Energy Code Guide for Commercial Construction in Utah



2015 International Energy Conservation Code (IECC)

C401.2 Application

Commercial buildings shall comply with either:

- ASHRAE 90.1-2013

OR

- 2015 IECC

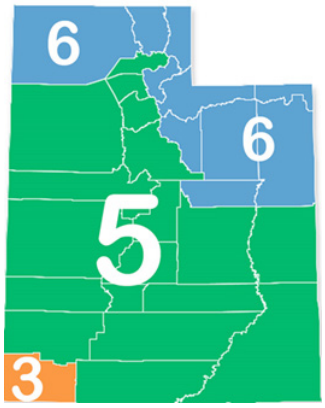
Shall use only one code option for the envelope, mechanical, and lighting compliance - no mixing of IECC and ASHRAE.

C103.2 - 103.3 Construction Documents

All thermal performance values and factors must be identical and included on:

- Plans
- Specifications
- Energy Compliance Documents
- HVAC Design Calculation

Utah Climate Zones by County



IECC Compliance Options

Prescriptive - Includes UA Trade-off

OR

Total Building Performance

2015 IECC Prescriptive and Trade-off Options

Comply with requirements of:

- C402 – Envelope
- C403 – Mechanical
- C404 – Service Water Heating (SWH)
- C405 – Lighting

AND

Pick 1 of 6 Additional Efficiency Options:

- C406.2 – Increase HVAC efficiency
- C406.3 – Reduced Lighting Power Density
- C406.4 – Enhanced Lighting Controls
- C406.5 – On-site Renewable Energy
- C406.6 – Dedicated Ventilation Systems
- C406.7 – High Efficiency SWH

ENVELOPE

C-402.2 - 402.4 Specific Envelope Requirements

- Continuous insulation
- Frame and Mass walls
- Floor and Slab-on-grade floors
- Roof reflectance – Climate Zone 3 only
- 30% of gross wall area limit on fenestration
  - Increase to 40% with daylight responsive controls
- Minimum skylight area for spaces > 2500 ft^2
  - 3% of gross roof area limit on skylights
- Increase to 5% with daylight responsive controls

2015 IECC Prescriptive Option

Opaque Thermal Envelope Requirements Comply with:

Table C402.1.3 - R-Value Method

OR

Table C402.1.4 - U-Factor Method

AND

Table C402.4 - Fenestration U-Factor and SHGC

Trade-Off Option (Prescriptive alternate)

- C402.1.5 - Component performance alternative

- Perform UA calculation with COMcheck

OR

- Equation 4-2

Mandatory Requirements

C402.5 Air Leakage-Thermal Envelope
Comply with C402.5.1 through C402.5.8 OR test at 75Pa, to a leakage ≤ 0.40 cfm/ft^2

- Air Barriers - construction, materials, assemblies
- Fenestration leakage
- Rooms containing fuel burning appliances
- Vestibules
- Air intakes, exhaust openings, stairs and shafts

2015 IECC Performance Option

Comply with requirements of:

- C407 – Total Building Performance
- C402.5 – Air Leakage
- C403.2 – Provisions applicable to all mechanical systems
- C404 – SWH
- C405.2, C405.3, C405.5 and C405.6 – Lighting

AND

C401.2(3)- Building Energy Cost ≤ 85% of standard reference design building.

MECHANICAL

Applies to all heating, cooling, ventilation, walk-in coolers and freezers and refrigerated warehouses

C403.2 Mandatory Requirements

- Load calculations
- Equipment sizing
- Equipment performance - efficiency
- Control requirements - set points
  - Snow melt
  - Zoning
  - Freeze protection
  - Economizer Fault Detection
  - Boiler reset
- Ventilation
  - Demand Controlled ventilation
  - Enclosed parking ventilation
  - Energy Recover ventilation
  - Kitchen Exhaust
- Duct Sealing and Insulation
- Piping insulation
- Fan motor horsepower and efficiency
- Heating outside a building - controls
- Comprehensive refrigeration/freezer requirements

C403.3 Economizers

- Required for cooling system ≥ 54,000 Btu/hr
- Controls and design dependent on use

C403.4 Hydronic and Multi-zone

VAV system places limits on reducing airflows to minimums, re-heat, and fan horsepower

C403.4.5 Heat Recovery for Service Water Heating

For buildings with high continuous water demand (example - hotel) > 6,000,000
BTU/hr, use A/C rejection heat

C404 Service Water Heating

- Equipment performance
- Higher efficiency where demand is high
- Heat traps and piping insulation

C404.5 - Efficient piping size and length

C406.6 - Heated water re-circulation
- Controls, temperature

C404.9 - Pools and Spas
- Controls, pumps and covers

LIGHTING

C405.1 Controls and Maximum Lighting Power Density for Interior and Exterior Lighting

- Occupancy sensors
- Time switch controls
- Lighting reduction controls
- Daylight Responsive controls
  - Reduce artificial lighting automatically
- Daylight zones - independent control in areas
  - Windows and skylights
- Exterior lighting automatic operate per available natural light

C405.4 Interior Lighting Power

Total connected interior lighting power (TCLP)
- Building area method

OR

- Space by space method
- Tables for both methods based on use of area or space
- Additional allowances for specific lighting functions

C405.5 Exterior Lighting Power

- Lighting power allowance based on space; parking, walkway, entry etc.
- Trade-offs allowed between some space types
- Total allowable lighting based on area
  1. Developed forest, park - rural
  2. Residential
  3. Other
  4. High activity commercial

C405.8 Electrical Motors

Nominal full load efficiency per table, based on horsepower

C405.9 Vertical Horizontal Transportation Systems and Equipment

- Elevators, escalators and moving walks
- Light limits elevators
- Control to reduce speed when unoccupied
- Regenerative drive down operation escalator

C408 System Commissioning

- Must have commission plan at design stage
- Air and water balance
- Functional testing sequence of operation
- control calibration of mechanical, SWH and lighting
- Final Commissioning Report

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