

Energy Code Compliance and Documentation

Spring 2019 Career Development Series

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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

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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**

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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

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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

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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

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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

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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

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R402 Residential Thermal Envelope

Table R402.1.1 Requirements by Component		Table R402.1.3 Equivalent U-factors	
Fenestration U-factor	0.32	Fenestration U-factor	0.32
Skylight U-factor	0.55	Skylight U-factor	0.55
Glazed Fenestration SHGC	NR	Ceiling U-factor	0.026
Ceiling R-value	49	Frame Wall U-factor	0.06
Wood Frame Wall R-value	20 or 13+5	Mass Wall U-factor	0.082
Mass Wall R-value	13/17	Floor U-factor	0.033
Floor R-value	30	Basement Wall U-factor	0.050
Basement Wall R-value	15/19	Crawl Space Wall U-factor	0.055
Slab R-value and Depth	10, 12 ft	R-15 for heated Slab in footnote Or R402.1.4 Alternative	
Crawl Space Wall R-value	15/19		

Table R402.2.6 Steel-Frame Insulation R-value		
	Wood Frame Requirement	Cold-Formed Steel Equivalent R-Value
Steel Truss Ceilings	R-49	R-38
Steel-Framed Wall, 6" O.C.	R-20	R-0 or 4.0 or R-13 or 8.9 or R-15 or 8.5 or R-19 or 7.8 or R-19 or 6.2 or R-21 or 7.5
Steel-Framed Wall, 24" O.C.	R-20	R-0 or 4.0 or R-13 or 7.7 or R-15 or 7.1 or R-19 or 6.3 or R-21 or 5.9

Yellow indicates change from 2012 IECC

Continuous insulation (ci):
Insulation that is continuous across all structural members without thermal bridges other than fasteners and service openings.

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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**

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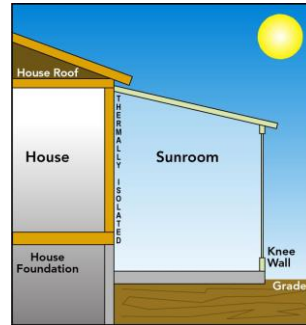
R402.2 Specific Insulation Requirements

- **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**

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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.

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R402.4 Air Leakage

Table R402.4.1.1

- General requirements
- Ceiling/attic
- Walls
- Windows, skylights & doors
- Rim joists
- Floors (including above garage and cantilevered floors)
- Crawl space walls
- Shafts, 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

TABLE R402.4.1.1 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/suffit 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/suffit 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.	Cracks in corners and headers of frame walls shall be resolved 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/door joints and framing, and skylights and framing shall be sealed.	Rim joints shall be insulated.
Rim joists	Rim joints shall include the air barrier.	Flare 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 decking, or continuous insulation installed on the underside of floor framing and extend from the bottom to the top of all perimeter floor framing members.
Floors (including above garage and cantilevered floors)	The air barrier shall be installed at any exposed edge of insulation.	Where provided instead of floor insulation, insulation shall be permanently attached to the envelope walls.
Crawl space walls	Exposed earth in unvented crawl spaces shall be covered with a Class I vapor retarder with overlapping seams taped.	
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 in 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 snugly to fit around piping 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 building thermal envelope.	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 outdoor air wall.	
Concealed sprinklers	When required to be sealed, concealed fire sprinklers shall not 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.	

1. In addition, inspection of log walls shall be in accordance with the provisions of ICC-405.

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R402.4 Air Leakage

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

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R403 Residential Systems

- R403.1 Controls
 - ≥ 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

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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)

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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

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R403.6 Mechanical Ventilation

- **R403.6.1 Whole-house fan efficiency**

Mechanical Ventilation System Fan Efficiency			
Fan Location	Air Flow Rate Minimum (cfm)	Minimum Efficacy (cfm/watt)	Air Flow Rate Maximum (cfm)
Range hoods	Any	2.8	Any
In-line fan	Any	2.8	Any
Bathroom, utility room	10	1.4	<90
Bathroom, utility room	90	2.8	Any

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

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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

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R406 Energy Rating Index (ERI)

Compliance:

- Meet mandatory requirements in sections R401.2 and R403.5.3
- ERI ≤ 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

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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

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Sample Residential Project



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REScheck Inputs for Sample Project

[unknown](#) | [Help](#) | [Sign off](#) |

[Home](#) > [New Project](#)

Project | **Envelope** | Compliance x

[Cancel](#) [Save](#) [Report](#) [Compliance Check](#)

Project Info:

Project Title*

Energy Code: What's my code?

Location

Project Type
 New Construction
 Addition
 Alteration

Compliance Method
 UA Trade-Off
 Performance Alternative

Building Characteristics

Construction Type
 1- and 2-Family, Detached
 Multifamily

Conditioned Floor Area sq²

Orientation - Front Faces Enable:

Features

All ducts and air handlers are located within conditioned spaces: Yes No

Thermally isolated sunroom: Yes No

Pool or inground spa: Yes No

Interior wood-burning fireplace: Yes No

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REScheck for Sample Project

Generated by REScheck-Web Software Compliance Certificate

Project: 2015 IECC Residential
 Energy Code: 2015 IECC
 Location: Berlin, Connecticut
 Construction Type: Single-Family
 Project Type: New Construction
 Orientation: 85deg. Facing 180 deg. from North
 Conditional Floor Area: 2,492.82
 Glazing Area: 1.2%

Envelope Assemblies

Assembly	Gross Area of Particular	Cavity R-Value	Cont. R-Value	U-Factor	UA
Ceiling: Flat Ceiling or Scissor Truss	1,365	51.0	0.0	0.025	34
Ceiling: Cathedral Ceiling (no attic)	364	51.0	0.0	0.021	8
Wall: Wood Frame, 2x4 w/c-Orientation: Unspecified	2,612	22.0	0.0	0.054	121
Door: Solid Door (under 50% glazing) Orientation: Unspecified	28			0.320	9
Door: Solid Door (under 50% glazing) Orientation: Unspecified	18			0.270	5
Door: Solid Door (under 50% glazing) Orientation: Unspecified	17			0.210	4
Window: Wood Frame Orientation: Unspecified	183			0.280	51
Window: Wood Frame Orientation: Unspecified	124			0.250	36
Floor: All-Wood joist/Truss	264	32.0	0.0	0.031	8
Floor: All-Wood joist/Truss	107	32.0	0.0	0.031	3
Basement: Solid Concrete or Masonry Orientation: Unspecified Wall Height: 8.0' Depth below grade: 3.0' Insulation depth: 8.0'	1,294	0.0	16.0	0.050	65

Compliance Certificate Energy UA Trade-off
 Conditions: 8.5% Better than Code Minimum UA: 376 Total UA: 344
 UA is better or more than Code table reflects how close to compliance the design is based on code trade-off rules.
 A 0.001 UA penalty is indicated at the end of each row and reflects a minimum UA floor.

Compliance Statement: The proposed building design described here is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2015 IECC requirements in REScheck Version : REScheck-Web and to comply with the mandatory requirements listed in the REScheck Inspection Checklist.

Name - Title Signature Date

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.

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REScheck for Sample Project

REScheck Software Version : REScheck-Web Inspection Checklist Energy Code: 2015 IECC

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.

Section # & Req-ID	Pre-Inspection/Plan Review	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
103.1, 103.2 [PR1]	Construction drawings and documentation demonstrate energy code compliance for the building envelope. Thermal envelope represented on construction documents.			<input type="checkbox"/> Complies <input checked="" type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
103.1, 403.7 [PR3]	Construction drawings and documentation demonstrate energy code compliance for lighting and mechanical systems. Systems serving multiple dwelling units must demonstrate compliance with the IECC Commercial Provisions.			<input checked="" type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	REScheck Software Version : REScheck-Web Inspection Checklist Energy Code: 2015 IECC 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.
302.1, 403.7 [PR2]	Heating and cooling equipment is sized per ACCA Manual S based on loads calculated per ACCA Manual J or other methods approved by the code official.	Heating: Btu/hr Cooling: Btu/hr	Heating: Btu/hr Cooling: Btu/hr	<input checked="" type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Additional Comments/Assumptions: Heating and cooling equipment is: Heating: Cooling:

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REScheck for Sample Project

3 ✓ [403.3.4] Duct tightness test result of <=4 cfm/100 R2 across the system or <=3 cfm/100 R2 without air handler @ 25 Pa. Inspection.

Requirement resolution

Resolution will be met

All ducts and air handlers are located within conditioned space.

Requirement is not applicable.

Plans reference page / section:

Mechanical and Water Heating (11)

1 ✓ [403.3.2.1] Air handler leakage designated by manufacturer at <=2% of design air flow.

Requirement resolution

Resolution will be met

Requirement is not applicable.

Plans reference page / section:

4 ✓ [403.3.3] Ducts are pressure tested to determine air leakage with either Rough-in test: Total leakage measured with a pre manufacturer's air handler enclosure if installed at time of test. Postconstruction test: Total leakage measured with a pressure manufacturer's air handler enclosure.

Requirement resolution

Resolution will be met

All ducts and air handlers are located within conditioned space.

Requirement is not applicable.

Plans reference page / section:

2 ✓ [403.1.1] Programmable thermostats installed for control of primary heating and cooling systems and

Requirement resolution

Resolution will be met

Requirement is not applicable.

Plans reference page / section:

3 ✓ [403.1.2] Heat pump thermostat installed on heat pumps.

Requirement resolution

Resolution will be met

Requirement is not applicable.

Plans reference page / section:

4 ✓ [403.6.1] Circulating service hot water systems have automatic or accessible manual controls.

Requirement resolution

Resolution will be met

Requirement is not applicable.

Plans reference page / section:

5 ✓ [403.6.1] All mechanical ventilation system fans not part of tested and listed HVAC equipment meet eff

Requirement resolution

Resolution will be met

Requirement is not applicable.

Plans reference page / section:

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REScheck for Sample Project

Section # & Req.ID	Foundation Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
402.1.1 [FO4] ✓	Conditioned basement wall insulation R-value. Where interior insulation is used, verification may need to occur during insulation inspection. Not required in warm-humid locations in Climate Zone 3.	R-____ R-____	R-____ R-____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the <i>Envelope Assemblies table for values.</i>
303.2 [FO5] ✓	Conditioned basement wall insulation installed per manufacturer's instructions.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
402.2.9 [FO6] ✓	Conditioned basement wall insulation depth of burial or distance from top of wall.	____ ft	____ ft	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the <i>Envelope Assemblies table for values.</i>
303.2.1 [FO11] ✓	A protective covering is installed to protect exposed exterior insulation and extends a minimum of 6 in. below grade.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement is not applicable.
403.9 [FO12] ✓	Snow- and ice-melting system controls installed.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement is not applicable.

Additional Comments/Assumptions:

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REScheck for Sample Project

Section # & Req.ID	Framing / Rough-In Inspection	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
402.1.1, 402.3.4 [FR1] ²	Door U-factor.	U- ____	U- ____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Envelope Assemblies table for values.
402.1.1, 402.3.1, 402.3.3, 402.5 [FR2] ¹	Glazing U-factor (area-weighted average).	U- ____	U- ____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	See the Envelope Assemblies table for values.
303.1.3 [FR4] ¹	U-factors of fenestration products are determined in accordance with the NFRC test procedure or taken from the default table.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
402.4.1.1 [FR23] ¹	Air barrier and thermal barrier installed per manufacturer's instructions.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
402.4.3 [FR20] ¹	Fenestration that is not site built is listed and labeled as meeting AAMA/WDMA/CSA 101/I.S.2/A440 or has infiltration rates per NFRC 400 that do not exceed code limits.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

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REScheck for Sample Project

403.3.1 [FR12] ¹	Supply and return ducts in attics insulated $\geq R-8$ where duct is ≥ 3 inches in diameter and $\geq R-6$ where < 3 inches. Supply and return ducts in other portions of the building insulated $\geq R-6$ for diameter ≥ 3 inches and R-4.2 for < 3 inches in diameter.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Ducts located completely inside the building envelope.
403.3.5 [FR15] ²	Building cavities are not used as ducts or plenums.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
403.4 [FR17] ²	HVAC piping conveying fluids above 105 °F or chilled fluids below 55 °F are insulated to $\geq R-3$.	R- ____	R- ____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
403.4.1 [FR24] ¹	Protection of insulation on HVAC piping.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
403.5.3 [FR18] ²	Hot water pipes are insulated to $\geq R-3$.	R- ____	R- ____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
403.6 [FR19] ²	Automatic or gravity dampers are installed on all outdoor air intakes and exhausts.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

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REScheck for Sample Project

402.2.4 [F13]?	Attic access hatch and door insulation \geq R-value of the adjacent assembly.	R-____	R-____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
402.4.1.2 [F117]?	Blower door test @ 50 Pa. \leq 5 ach in Climate Zones 1-2, and \leq 3 ach in Climate Zones 3-8.	ACH 50 = ____	ACH 50 = ____	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
403.3.4 [F14]?	Duct tightness test result of \leq 4 cfm/100 ft ² across the system or \leq 3 cfm/100 ft ² without air handler @ 25 Pa. For rough-in tests, verification may need to occur during Framing Inspection.	____ cfm/100 ft ²	____ cfm/100 ft ²	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: All ducts and air handlers are located within conditioned space.
403.3.3 [F127]?	Ducts are pressure tested to determine air leakage with either: Rough-in test: Total leakage measured with a pressure differential of 0.1 inch w.g. across the system including the manufacturer's air handler enclosure if installed at time of test. Postconstruction test: Total leakage measured with a pressure differential of 0.1 inch w.g. across the entire system including the manufacturer's air handler enclosure.	____ cfm/100 ft ²	____ cfm/100 ft ²	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: All ducts and air handlers are located within conditioned space.
403.3.2.1 [F124]?	Air handler leakage designated by manufacturer at \leq 2% of design air flow.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable	Requirement will be met.

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REScheck for Sample Project

Section # & Req.ID	Final Inspection Provisions	Plans Verified Value	Field Verified Value	Complies?	Comments/Assumptions
401.3 [F17]?	Compliance certificate posted.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
303.3 [F118]?	Manufacturer manuals for mechanical and water heating systems have been provided.			<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

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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

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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 $\leq 85\%$ of standard reference design building

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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

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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

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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

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C302.1 General Requirements

- **Connecticut amendment**
 - **C302.1 Light pollution control**
 - Exterior lighting from building service
 - Full cutoff luminaires

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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**

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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

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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

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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

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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

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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

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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

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C503 Alterations – Existing Buildings

- **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 $\geq 10\%$ luminaires in space or
 - Increases installed interior lighting power

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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

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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

Climate Zone	All Other	Group
Roofs		
Insulation entirely above deck	R-30ci	R-30ci
Metal buildings with thermal locks	R-19 or R-11LS	R-19 or R-11LS
Attic and other	R-38	R-49
Walls, Above Grade		
Mass	R-11.4ci	R-13.3ci
Metal buildings	R-13 or R-13ci	R-13 or R-13ci
Metal framed	R-13 or R-7.5ci	R-13 or R-7.5ci
Wood framed and other	R-13 or R-3.8ci or R-20	R-13 or R-7.5ci or R-20 or R-3.8ci
Walls, Below Grade		
Below-grade wall	R-7.5ci	R-7.5ci
Floors		
Mass	R-10ci	R-12.5ci
Joist/framing	R-30	R-30
Slab-on-Grade Floors		
Unheated slabs	R-10 for 24" below	R-10 for 24" below
Heated slabs	R-15 for 6" below	R-15 for 6" below
Opaque Doors		
Nonswinging	R-4.75	R-4.75

Yellow indicates change from 2012 IECC

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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

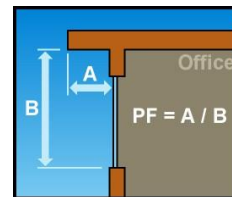
Climate Zone	All Other	Group R
Roofs		
Insulation entirely above deck	U-0.032	U-0.032
Metal buildings	U-0.035	U-0.035
Attic and other	U-0.027	U-0.021
Walls, Above Grade		
Mass	U-0.090	U-0.080
Metal buildings	U-0.052	U-0.052
Metal framed	U-0.064	U-0.064
Wood framed and other	U-0.064	U-0.064
Walls, Below Grade		
Below-grade wall	C-0.119	C-0.119
Floors		
Mass	U-0.074	U-0.064
Joist/framing	U-0.033	U-0.033
Slab-on-Grade Floors		
Unheated slabs	F-0.54	F-0.54
Heated slabs	F-0.65	F-0.65
Opaque Doors		
Swinging	U-0.37	U-0.37

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C402.1.3 Thermal Envelope

Fenestration

Climate Zone 5		
Vertical Fenestration U-factor		
Fixed Fenestration	0.38	
Operable Fenestration	0.45	
Entrance Doors	0.77	
Vertical Fenestration SHGC		
Orientation	SEW	N
PF < 0.2	0.40	0.53
0.2 ≤ PF < 0.5	0.48	0.58
PF ≥ 0.5	0.64	0.64
Skylights		
U-factor	0.50	
SHGC	0.40	



Yellow indicates change from 2012 IECC

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C402.4.1 Fenestration

- **Maximum area**
 - $\leq 30\%$ gross above-grade wall area
 - $\leq 3\%$ gross roof area
- **Maximum area with daylight responsive controls**
 - $\leq 40\%$ gross above grade wall area
 - Net floor area in daylight zone
 - $\geq 50\%$ for buildings ≤ 2 stories
 - $\geq 25\%$ for buildings ≥ 3 stories
 - Visible transmittance ≥ 0.44
 - $\leq 5\%$ gross roof area

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C402.4 Fenestration

- **Minimum skylight area**
 - **Above enclosed spaces**
 - $> 2,500$ sq. ft.
 - > 15 ft. ceiling height over $\geq 75\%$ floor area
 - Minimum daylight zone area
 - For defined spaces
 - **Multilevel lighting controls**
 - $> 90\%$ haze factor for defined spaces

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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

Fenestration Assembly	Max Rate (cfm/sf)
Windows	0.20
Sliding doors	0.20
Swinging doors	0.20
Skylights - with condensation weepage openings	0.30
Skylights - all others	0.20
Curtain walls	0.06
Storefront glazing	0.06
Commercial glazed swinging entrance doors	1.00
Revolving doors	1.00
Garage doors	0.40
Rolling doors	1.00
High-speed doors	1.30

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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 \leq calculated loads

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C403.2 Mechanical Systems

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

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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**

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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

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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

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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

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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**

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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

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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

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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

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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

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C405.4 Interior Lighting Power

Connected lighting power \leq 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

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C405.5.1 Exterior Building Lighting Power

- **Total exterior lighting power allowance**
 - Base site allowance
 - Lighting zones
 - Illuminated and permitted individual areas
 - Tradeable surfaces
 - Nontradeable 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

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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

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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

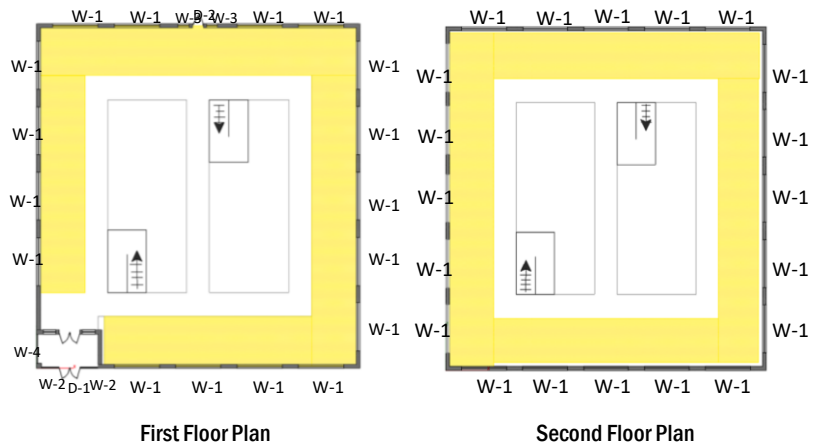
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C408 System Commissioning

- 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

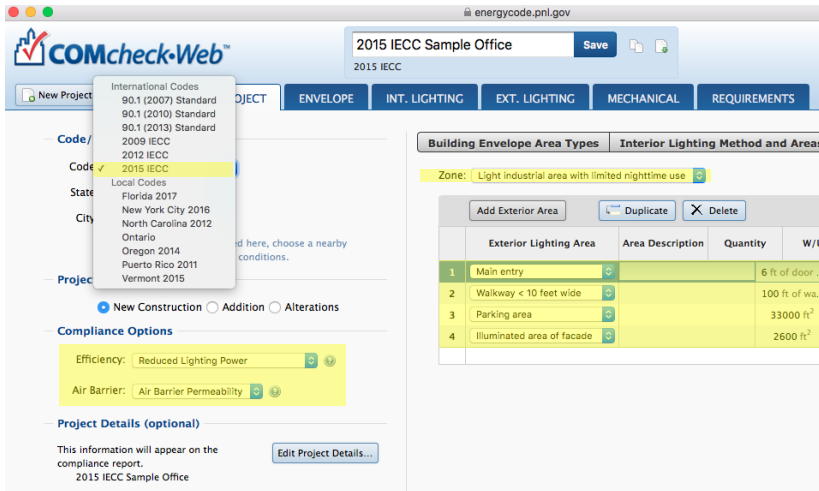
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Sample Commercial Project



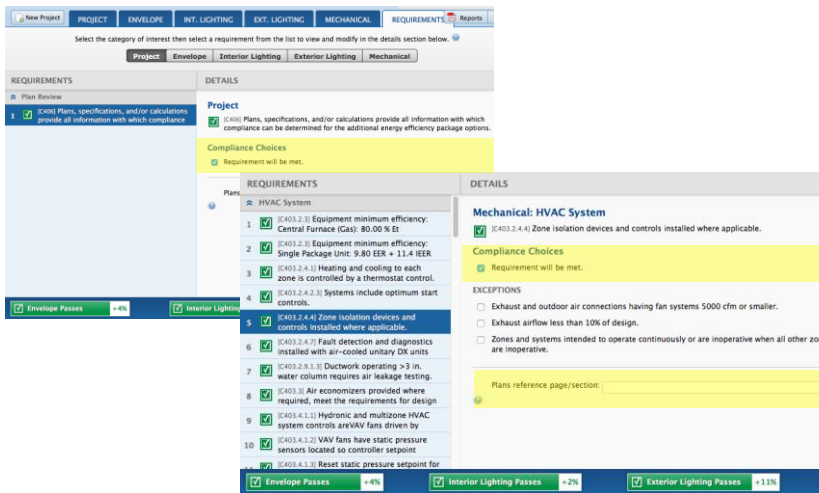
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COMcheck Input for Sample Project



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COMcheck Input for Sample Project



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COMcheck Report for Sample Project

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor _(a)
Roof: Insulation Entirely Above Deck, [Bldg. Use 1 - Office]	10000	---	30.0	0.032	0.032
Ext. Wall: Steel-Framed, 16in. o.c., [Bldg. Use 1 - Office]	10400	19.0	7.5	0.060	0.064
Window: Metal Frame with Thermal Break: Fixed, Perf. Specs.: Product ID 123, SHGC 0.40, [Bldg. Use 1 - Office] (b)	2849	---	---	0.380	0.380
Window: Metal Frame with Thermal Break: Fixed, Perf. Specs.: Product ID 123, SHGC 0.40, [Bldg. Use 1 - Office] (b)	60	---	---	0.380	0.380
Window: Metal Frame with Thermal Break: Fixed, Perf. Specs.: Product ID 123, SHGC 0.40, [Bldg. Use 1 - Office] (b)	39	---	---	0.380	0.380
Window: Metal Frame with Thermal Break: Fixed, Perf. Specs.: Product ID 123, SHGC 0.40, [Bldg. Use 1 - Office] (b)	72	---	---	0.380	0.380
Door: , Perf. Specs.: Product ID 456, SHGC 0.40, [Bldg. Use 1 - Office] (b)	52	---	---	0.770	0.770
Door: Insulated Metal, Swinging, [Bldg. Use 1 - Office]	28	---	---	0.370	0.370

(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 IECC requirements in COMcheck Version COMcheck-Web and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

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Additional Efficiency Package

Reduced interior lighting power. Requirements are implicitly enforced within interior lighting allowance calculations.

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft ²)	C Allowed Watts / ft ²	D Allowed Watts
1-Office	20000	0.74	14760
Total Allowed Watts =			14760

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
1-Office				
Linear Fluorescent: 48" T8 32W (Super T8): Premium efficiency:	2	210	48	10080
Linear Fluorescent: 24" T8 17W: Premium efficiency:	2	70	28	1960
Linear Fluorescent: 24" T8 17W: Premium efficiency:	2	70	28	1960
Linear Fluorescent: 48" T8 32W (Super T8): Premium efficiency:	1	4	28	112
LED: LED PAR 13W:	1	30	13	390
Total Proposed Watts =				14502

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 IECC requirements in COMcheck Version COMcheck-Web and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

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COMcheck Report for Sample Project



COMcheck Software Version COMcheck-Web

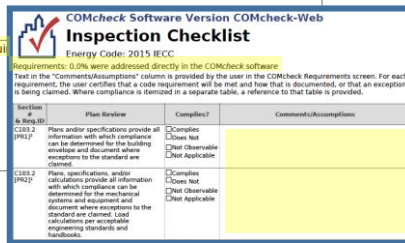
Inspection Checklist

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.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR1] ¹	Plans and/or specifications provide all information with which compliance can be determined for the building envelope and document where exceptions to the standard are claimed.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C103.2 [PR2] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requ...



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C103.2 [PR4] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C103.2 [PR8] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C402.4.1 [PR10] ¹	The vertical fenestration area <= 30 percent of the gross above-grade wall area.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

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COMcheck Report for Sample Project

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C402.4.1 [PR11] ¹	The skylight area <= 3 percent of the gross roof area.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C402.4.2 [PR14] ¹	In enclosed spaces > 2,500 ft ² directly under a roof with ceiling heights >15 ft. and used as an 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, 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.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Exception: Requirement does not apply.
C406 [PR9] ¹	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met. Location on plans/spec: Plan Pages/Specifications

Additional Comments/Assumptions:

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C408.2.1 [FI28] ¹	Commissioning plan developed by registered design professional or approved agency.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.3.1 [FI31] ¹	HVAC equipment has been tested to ensure proper operation.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.3.2 [FI10] ¹	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.3.3 [FI32] ¹	Economizers have been tested to ensure proper operation.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.
C408.2.4 [FI29] ¹	Preliminary commissioning report completed and certified by registered design professional or approved agency.	<input type="checkbox"/> Complies <input type="checkbox"/> Does Not <input type="checkbox"/> Not Observable <input type="checkbox"/> Not Applicable	Requirement will be met.

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AIA CT Sample Documentation

AIA Connecticut Web Page Committees Building Performance & Regulations

<http://aiact.org/about-aia-connecticut/committees/building-performance-regulations/>

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AIA CT Sample Documentation

	See the instructions and disclaimer for this spreadsheet.		Commercial Chapter 4 [CE] 2015 IECC Requirement	Values Incorporated Into This Design
		Element		
Section C401				
Application				
Compliance with C402, C403, C404 and C405 AND at least one of Additional Efficiency Package Option (C406)		New construction		
	1 More efficient HVAC performance			
	2 Reduced lighting power density			
	3 Enhanced lighting controls			
	4 On-site renewable energy			
	5 Provision of dedicated outdoor air system			
	6 High-efficiency service water heating			
Compliance with C402, C403, C404 or C405		Existing building		
	Addition			
	Alteration			
Section C402				
Building envelope (Climate Zone 5A)				
Space-conditioning category (nonresidential or residential)				
Gross roof area				
	Total (new construction)			
	Total (existing & addition/alteration as single building)			
	Addition only			
	Alteration only			
Roofs:	Maximum assembly U-factor			
	Minimum insulation R-value			
Walls:	Above-grade: maximum assembly U-factor			

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AIA CT Sample Documentation

Total skylight area				
Total (new construction)				
Total (existing & addition/alteration as single building)				
Addition only				
Alteration only				
Skylight: percent of roof area				
Total (new construction)				
Total (existing & addition/alteration as single building)				
Addition only				
Alteration only				
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				

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AIA CT Sample Documentation

Section C403				
Building mechanical systems				
Calculated load		Heating		
		Cooling		
Equipment output capacity		Heating		
		Cooling		
HVAC equipment performance				
Unitary air conditioners, electrically operated, minimum efficiency				
Condensing units, electrically operated, minimum efficiency				
Unitary and applied heat pumps, electrically operated, minimum efficiency				
Unitary and applied heat pumps, electrically operated, minimum efficiency				
Package terminal air conditioners		New		
		Replacements		
Package terminal heat pumps		New		
		Replacements		
Package terminal heat pumps		New		
		Replacements		
Single package vertical air conditioners (cooling mode)				
Single package vertical heat pump				
Single package vertical heat pump (heating mode) minimum efficiency				

Air cooled	Split system	≤45,000 Btu/h
	Single package	≤25,000 Btu/h
Through-the-wall, air cooled	Split system	≤20,000 Btu/h
	Single package	≤30,000 Btu/h
Small-duct high-velocity, air cooled	Split system	≤45,000 Btu/h
Air cooled with electric resistance heating or none		≤45,000 Btu/h and ≤135,000 Btu/h
		≤135,000 Btu/h and ≤40,000 Btu/h
		≤240,000 Btu/h and ≤200,000 Btu/h
		≤700,000 Btu/h
Air cooled with other than electric heating		≤45,000 Btu/h and ≤135,000 Btu/h
		≤135,000 Btu/h and ≤240,000 Btu/h
		≤240,000 Btu/h and ≤760,000 Btu/h
Water-cooled		≤45,000 Btu/h

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AIA CT Sample Documentation

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

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AIA CT Sample Documentation

Section C405				
Electrical power and lighting				
Building type				
Gross lighted floor area				
Interior lighting power allowance calculation (building area or space-by-space) method				
Interior lighting power allowance		Allowance		
Equivalent interior lighting power density		Connected		
Additional interior lighting power used with space-by-space method				
High efficacy lamps in dwelling units		Percentage fixtures with		
		Percentage lamps		
Lighting controls				
Occupant sensor controls in required spaces (automatic off / manual on or automatic on to 50% power / manual off)				
Occupant sensor control in warehouse aiseways and open areas (automatically reduce lighting ≥50% when unoccupied)				
Time-switch controls in each area not provided with occupant sensor controls				
Light-reduction controls in spaces with manual controls (≥50% power reduction with reasonably uniform illumination)				
Daylight-responsive controls				
Specific application controls				
Exterior lighting control				

- Classrooms / lecture/training rooms
- Conference / meeting / multipurpose rooms
- Copy / print rooms
- Lounges
- Employee lunch & break
- Private offices
- Restrooms
- Storage rooms
- Janitorial closet
- Locker rooms
- by floor-to-ceiling height partitions

- In sidelight daylight zones
- In toplight daylight zones

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Use of OEDM Training Materials

Use of Office of Education and Data Management (OEDM) training materials must be approved in writing by the State of Connecticut, Department of Administrative Services' Office of Communications. In approving of such use, the State of Connecticut assumes no liability associated with such use, including, but not limited to, the user's dissemination of any inaccurate information or interpretation in connection with its use of these training materials. Use of the training materials is at the sole risk of the user, and the State's approval of the use does not constitute an endorsement of the user or its intended use.

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