

2015 CBES Proposed Stretch Code

Item #	Base Code Description	Stretch Code Description	Source	Link to Proposed Language
1.	Buildings must comply with either: <ul style="list-style-type: none"> a. Materials or Assemblies or b. Air leakage testing to 0.50 CFM/SF of shell area 	Buildings must comply with either: <ul style="list-style-type: none"> a. Materials or Assemblies plus air barrier commissioning or b. Air leakage testing to 0.40 CFM/SF of shell area 	ICC G4-2012 Guideline for Commissioning	C701
2.	Table C402.1	Meet specified insulation R-values/u-factors for opaque building envelope	Climate zone 7 and 8 in 2015 IECC	Table C702.1
3.	Table C402.4	Meet specified u-factors and SHGC values for building envelope fenestration	Climate zone 7 in 2015 IECC	Table C702.4
4.	C403.2.9 Duct and plenum insulation and sealing. No limit on amount of outside ductwork.	Meet all base code duct insulation requirements plus additional requirement of no more than 5% of the ductwork may be located outside the building thermal envelope.	Advanced Buildings New Construction Guide	C703.2.9
5.	C403.2.7 Energy recovery ventilation systems. Climate Zone 6 requirements.	HVAC Energy Recovery	Climate zones 7 and 8 in 2015 IECC	C703.2.7

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6.	Projects must choose one package.	Additional Efficiency Package Options: Choose any two packages. If package requiring Section 406.5 is not chosen, choose two packages and meet <i>Section C405.XX Requirements for renewable-ready energy systems</i>	N/A	C706.1
7.	None	Computer/Server Rooms	New Buildings Institute Core Performance Tier 2	C707.1
8.	None	Electric Vehicle Charging Stations	N/A	C708.1

Air Barrier Compliance Stretch Code Requirement

Base Code Reference Section	Stretch Code Section	Comments
C402.5 Air leakage—thermal envelope	C701	Buildings must comply with either: a. Materials or Assemblies plus air barrier commissioning <i>or</i> b. Air leakage testing to 0.40 CFM/SF of shell area

C701 Air leakage—thermal envelope (Mandatory). The *thermal envelope* of buildings shall comply with Sections C402.5.1 through C402.5.8 of the base code, in addition to stretch code section C701.1, or the building *thermal envelope* shall be tested and deemed to comply with the provisions of these sections when the tested air leakage rate of the building thermal envelope is not greater than 0.40 cfm/per square foot of shell area (excluding area of slab and below grade walls) at 50 Pa in accordance with ASTM E 779 or an equivalent method approved by the code official or authority having jurisdiction. Where compliance is based on such testing, the building shall also comply with Sections C402.5.5, C402.5.6 and C402.5.7.

C701.1 Continuous Air Barrier Commissioning. Prior to the final inspection, the registered design professional shall provide evidence of commissioning of the continuous air barrier by an approved agency. As part of the continuous air barrier commissioning, a building air leakage test shall be performed and the resulting air leakage rate of the building thermal envelope shall be reported in units of cfm/per square foot of shell area (excluding area of slab and below grade walls) at 50 Pa in accordance with ASTM E 779 or an equivalent method approved by the code official or authority having jurisdiction. There is no maximum air leakage rate specified for compliance. A final commissioning report shall be delivered to the building owner, and shall include at a minimum:

1. A field inspection checklist showing the requirements necessary for proper installation of the continuous air barrier.
2. The Results of the required any-building air leakage testing (no maximum air leakage rate specified for compliance).
3. Reports from field inspections during project construction showing compliance with continuous air barrier requirements including but not limited to proper material handling and storage, use of approved materials and approved substitutes, proper material and surface preparation, air barrier continuity at building thermal envelope penetrations

C701.2 Building Envelope Commissioning Guideline. In addition to complying with C701.1, projects shall follow all applicable items in Table C701.2.

TABLE C701.2 BUILDING ENVELOPE Commissioning Checklist

RELATED SYSTEMS, EQUIPMENT, ASSEMBLIES AND COMPONENTS	TASKS/COMMENTS
<ul style="list-style-type: none"> • Foundations subsoil drainage system • Foundation damp-proofing and waterproofing • Flashing at: exterior doors, skylights, wall flashing and drainage systems • Exterior wall coverings 	<ul style="list-style-type: none"> • Verify compliance with approved plans, specifications and construction documents.
<ul style="list-style-type: none"> • Moisture envelopes 	<ul style="list-style-type: none"> • Meet Owner's Project Requirements (OPR), Basis of Design (BOD), Cx specifications.
<ul style="list-style-type: none"> • Exterior below-grade walls 	<ul style="list-style-type: none"> • Check for proper drainage system at exterior wall perimeter to keep water from entering the building.

**TABLE C701.2 BUILDING ENVELOPE Commissioning Checklist
(Continued)**

RELATED SYSTEMS, EQUIPMENT, ASSEMBLIES AND COMPONENTS	TASKS/COMMENTS
<ul style="list-style-type: none"> External floor and soffits, slab-on-grade 	<ul style="list-style-type: none"> Check for thermal resistance or insulation when required. Slabs: Check drainage for moisture penetration.
<ul style="list-style-type: none"> Exterior walls 	<ul style="list-style-type: none"> Check drawings for wall assembly requirements and any sound transmission class (STC) requirements in accordance with ASTM E 90 and ASTM E 413.
<ul style="list-style-type: none"> Exterior glazed window fenestration: windows, glazed doors and skylights 	<p>Drawing reviews and contractor submittal reviews:</p> <ul style="list-style-type: none"> Check that fenestration products are labeled with a U-factor (see NFRC 100) and a solar heat gain coefficient (SHGC) (see NFRC 200), and certification for the air infiltration requirement of 0.3 cfm/ft² of the 2010 California Energy Code (CEC) or other approved standards. Check for proper flashing and caulking at walls and roof assemblies. <p>Glazed doors:</p> <ul style="list-style-type: none"> Check for proper flashing, and seals and gaskets; and proper pull force, if provided with a closer. Check for proper door swing. Check for STC requirements, if applicable.
<ul style="list-style-type: none"> Site-built fenestration: curtain walls and store-front systems, and atrium roof systems 	<ul style="list-style-type: none"> Check for a label certificate issued by the National Fenestration Rating Council (NFRC) or a label certificate issued by the glazing fabricator that meets the default U-factor of the 2008 CEC and SHGC; or an NFRC component modeling approach (CMA) label certificate or another approved standard. Check for proper door swing. Check for STC requirements, if applicable.
<ul style="list-style-type: none"> Field-fabricated fenestrations: fenestration made at the site, not preformed or cut 	<ul style="list-style-type: none"> Check for compliance with the default U-factor and the default SHGC in accordance with the tables of the 2008 CEC or another approved standard.
<ul style="list-style-type: none"> Exterior doors 	<ul style="list-style-type: none"> Check for proper flashing installation at header, walls and floor. Check for U-factor requirements for swinging and nonswinging doors. Check for appropriate manufacturer's referenced standard [American Architectural Manufacturer's Association (AAMA); Canadian Standards Association (CSA); and Window and Door Manufacturer's Association (WDMA) or other approved standard] product data sheets.
<ul style="list-style-type: none"> Sealants, control joints and flashing (stationary and moveable) 	<ul style="list-style-type: none"> Check for proper installation in accordance with the manufacturer's written instructions.
<ul style="list-style-type: none"> Shading devices (stationary and 	<ul style="list-style-type: none"> Check for proper anchoring to building with proper flashing at wall connections.
<ul style="list-style-type: none"> Structural systems 	<ul style="list-style-type: none"> Check for proper anchoring in accordance with construction documents, including metal connectors and beam supports.
<ul style="list-style-type: none"> Materials and finishes 	<ul style="list-style-type: none"> Check for compliance with allowed volatile organic compound limits and proper manufacturer's installation application.

Opaque Envelope Stretch Code Requirements

TABLE C402.1 BUILDING ENVELOPE REQUIREMENTS—OPAQUE ASSEMBLIES AND ELEMENTS

Component	Maximum Overall U-Factor		Minimum R-Values	
	All other	Group R	All other	Group R
Roofs				
Insulation entirely above deck	U-0.028		R-35ci	
Metal buildings	U-0.029		R-30 + R-11LS	
Attic and Other	U-0.021		R-49	
Walls, Above grade				
Mass	U-0.061		R-25ci	
Metal building	U-0.039		R-13 + R-19.5ci	
Metal-framed	U-0.052		R-13 + R-15.6ci	
Wood-framed and other	U-0.036		R-13+R-15.6ci or R-20+R-10ci	
Walls, Below Grade				
Below-grade wall	C-0.092		R-10ci	
Floors				
Mass	U-0.055	U-0.051	R-15ci	R-16.7ci
Joist/Framing-metal	U-0.032		R-38	
Joist/Framing – Wood & Other	U-0.033		R-30	
Slab-on-Grade Floors				
Unheated slabs	F-0.48	F-0.45	R-10 for 48 in. below	R-15 for 48 in. below
Heated slabs	F-0.55		R-10 for entire slab ^f	
Opaque Doors				
Swinging	U-0.37		N/A	
Non-Swinging	N/A		R-4.75	
Upward-acting, Sectional	N/A		R-10	

Building Envelope Fenestration Stretch Code Requirements

TABLE C702.4

BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC REQUIREMENTS

Vertical Fenestration		
U-factor		
Fixed fenestration	0.29	
Operable fenestration	0.37	
Entrance doors	0.77	
SHGC		
Orientation ^a	S/E/W	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	

PF = Projection factor.

"N" indicates vertical fenestration oriented within 45 degrees of true north. "SEW" indicates orientations other than "N."

Exterior Duct Limitation Stretch Code Requirements

C703.2.9 Roof-top unit, duct and plenum insulation and sealing. Supply and return air ducts and plenums shall be insulated with a minimum of R-8 insulation where located in unconditioned spaces and where located outside the building with a minimum of R-12 insulation. No more than 5% of the ductwork may be located outside the building thermal envelope. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by a minimum of R-12 insulation.

Exceptions:

1. Where located within equipment.
2. Where the design temperature difference between the interior and exterior of the duct or plenum is not greater than 15°F (8°C).

Ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with Section 603.9 of the *International Mechanical Code*.

HVAC Energy Recovery Stretch Code Requirements

C703.2.7 Energy recovery ventilation systems. Where the supply airflow rate of a fan system meets or exceeds the values specified in Tables C703.2.7(1) or for ventilation systems operating not less than 8,000 hours per year, the system shall include an energy recovery system. *[All other base code requirements apply]*

**TABLE C703.2.7(1) ENERGY RECOVERY REQUIREMENT
(Ventilation systems operating less than 8,000 hours per year)**

	≥ 10% and < 20%	≥ 20% and < 30%	≥ 30% and < 40%	≥ 40% and < 50%	≥ 50%
PERCENT (%) OUTDOOR AIR AT FULL DESIGN AIRFLOW RATE					
DESIGN SUPPLY FAN AIRFLOW RATE (cfm)	≥ 4,500	≥ 4,000	≥ 2,500	≥ 1,000	> 0

For SI: 1 cfm = 0.4719 L/s.

Additional Efficiency Package Options

C706.1 Requirements for renewable-ready energy systems. Building projects with footprint greater than 20,000 square feet, shall install *on-site renewable energy* systems with a minimum rating of 3.7 W/ft² or 13 Btu/h-ft² (40 W/m²) multiplied by the horizontally-projected gross roof area less the area covered by rooftop equipment, skylights, occupied roof decks and planted areas.

Exceptions:

1. Additions, alterations and repairs to existing buildings.

C706.2 Requirements. Buildings shall comply with at least two of the following package options:

1. More efficient HVAC performance in accordance with Section C406.2.
2. Reduced lighting power density system in accordance with Section C406.3.
3. Enhanced lighting controls in accordance with Section C406.4.
4. On-site supply of renewable energy in accordance with Section C406.5.
5. Provision of a dedicated outdoor air system for certain HVAC equipment in accordance with Section C406.6.
6. High-efficiency service water heating in accordance with Section C406.7.

Computer/Server Rooms Stretch Code Requirements

C707.1 Economizers. Each individual cooling fan system primarily serving computer room(s) shall include either:

1. An integrated air economizer capable of providing 100 percent of the expected system cooling load as calculated in using, an outside air temperatures of 55°F dry-bulb/50°F wet-bulb and below; or
2. An integrated water economizer capable of providing 100 percent of the expected system cooling load as calculated using, an outside air temperatures of 40°F dry-bulb/35°F wet-bulb and below.

Exceptions:

1. Individual computer rooms under 5 tons.
2. New cooling systems serving an existing computer room in an existing building up to a total of 50 tons of new cooling equipment per building.
3. New cooling systems serving a new computer room in an existing building up to a total of 20 tons of new cooling equipment per building.
4. A computer room may be served by a fan system without an economizer if it is also served by a fan system with an economizer that also serves non-computer room(s) provided that all of the following are met:
 - 4.1. The economizer system is sized to meet the design cooling load of the computer room(s) when the non-computer room(s) are at 50% of their design load; and.
 - 4.2. The economizer system has the ability to serve only the computer room(s), e.g. shut off flow to non-computer rooms when unoccupied; and.
 - 4.3. The non-economizer system does not operate when the cooling load of the non-computer room(s) served by the economizer system is less than 50% of design load.

C707.1.2 HVAC controls. Each computer room zone shall have controls that prevent reheating, recooling, and simultaneous provisions of heating and cooling to the same zone, such as mixing or simultaneous supply of air that has been previously mechanically heated and air that has been previously cooled, either by cooling equipment or by economizer systems.

C707.1.3 Humidification. Non-adiabatic humidification (e.g. steam, infrared) is prohibited. Where humidification is needed, only adiabatic humidification (e.g. direct evaporative, ultrasonic) is permitted.

C707.1.4 Fan power limitation. The total fan power at design conditions of each fan system shall not exceed 27 W/kBtu·h of net sensible cooling capacity.

C707.1.5 Fan power controls. Each unitary air conditioner with mechanical cooling capacity exceeding 60,000 Btu/hr and each chilled water fan system shall be designed to vary the airflow rate as a function of actual load and shall have controls and/or devices (such as two-speed or variable speed control) that will result in fan motor demand of no more than 50 percent of design wattage at 66 percent of design fan speed.

C707.1.6 Air sealing. Computer rooms with air-cooled computers in racks and with a design load exceeding 175 kW/room shall include air barriers such that there is no significant air path for computer discharge air to recirculate back to computer inlets without passing through a cooling system.

Exception: Computer racks with a design load less than 1 kW/rack.

Electric Vehicle Charging Stations

C708.1 Electric Vehicle Charging. Parking spots shall have a socket capable of providing either a level 1 or level 2 charge (see below) within 5 feet of the centerline of the parking space (“EV Charging Parking Space”).

Level 1 requires one 120V 20 amp grounded AC outlet, or equivalent, for each EV Charging Parking Space

Level 2 requires one 208/240V 40 amp grounded AC outlet, or equivalent, for each EV Charging Parking Space

~~2b. Install conduit for future outlet for each parking space.~~

TABLE C708.1 ELECTRIC VEHICLE CHARGING PARKING SPACES

Facility Type	Minimum Number of Chargers (rounded up to nearest whole number)					
	<25		≥25 and <500		≥500	
	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2
Retail	0%	0%	2%	1%	1%	5
Hotel/Motel	4%	0%	2%	1%	1%	5
Restaurant	4%	4%	2%	2%	1%	5
Hospital/Health Care	4%	0%	2%	2%	1%	5
Office	4%	0%	4%	1%	2%	5
School/University	0%	0%	4%	2%	2%	5