
- Blower door test results
- Duct tightness test results, if required
- Equipment and systems maintenance instructions
Sample Residential Project

REScheck Inputs for Sample Project
REScheck for Sample Project

The proposed building has been designed to meet the 2015 IECC requirements in REScheck-Web and to comply with mandatory requirements listed in the REScheck Inspection Checklist.

REScheck for Sample Project

Requirements: 97.0% were addressed directly in the REScheck software

Text in the "Comments/Assumptions" column is provided by the user in the REScheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Additional Comments/Assumptions:
# REScheck for Sample Project

## Foundation Inspection

<table>
<thead>
<tr>
<th>Section &amp; Req.ID</th>
<th>Foundation Inspection</th>
<th>Plans Verified Value</th>
<th>Field Verified Value</th>
<th>Complies?</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>402.1.1 [FO47]</td>
<td>Conditioned basement wall insulation R-value. Where interior insulation in used, verification may need to occur during Insulation Inspection. Not required in warm/humid locations in Climate Zone 3.</td>
<td>R=___</td>
<td>R=___</td>
<td><strong>Complies</strong>&lt;br&gt;Does Not&lt;br&gt;Not Observable&lt;br&gt;Not Applicable</td>
<td>See the Envelope Assemblies table for values</td>
</tr>
<tr>
<td>303.2 [FO45]</td>
<td>Conditioned basement wall insulation installed per manufacturer's instructions.</td>
<td></td>
<td></td>
<td><strong>Complies</strong>&lt;br&gt;Does Not&lt;br&gt;Not Observable&lt;br&gt;Not Applicable</td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>402.2.9 [FO47]</td>
<td>Conditioned basement wall insulation depth of burial or distance from top of wall.</td>
<td>____ ft</td>
<td>____ ft</td>
<td><strong>Complies</strong>&lt;br&gt;Does Not&lt;br&gt;Not Observable&lt;br&gt;Not Applicable</td>
<td>See the Envelope Assemblies table for values</td>
</tr>
<tr>
<td>303.2.1 [PO11]</td>
<td>A protective covering is installed to protect exposed exterior insulation and extends a minimum of 6 in. below grade.</td>
<td></td>
<td></td>
<td><strong>Complies</strong>&lt;br&gt;Does Not&lt;br&gt;Not Observable&lt;br&gt;Not Applicable</td>
<td>Exception: Requirement is not applicable.</td>
</tr>
<tr>
<td>403.9 [PO12]</td>
<td>Snow- and ice-melting system controls installed.</td>
<td></td>
<td></td>
<td><strong>Complies</strong>&lt;br&gt;Does Not&lt;br&gt;Not Observable&lt;br&gt;Not Applicable</td>
<td>Exception: Requirement is not applicable.</td>
</tr>
</tbody>
</table>

**Additional Comments/Assumptions:**
### REScheck for Sample Project

#### Framing / Rough-In Inspection

<table>
<thead>
<tr>
<th>Section # &amp; Req ID</th>
<th>Framing / Rough-In Inspection</th>
<th>Plans Verified Value</th>
<th>Field Verified Value</th>
<th>Complies?</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>402.1.1, 402.3.4 [FR1]</td>
<td>Door U-factor.</td>
<td>U-</td>
<td>U-</td>
<td>Does Not</td>
<td></td>
</tr>
<tr>
<td>303.1.3 [FR3]</td>
<td>U-factors of fenestration products are determined in accordance with the NFRC test procedure or taken from the default table.</td>
<td></td>
<td></td>
<td>Complies</td>
<td></td>
</tr>
<tr>
<td>402.4.1.1 [FR23]</td>
<td>Air barrier and thermal barrier installed per manufacturer's instructions.</td>
<td></td>
<td></td>
<td>Does Not</td>
<td></td>
</tr>
<tr>
<td>402.4.3 [FR20]</td>
<td>Fenestration that is not site-built is listed and labeled as meeting AAMA 1021/1021A or has infiltration rates per NFRC 400 that do not exceed code limits.</td>
<td></td>
<td></td>
<td>Does Not</td>
<td></td>
</tr>
</tbody>
</table>

#### HVAC and Vents

<table>
<thead>
<tr>
<th>Section # &amp; Req ID</th>
<th>HVAC and Vents</th>
<th>Plans Verified Value</th>
<th>Field Verified Value</th>
<th>Complies?</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>403.3.1 [FR12]</td>
<td>Supply and return ducts in attics insulated &gt;= R-8 where duct is &gt;= 3 inches in diameter and &gt;= R-6 where &lt; 3 inches. Supply and return ducts in other portions of the building insulated &gt;= R-4.2 for diameter &gt;= 3 inches and R-4.2 for &lt; 3 inches in diameter.</td>
<td>P:</td>
<td>P:</td>
<td>Complies</td>
<td>Exception: Ducts located completely inside the building envelope.</td>
</tr>
<tr>
<td>403.3.5 [FR15]</td>
<td>Building cavities are not used as ducts or plenums.</td>
<td></td>
<td></td>
<td>Does Not</td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>403.4 [FR17]</td>
<td>HVAC piping conveying fluids above 105 °F or chilled fluids below 55 °F are insulated to 2R-3.</td>
<td>P:</td>
<td>P:</td>
<td>Complies</td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>403.4.1 [FR24]</td>
<td>Protection of insulation on HVAC piping.</td>
<td></td>
<td></td>
<td>Does Not</td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>403.5.2 [FR18]</td>
<td>Hot water pipes are insulated to 2R-3.</td>
<td>P:</td>
<td>P:</td>
<td>Complies</td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>403.6 [FR19]</td>
<td>Automatic or gravity dampers are installed on all outdoor air intakes and exhausts.</td>
<td></td>
<td></td>
<td>Does Not</td>
<td>Requirement will be met.</td>
</tr>
</tbody>
</table>
REScheck for Sample Project

<table>
<thead>
<tr>
<th>Section</th>
<th>Final Inspection Provisions</th>
<th>Plans Verified Value</th>
<th>Field Verified Value</th>
<th>Complies?</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>403.3.1</td>
<td>Compliance certificate posted.</td>
<td></td>
<td></td>
<td></td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>403.3.3</td>
<td>Manufacturer manuals for mechanical and water heating systems have been provided.</td>
<td></td>
<td></td>
<td></td>
<td>Requirement will be met.</td>
</tr>
</tbody>
</table>

Additional Comments/Assumptions:
Commercial Provisions

• Chapter 3  General Requirements
• Chapter 5  Existing Buildings
  • C501  General
  • C502  Additions
  • C503  Alterations
  • C504  Repairs
  • C505  Change of occupancy or use
• Chapter 4  Commercial Energy Efficiency

C401.2 Energy Efficiency Application

• New building shall comply with one of:
  1. ANSI/ASHRAE/IESNA Standard 90.1-2013
     (with Normative Appendix G Excerpt published in June 2015)
  2. IECC envelope., mechanical systems, service water heating, electrical power and lighting systems requirements AND one additional efficiency option
  3. IECC Total Building Performance where proposed building energy cost ≤85% of standard reference design building
C406 Additional Efficiency Package Option

• Building complies with **at least one** of
  1. More efficient HVAC performance
  2. Reduced lighting power density
  3. Enhanced digital lighting control
  4. On-site supply of renewable energy
  5. Dedicated outdoor air system
  6. Reduced energy use in service water heating for defined building types

• Individual tenant spaces comply with:
  • 1, 2, 3, 5 or 6 above
  • Unless entire building complies with 4 above

C103.2 Information on Construction Documents

• Insulation material and their R-values
• Fenestration U-factors and SHGCs
• Area-weighted U-factor and SHGC calculations
• Mechanical system design criteria
• Equipment types, sizes and efficiencies
• Economizer description
• Equipment and system controls
• Fan motor horsepower (hp) and controls
• Duct sealing, duct and pipe insulation and location
• Lighting fixture schedule with wattage and control narrative
• Location of daylight zones on floor plans
• Air sealing details
• Building thermal envelope depiction on drawings
Compliance Documentation

• Critical for commercial projects
  • Multiple compliance paths
  • Requirements imposed by envelope design decisions

• Options
  • COMcheck
  • AIA sample documents
  • Standard forms
  • Developed by individual design professionals

C302.1 General Requirements

• Connecticut amendment
  • C302.1 Light pollution control
    • Exterior lighting from building service
    • Full cutoff luminaires
C502 Additions – Existing Buildings

• Compliance
  • Addition alone complies with
    • IECC or
    • ASHRAE/IESNA Standard 90.1-2013
  • Existing building & addition (as single building) complies with
    • IECC or
    • ASHRAE/IESNA Standard 90.1-2013

• Unaltered portions of existing building or building system not required to comply

C502.2 Additions – Existing Buildings

• Prescriptive compliance
  • C502.2.1 Vertical fenestration
    • Total building fenestration area with addition complies
    • Total building fenestration area with addition’s fenestration area exceeds maximum allowed
      • Addition alone complies
      • Total building performance method for total building
C502.2 Additions – Existing Buildings

• Prescriptive compliance
  • C502.2.2 Skylight area
    • Total fenestration area with new skylight area complies
    • Total building skylight area exceeds maximum allowed
      • Addition alone complies
      • Total building performance method for total building

C502.2 Additions – Existing Buildings

• Prescriptive compliance
  • C502.2.3 Building mechanical system
  • C502.2.4 Service water-heating systems
  • C502.2.6 Lighting power and systems
    • Addition alone complies
    • Existing building & addition complies as single building
C503 Alterations – Existing Buildings

• Alterations comply with
  • IECC or
  • ASHRAE/IESNA Standard 90.1-2013
• Altered building no less conforming

• Exceptions:
  • Storm windows installed over existing fenestration
  • Surface-applied window film on existing single-pane fenestration
  • Existing cavities exposed during construction filled with insulation
  • Construction where cavity is not exposed
  • Roof recover
  • Air barrier for roof recover & roof replacement & no other part of envelope
  • Replace <50% luminaires in space without increasing installed interior lighting power

C503 Alterations – Existing Buildings

• C503.3.1 Roof replacement where
  • Roof assembly part of thermal envelope
  • Insulation entirely above roof deck

• C503.3.2 Vertical fenestration
  • Total building fenestration area complies
  • Total building fenestration area exceeds maximum
    • Space adjacent to new fenestration complies
    • Total building performance method for total building
C503 Alterations – Existing Buildings

• C503.3.3 Skylight area
  • Total building skylight area complies
  • Total building skylight area exceeds maximum
    • Space adjacent to new skylight complies
    • Total building performance method for total building

• C503.4 Heating and cooling systems
  • New systems comply
  • Economizers for new systems in alteration

• C503.5 Service hot water systems
  • New systems comply

• C503.6 Lighting systems
  • Installed as part of alteration comply
    • Replaces ≥10% luminaires in space or
    • Increases installed interior lighting power
C503 Alterations – Existing Buildings

- Space converted to conditioned space must fully comply
- Change of occupancy or use comply where
  - Results in increased energy demand
  - Change in interior lighting building/space type

C402.1.3 Thermal Envelope

- Insulation Component (R-value-based method)
  - R-value of insulation in framing cavity
  - R-value of continuous insulation

Continuous insulation (ci): Insulation that is continuous across all structural members without thermal bridges other than fasteners and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building envelope.

| Table C402.1.3
<p>| Opaque Thermal Envelope Insulation Requirements |</p>
<table>
<thead>
<tr>
<th>Climate Zone 5</th>
<th>All Other</th>
<th>Group R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roofs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation entirely above deck</td>
<td>R-30ci</td>
<td>R-30ci</td>
</tr>
<tr>
<td>Metal buildings (with R-5 thermal blocks)</td>
<td>R-19 + R-11 LS</td>
<td>R-19 + R-11 LS</td>
</tr>
<tr>
<td>Attic and other</td>
<td>R-19</td>
<td>R-19</td>
</tr>
<tr>
<td>Walls, Above Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>R-11.4ci</td>
<td>R-13.3ci</td>
</tr>
<tr>
<td>Metal buildings</td>
<td>R-13 + R-13ci</td>
<td>R-13 + R-13ci</td>
</tr>
<tr>
<td>Metal Framed</td>
<td>R-13 + R-7.5ci</td>
<td>R-13 + R-7.5ci</td>
</tr>
<tr>
<td>Wood Framed and Other</td>
<td>R-13 + R-3.8ci or R-20</td>
<td>R-13 + R-7.5ci or R-20 + R-3.8ci</td>
</tr>
<tr>
<td>Walls, Below Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below-grade wall</td>
<td>R-7.5ci</td>
<td>R-7.5ci</td>
</tr>
<tr>
<td>Floors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>R-10ci</td>
<td>R-12.5ci</td>
</tr>
<tr>
<td>joist/framing</td>
<td>R-10</td>
<td>R-30</td>
</tr>
<tr>
<td>Slab-on-Grade Floors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unheated slabs</td>
<td>R-10 for 24&quot; below</td>
<td>R-10 for 24&quot; below</td>
</tr>
<tr>
<td>Heated slabs</td>
<td>R-15 for 36&quot; below</td>
<td>R-15 for 36&quot; below</td>
</tr>
<tr>
<td>Opaque Doors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonswinging</td>
<td>R-4.75</td>
<td>R-4.75</td>
</tr>
</tbody>
</table>

Yellow indicates change from 2012 IECC
C402.1.3 Thermal Envelope

- Assembly U-factor, C-factor or F-factor-based method
- Determination for cold-formed steel walls table
- Assembly values in appendix A of Standard 90.1

Component performance alternative

Yellow indicates change from 2012 IECC

Table C402.1.4

<table>
<thead>
<tr>
<th>Opaque Thermal Envelope Assembly Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Zone 5</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Roofs</td>
</tr>
<tr>
<td>Insulation entirely above deck</td>
</tr>
<tr>
<td>Metal buildings</td>
</tr>
<tr>
<td>Attic and other</td>
</tr>
<tr>
<td>Walls, Above Grade</td>
</tr>
<tr>
<td>Mass</td>
</tr>
<tr>
<td>Metal buildings</td>
</tr>
<tr>
<td>Metal framed</td>
</tr>
<tr>
<td>Wood framed and other</td>
</tr>
<tr>
<td>Walls, Below Grade</td>
</tr>
<tr>
<td>Below-grade wall</td>
</tr>
<tr>
<td>Floors</td>
</tr>
<tr>
<td>Mass</td>
</tr>
<tr>
<td>Joist/framing</td>
</tr>
<tr>
<td>Slab-on-Grade Floors</td>
</tr>
<tr>
<td>Unheated slabs</td>
</tr>
<tr>
<td>Heated slabs</td>
</tr>
<tr>
<td>Opaque Doors</td>
</tr>
<tr>
<td>Swinging</td>
</tr>
</tbody>
</table>

C402.1.3 Thermal Envelope

Fenestration

Table C402.4

<table>
<thead>
<tr>
<th>Building Envelope Fenestration Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Zone 5</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Yellow indicates change from 2012 IECC
C402.4.1 Fenestration

• Maximum area
  • ≤30% gross above-grade wall area
  • ≤3% gross roof area

• Maximum area with daylight responsive controls
  • ≤40% gross above grade wall area
    • Net floor area in daylight zone
      • ≥50% for buildings ≤2 stories
      • ≥25% for buildings ≥3 stories
    • Visible transmittance ≥0.44
  • ≤5% gross roof area

C402.4 Fenestration

• Minimum skylight area
  • Above enclosed spaces
    • >2,500 sq. ft.
    • >15 ft. ceiling height over ≥75% floor area
  • Minimum daylight zone area
    • For defined spaces
  • Multilevel lighting controls
  • >90% haze factor for defined spaces
C402.5.1 Air Leakage

• Air barriers
  • Continuous throughout envelope

• Air barrier construction
  • Continuous for all assemblies
  • Continuous across all joints and transitions

• Seal joints and seams
• Seal penetrations

<table>
<thead>
<tr>
<th>Table C402.5.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Air Infiltration Rate for Fenestration Assemblies</td>
</tr>
<tr>
<td>Fenestration Assembly</td>
</tr>
<tr>
<td>Windows</td>
</tr>
<tr>
<td>Sliding doors</td>
</tr>
<tr>
<td>Swinging doors</td>
</tr>
<tr>
<td>Skylights - with condensation weepage openings</td>
</tr>
<tr>
<td>Skylights - all others</td>
</tr>
<tr>
<td>Curtain walls</td>
</tr>
<tr>
<td>Storefront glazing</td>
</tr>
<tr>
<td>Commercial glazed swinging entrance doors</td>
</tr>
<tr>
<td>Revolving doors</td>
</tr>
<tr>
<td>Garage doors</td>
</tr>
<tr>
<td>Rolling doors</td>
</tr>
<tr>
<td>High-speed doors</td>
</tr>
</tbody>
</table>

C403.2 Mechanical Systems

• C403.2.1 Calculation of heating and cooling loads
  • Per ASHRAE Standard 183
  • All loads based on project design
  • Account for energy recovery

• C403.2.2 Equipment and system sizing
  • Output capacity ≤ calculated loads
C403.2 Mechanical Systems

- Controls
  - Thermostatic
  - Automatic start / stop / setback
  - Shutoff damper
  - Zone isolation
  - Boiler outdoor temperature setback
  - Airflow control
    - ≥65,000 Btu/h for DX cooling
    - ≥1/4 hp for chilled water and evaporative cooling
  - Compressor staging
    - Minimum number based on capacity

C403.2 Ventilation

- C403.2.6.1 Demand Control Ventilation
  - Spaces >500 sq. ft. and
  - Average occupant load ≥25 people per 1,000 sq. ft.
  - Defined systems

- C403.2.6.2 Enclosed parking garage ventilation
  - Automobiles operating under own power
  - Automatic fan control

- C403.2.7 Energy recovery ventilation systems
- C403.2.8 Kitchen exhaust systems
C403.2 Mechanical Systems

- HVAC equipment performance requirements
- Refrigeration equipment performance
  - Efficiencies for
    - Commercial refrigeration
    - Commercial refrigerators and freezers
  - Requirements for
    - Walk-in coolers
    - Walk-in freezers
    - Refrigerated warehouse coolers
    - Refrigerated warehouse freezers
    - Refrigerated display cases
    - Refrigeration system condensers and compressors

C403.3 Economizers

Air or water economizer on each cooling system

- Exception:
  - Individual fan cooling units <54,000 Btu/h meeting one
    - Direct expansion coils
    - Chilled water system capacity less units with air economizer
      - 1,320,000 Btu/h for local water-cooled system
      - 1,720,000 Btu/h for air-cooled system or district system
  - Total capacity of all-fan units without economizer
    - 20% total supply capacity in building or
    - 300,000 Btu/h
  - <5× capacity chilled water system serving residential
C403.3 Economizers

• Fault Detection and Diagnostics
  • Required for (when equipped with economizer)
    • Direct-expansion air-cooled unitary units
    • Variable refrigerant flow units
  • Fault detection capabilities
    • Air temperature sensor failure/fault
    • Not economizing when unit should be
    • Economizing when unit should not be
    • Dampers not modulating
    • Excess outdoor air

C404 Service Water Heating

• C404.2 Equipment performance efficiency tables
• C404.2.1 High input-rated systems
• C404.3 Heat traps
• C404.4 Pipe insulation
• C404.5 Efficient heated water supply piping
  • C404.5.1 Maximum allowable pipe length
    • From nearest source to termination of fixture supply pipe
  • C404.5.2 Maximum allowable pipe volume
C404  Service Water Heating

- C404.6.1 Circulation system controls
- C404.6.2 Heat trace system controls
- C404.6.3 Controls for hot water storage
- C404.7 Demand recirculation controls
- C404.9 Pools and permanent spas
  - C404.9.1 Heaters
  - C404.9.2 Time switches
  - C404.9.3 Covers
- C404.10 Portable spas

C405.2  Lighting System Controls

- C405.2.1 Occupant sensor control required spaces
  1. Classrooms/lecture/training rooms
  2. Conference/meeting/multipurpose rooms
  3. Copy/print rooms
  4. Lounges
  5. Employee lunch and break rooms
  6. Private offices
  7. Restrooms
  8. Storage rooms
  9. Janitorial closets
  10. Locker rooms
  11. Other spaces ≤300 ft² enclosed by floor-to-ceiling height partitions
  12. Warehouses
- C405.2.1.1 Occupant sensor control functions
- C405.2.1.2 Occupant sensor control functions in warehouse
C405.2 Lighting System Controls

• C405.2.2 Time-switch controls
  • In each area without occupant sensor control
  • Manual control for light-reduction

• C405.2.2.2 Light reduction control

• C405.2.3 Daylight-responsive controls
  • >150 watts of general lighting within daylight zone
  • Sidelight zones
  • Toplight zones

C405.2 Lighting System Controls

• C405.2.5 Exterior lighting controls
  1. Automatic off based on available daylight
  2. Automatic off for facade or landscape lighting
     • Dusk to dawn and
     • Set opening and closing time
  3. Automatic lighting power reduction (not covered in 2)
     • From not later than midnight to 6 am
     • From 1 hour after closing to 1 hour before opening
     • After no activity detected after 15 minutes
C405.4 Interior Lighting Power

Connected lighting power ≤ Lighting power allowance

• C405.4.1 Total connected interior lighting power
  • Sum of all interior lighting equipment in watts
• C405.4.2 Total interior lighting power allowance
  • Building area method or
  • Space-by-space method

C405.5.1 Exterior Building Lighting Power

• Total exterior lighting power allowance
  • Base site allowance
  • Lighting zones
  • Illuminated and permitted individual areas
  • Tradeable surfaces
  • Nontradable surfaces
• Exceptions
  • Specialized lighting associated with transportation
  • Advertising and directional signage
  • Integral to equipment or instrumentation
  • Theatrical purposes
  • Athletic playing areas
  • Temporary lighting
  • Industrial production, material handling, transportation sites and associated storage areas
  • Theme elements in theme/amusement parks
  • Used to highlight features of public monuments, historic landmarks or buildings
C405 Electrical Power

- C405.7 Electrical transformers
- C405.8 Electrical motors
- C405.9 Vertical & horizontal transportation
  - C405.9.1 Elevator cabs
  - ≥35 lumens per watt for lamination in each cab
  - ≤0.33 watts/cfm for ventilation fans
  - Controls to de-energize fans & lighting
- C405.9.2 Escalators and moving walks
  - Automatic speed control
- C405.9.2 Regenerative drive
  - For one-way down or reversible escalators

C408 System Commissioning

- C408.2 Mechanical & service water-heating
  - Indicated on construction documents
  - Prior to final inspection
  - Evidence of commissioning and completion
  - Documents to owner
  - Documents available to building official
- Exceptions
  - Systems in buildings
    - <480,000 Btu/h total cooling capacity and
    - <600,000 Btu/h combined water & space heating capacity
  - Systems serving dwelling units & sleeping units
C408 System Commissioning

- C408.3.1 Lighting system functional testing
  - C408.3.1.1 Occupant sensor controls
  - C408.3.1.2 Time-switch controls
  - C408.3.1.3 Daylight responsive controls
- C408.3.2 Documentation requirements

Sample Commercial Project

First Floor Plan

Second Floor Plan
COMcheck Input for Sample Project

[Image of COMcheck interface]

COMcheck Input for Sample Project

[Second image of COMcheck interface]
**COMcheck Input for Sample Project**

<table>
<thead>
<tr>
<th>Component</th>
<th>Equipment Type</th>
<th>Quantity</th>
<th>Equipment Capacity</th>
<th>Fuel Type/Heat Source</th>
<th>Condenser Type</th>
<th>Fan System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HVAC System</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>FAN SYSTEM 1</td>
</tr>
<tr>
<td>2</td>
<td>Heating equipment</td>
<td>1</td>
<td>324 kBtu/h</td>
<td>Gas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cooling equipment</td>
<td>1</td>
<td>259 kBtu/h</td>
<td>Air Cooled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HVAC System</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Heating equipment</td>
<td>1</td>
<td>324 kBtu/h</td>
<td>Gas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Cooling equipment</td>
<td>1</td>
<td>259 kBtu/h</td>
<td>Air Cooled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Plant</td>
<td>1</td>
<td>400 kBtu/h</td>
<td>Gas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Water Heater</td>
<td>1</td>
<td>1 gallons</td>
<td>Electric</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COMcheck Report of Sample Project**

---

**Envelop Compliance Certificate**

**Project Information**

- Energy Code: 2015 IECC
- Project Title: 2015 IECC Sample Office
- Location: Hartford, Connecticut
- Climate Zone: 5a
- Project Type: New Construction
- Vertical Glazing / Wall Area: 30%
- Construction Site: 
- Owner/Agent: 
- Designer/Contractor: 

**Building Area**  
- 1-Office: Nonresidential  
- Floor Area: 20000

**Additional Efficiency Package**

- Reduced interior lighting power. Requirements are implicitly enforced within interior lighting allowance calculations.
COMcheck Report for Sample Project

Envelope Assemblies

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Gross Area of Perimeter</th>
<th>Cavity R-Value</th>
<th>Cont. R-Value</th>
<th>Proposed U-Factor</th>
<th>Budget U-Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof: Insulation Entirely Above Deck, [Bldg. Use 1 - Office]</td>
<td>10400</td>
<td>30.0</td>
<td>0.032</td>
<td>0.022</td>
<td></td>
</tr>
<tr>
<td>Ext. Wall: Steel-Frame, 16&quot; c.c., [Bldg. Use 1 - Office]</td>
<td>10400</td>
<td>19.0</td>
<td>7.5</td>
<td>0.060</td>
<td>0.064</td>
</tr>
<tr>
<td>Window: Metal Frame with Thermal Break: Fixed, Per Spec.: Product ID 125, SHRGC 0.40, [Bldg. Use 1 - Office] [b]</td>
<td>3849</td>
<td>—</td>
<td>—</td>
<td>0.380</td>
<td>0.380</td>
</tr>
<tr>
<td>Window: Metal Frame with Thermal Break: Fixed, Per Spec.: Product ID 129, SHRGC 0.40, [Bldg. Use 1 - Office] [b]</td>
<td>60</td>
<td>—</td>
<td>—</td>
<td>0.390</td>
<td>0.390</td>
</tr>
<tr>
<td>Window: Metal Frame with Thermal Break: Fixed, Per Spec.: Product ID 132, SHRGC 0.40, [Bldg. Use 1 - Office] [b]</td>
<td>35</td>
<td>—</td>
<td>—</td>
<td>0.380</td>
<td>0.380</td>
</tr>
<tr>
<td>Door: Metal Frame with Thermal Break: Fixed, Per Spec.: Product ID 123, SHRGC 0.40, [Bldg. Use 1 - Office] [b]</td>
<td>72</td>
<td>—</td>
<td>—</td>
<td>0.380</td>
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</tr>
<tr>
<td>Door: Metal Frame with Thermal Break: Fixed, Per Spec.: Product ID 129, SHRGC 0.40, [Bldg. Use 1 - Office] [b]</td>
<td>52</td>
<td>—</td>
<td>—</td>
<td>0.770</td>
<td>0.770</td>
</tr>
<tr>
<td>Door: Insulated Metal, Swinging, [Bldg. Use 1 - Office]</td>
<td>10</td>
<td>—</td>
<td>—</td>
<td>0.370</td>
<td>0.370</td>
</tr>
</tbody>
</table>

(a) Budget U-Factors are used for software baseline calculations ONLY, and are not code requirements.
(b) Fenestration product performance must be certified in accordance with NFRC and requires supporting documentation.

Envelope PASSES: Design 4% better than code

Envelope Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed envelope systems have been designed to meet the 2015 ICC requirements in COMcheck Version 7.0 on COMcheck-Web and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

COMcheck Report for Sample Project

Additional Efficiency Package

Reduced interior lighting power: Requirements are explicitly enforced within interior lighting allowance calculations.

Allowed Interior Lighting Power

<table>
<thead>
<tr>
<th>Area Category</th>
<th>D</th>
<th>C</th>
<th>Allowed Watts / ft²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>20000</td>
<td>0.74</td>
<td>14760</td>
</tr>
</tbody>
</table>

Total Allowed Watts = 14760

Proposed Interior Lighting Power

<table>
<thead>
<tr>
<th>Fixture ID</th>
<th>Description</th>
<th>Lamp</th>
<th>Wattage Per Lamp</th>
<th>Ballast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>Linear fluorescent: 4' T12 32W (Super T8): Premium efficiency</td>
<td>2</td>
<td>2000</td>
<td>10360</td>
</tr>
<tr>
<td>Office</td>
<td>Linear fluorescent: 2' T8 22W: Premium efficiency</td>
<td>2</td>
<td>70</td>
<td>1950</td>
</tr>
<tr>
<td>Office</td>
<td>Linear fluorescent: 4' T12 17W: Premium efficiency</td>
<td>2</td>
<td>70</td>
<td>1950</td>
</tr>
<tr>
<td>Office</td>
<td>Linear fluorescent: 4' T8 32W (Super T8): Premium efficiency</td>
<td>1</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Office</td>
<td>LED LED-PAR 13W</td>
<td>1</td>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

Total Proposed Watts = 14902

Interior Lighting PASSES: Design 2% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2015 ICC requirements in COMcheck Version 7.0 on COMcheck-Web and to comply with any applicable mandatory requirements listed in the Inspection Checklist.
## COMcheck Report for Sample Project

### Inspection Checklist

**Energy Code: 2015 IECC**

**Requirements:** 100.0% were addressed directly in the COMcheck software.

Text in the “Comments/Assumptions” column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

<table>
<thead>
<tr>
<th>Section &amp; Req ID</th>
<th>Plan Review</th>
<th>Complies?</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>C103.2 (PR4)</td>
<td></td>
<td></td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>C103.2 (PR8)</td>
<td></td>
<td></td>
<td>Requirement will be met.</td>
</tr>
<tr>
<td>C402.4.1 (PR10)</td>
<td></td>
<td></td>
<td>Requirement will be met.</td>
</tr>
</tbody>
</table>

---

### Extension

Additional detailed information and calculations related to the compliance requirements can be found in the following sections:

- C103.2 (PR4)
- C103.2 (PR8)
- C402.4.1 (PR10)
COMcheck Report for Sample Project

### Section & Req.ID | Plan Review | Compliance? | Comments/Assumptions
--- | --- | --- | ---
C402.4.1 [PR11]
The skylight area <= 3 percent of the gross roof area.
| | | Yes | Requirement will be met. |

### Exception: Requirement does not apply.

C406.2.2 [PR14]
In enclosed spaces > 2,500 ft² directly under a roof with ceiling heights > 15 ft. and used as an office, lobby, store, concourse, corridor, storage, gymnasium/exercise center, convention center, automobile service, manufacturing, non-sprinklered warehouse, retail store, distribution/sorting area, transportation, or workshop, the following requirements apply: (a) the daylight zone under skylights is >= half the floor area, (b) the skylight area to daylight zone is >= 3 percent with a skylight VT >= 0.40, or a minimum skylight effective aperture >= 1 percent.
| | | Yes | Requirement will be met. |

### Additional Comments/Assumptions:

---

COMcheck Report for Sample Project

### C406.2.1 [F128]
Commissioning plan developed by registered design professional or approved agency.
| | | Yes | Requirement will be met. |

### C406.2.2 [F131]
HVAC equipment has been tested to ensure proper operation.
| | | Yes | Requirement will be met. |

### C406.2.3 [F132]
HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.
| | | Yes | Requirement will be met. |

### C406.2.4 [F145]
Economizers have been tested to ensure proper operation.
| | | Yes | Requirement will be met. |

### C406.2.5 [F152]
Preliminary commissioning report completed and certified by registered design professional or approved agency.
| | | Yes | Requirement will be met. |
AIA CT Sample Documentation

AIA Connecticut Web Page
Committees Building Performance & Regulations


---

<table>
<thead>
<tr>
<th>Section C401</th>
<th>Application</th>
<th>Compliance with C402, C403, C404 and C405 AND at least one of Additional Efficiency Package Option (C406)</th>
<th>Non-construction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 More efficient HVAC performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Reduced lighting power density</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Enhanced lighting controls</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 On-site renewable energy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Provision of dedicated outdoor air system</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 High efficiency service water heating</td>
<td></td>
</tr>
<tr>
<td>Compliance with C402, C403, C404 or C405</td>
<td>Existing building</td>
<td>Addition</td>
<td>Alternative</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section C402</th>
<th>Building envelope (Climate Zone 5A)</th>
<th>Space-conditioning category (nonresidential or residential)</th>
<th>Gross roof area</th>
<th>Total (new construction)</th>
<th>Total (existing &amp; addition/alteration as single building)</th>
<th>Addition only</th>
<th>Alteration only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Roof</th>
<th>Maximum assembly U-factor</th>
<th>Minimum insulation R-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td>Above-grade maximum assembly U-factor</td>
<td></td>
</tr>
</tbody>
</table>
### AIA CT Sample Documentation

<table>
<thead>
<tr>
<th>Total skylight area</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (new construction)</td>
<td></td>
</tr>
<tr>
<td>Total (existing &amp; addition/alteration as single building)</td>
<td></td>
</tr>
<tr>
<td>Addition only</td>
<td></td>
</tr>
<tr>
<td>Alteration only</td>
<td></td>
</tr>
</tbody>
</table>

### Skylight: percent of roof area

<table>
<thead>
<tr>
<th>Total (new construction)</th>
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<tr>
<td>Total (existing &amp; addition/alteration as single building)</td>
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<td></td>
</tr>
</tbody>
</table>

### Increased skylight area with automatic daylight responsive controls

- Required minimum skylight fenestration area with daylight responsive control

### Skylight:

- Maximum assembly U-factor
- Maximum assembly solar heat gain coefficient
- Visible transmittance (VT)
- Haze factor

### HVAC equipment performance

- Air conditioning, electrically operated, minimum efficiency
- Heat pump, electrically operated, minimum efficiency
- Package terminal air conditioners
  - New
  - Replacement
- Package terminal heat pumps
  - New
  - Replacement
- Single package vertical air conditioners (cooling mode)
- Single package vertical heat pump
- Single package vertical heat pump (heating mode) minimum efficiency
### AIA CT Sample Documentation

#### HVAC system control

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Zone thermostatic control</td>
<td></td>
</tr>
<tr>
<td>Independent perimeter system thermostatic control</td>
<td></td>
</tr>
<tr>
<td>Control device for each humidification and/or dehumidification system</td>
<td></td>
</tr>
<tr>
<td>Heat pump supplementary electric resistance heat control</td>
<td></td>
</tr>
<tr>
<td>Surplus overlap restriction (deadband)</td>
<td></td>
</tr>
<tr>
<td>Automatic off-hour setback and shutdown zone control</td>
<td></td>
</tr>
<tr>
<td>Automatic start control</td>
<td></td>
</tr>
<tr>
<td>Automatic damper closure control</td>
<td></td>
</tr>
<tr>
<td>Freeze protection system controls</td>
<td></td>
</tr>
<tr>
<td>Hot water boiler outdoor temperature setback control</td>
<td></td>
</tr>
<tr>
<td>Economizer Fault Detection and Diagnostics (FDD)</td>
<td></td>
</tr>
<tr>
<td>Ventilation system controls</td>
<td></td>
</tr>
<tr>
<td>Energy recovery ventilation systems</td>
<td></td>
</tr>
<tr>
<td>Kitchen exhaust systems</td>
<td></td>
</tr>
</tbody>
</table>

#### Lighting controls

<table>
<thead>
<tr>
<th>Section C405: Electrical power and lighting</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Built up/are</td>
<td></td>
</tr>
<tr>
<td>Gross lighted floor area</td>
<td></td>
</tr>
<tr>
<td>Interior lighting power allowance calculation (building area or space-by-space method)</td>
<td></td>
</tr>
<tr>
<td>Interior lighting power allowance</td>
<td></td>
</tr>
<tr>
<td>Allowing</td>
<td></td>
</tr>
<tr>
<td>Exceeding allowable lighting power density</td>
<td></td>
</tr>
<tr>
<td>Additional interior lighting power used with space-by-space method</td>
<td></td>
</tr>
<tr>
<td>High efficacies lamps in dwelling units</td>
<td></td>
</tr>
<tr>
<td>Percent of design load</td>
<td></td>
</tr>
</tbody>
</table>

**Classrooms / lecture/training rooms**
- Conference / meeting / multipurpose rooms
- Copy / print rooms
- Lecture rooms
- Lounge
- Private offices
- Restrooms
- Storage rooms
- Washrooms
- Locker rooms
- Washrooms by floor-to-ceiling height partitions
  
**In sidelight daylight zones**
- In toplight daylight zones
- Daylight-responsive controls
- Specific application controls
- Exterior lighting controls
AIA CT Sample Documentation

Commercial Documentation Summary

- **Multiple compliance paths**
  - Identify code for compliance
  - Identify triggered requirements

- **Type of Documentation**
  - Separate from construction documents
  - Incorporated into construction documents

- **Requirements**
  - Show numeric values and commitment
  - Show numeric values and non-numeric items
Use of OEDM Training Materials

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Frederick F. Wajcs, P.E.
Energy Code Consultant

Phone: 860-644-5150
Email: wajcsff@cox.net