



Building Division

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2006 International Energy Conservation Code®

The City and County of Broomfield Building Division has adopted the 2006 *International Energy Conservation Code®*, effective February 28, 2008. **This handout will summarize the new requirements for energy code compliance.** This code applies to building permits for all new commercial projects, as well as tenant finish and remodel projects.

The 2006 IECC has been substantially changed from the 2003 IECC. For commercial construction there are four major design paths that the designer can take to show compliance with this adopted code: Option #1 is to follow the prescriptive requirements of IECC Chapter 5; Option #2 is to meet the requirements of ASHRAE/IESNA Standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings*; Option #3 is to meet certain IECC Chapter 5 Sections and to show compliance with the applicable provisions of ASHRAE/IESNA Standard 90.1 for those prescriptive sections not met; and Option #4 is to comply with the mandatory requirements of IECC Chapter 5 and perform a total building performance analysis complete with all supporting documentation. Broomfield is in Climate Zone 5.

OPTION #1 - PRESCRIPTIVE PATH

IECC Chapter 5 contains the requirements for the prescriptive path. The broad construction areas requiring compliance are the building envelope, building mechanical systems, service water heating, and electrical power and lighting systems.

1. Indicate all insulation "R" values, materials, and installed locations (walls, ceilings, cantilever floors, floors over unconditioned space, crawl space, basement walls, etc.) per Section 502.2 and Table 502.2 (1). Buildings with vertical fenestration or skylight area that exceeds Table 502.3 values may not use the prescriptive Section 502, but instead shall show compliance with the building envelope provisions of ASHRAE/IESNA Standard 90.1.
2. Plans shall delineate the location of the building thermal envelope.
3. List all fenestration U - factors, solar heat gain coefficients (SHGC), and projection factors (PF) as required by Section 502.3 on the window and door schedule. The window and door schedule (or submittal documents) should show the manufacturer's tested fenestration air leakage that complies with Section 502.4.1 and 502.4.2 for all window and door types.
4. Provide details on how openings and penetrations in the building envelope will be protected for air leakage, either on the plans or by notes per Section 502.4.3.
5. Outdoor air intakes and exhaust openings shall be equipped with not less than a Class I motorized, leakage-rated damper per with Section 502.4.4. Approved gravity (non-motorized) dampers are permitted in buildings less than three stories in height above grade.
6. Enclosed vestibules shall be provided at doors that separate conditioned space from the exterior per Section 502.4.6. Please note the numerous exceptions to this requirement.
7. All walls, floors, and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder. This shall be specifically detailed on the plans to be placed on the warm-in-winter side of the insulation.

8. Submit calculations of heating and cooling loads per Section 503.2.1. Heating and cooling equipment and systems capacity shall not exceed these calculated loads. The equipment schedule should show all capacities as well as the efficiency of the units. See Tables 503.2.3(1 through 11) for minimum efficiency requirements.
9. HVAC system controls shall comply with Sections 503.2.4, 503.2.5, and 503.2.6. Provide a written outline or schematic showing compliance.
10. Ducts, plenums, and piping shall be insulated and sealed in accordance with Sections 503.2.7 and 503.2.8. Plans should indicate how this will be addressed. Please note that all tapes and mastics shall be listed and labeled for the specific condition of use.
11. Prior to issuance of a certificate of occupancy, the design professional shall provide evidence of system completion to include: air system balancing; hydronic system balancing; and operating and maintenance manuals per Section 503.9.
12. Submittal documents should outline how the design complies with either Section 503.3 for simple HVAC systems or Section 503.4 for complex HVAC systems.
13. Service water heating equipment shall meet the minimum efficiency standard of Table 504.2. Please note equipment efficiencies on the equipment schedule.
14. Temperature controls, heat traps, and pipe insulation shall be shown on the plans.
15. Lighting controls shall be shown on the plans to comply with Section 505.2. This includes manual control for each area enclosed by walls or floor-to ceiling partitions; lighting reduction controls for dimming in a uniform pattern by at least 50%; and automatic lighting shutoff for buildings larger than 5,000 square feet. Plans shall indicate tandem wiring where applicable in accordance with Section 505.3. Exit signs shall not exceed 5 watts per side.
16. Provide calculations for interior lighting power requirements: the total connected interior lighting power shall be no greater than the interior lighting power allowance from Table 505.5.2 for the area of the building.
17. Provide calculations showing how the total connected exterior lighting requirements comply with the exterior lighting allowances per Section 505.6.2. Note the efficiency of the specified lamps per Section 505.6.1.

OPTION #2 - COMPLIANCE WITH ASHRAE/IESNA STANDARD 90.1

1. Provide calculations or assumption and summary printouts from software that checks for compliance with ASHRAE/IESNA Standard 90.1 chapters on:
 - Building Envelope;
 - Heating, Ventilating, and Air Conditioning;
 - Service Water Heating;
 - Power;
 - Lighting; and
 - Other equipment.
2. Information on the plans shall include all information necessary to verify compliance with system design.

OPTION #3 - PRESCRIPTIVE / ASHRAE/IESNA 90.1

(mix and match approach)

1. The designer may select to meet the prescriptive requirements of Chapter 5 of the 2006 IECC for each of the four major sections on an individual basis; where one or more of the prescriptive Sections (Building Envelope, Building Mechanical Systems, Service Water Heating, and Lighting), compliance for that section(s) shall be demonstrated in accordance with the applicable provisions of ASHRAE/IESNA 90.1.
2. See the submittal requirements for the prescriptive path above, and the software or calculation requirements for ASHRAE/IESNA 90.1 above.

OPTION #4 - TOTAL BUILDING PERFORMANCE PATH

1. Show how the building meets the mandatory requirements of Chapter 5, 2006 IECC and submit complete analysis and supporting documentation to show that the annual energy costs of the proposed design do not exceed those of the standard design per Section 506.1.

CITY AND COUNTY OF BROOMFIELD DESIGN PARAMETERS	
Outdoor Design Conditions per Table 1A ACCA Manual J Eighth Edition	
Elevation:	5344 feet
Latitude:	40° North
Winter heating 99% Dry Bulb:	1° F
Summer Cooling 1% Dry Bulb:	91° F
Coincident Wet Bulb:	59°F
Design Grains Difference at 50% RH:	-41
Daily Range:	High (H)
Relative Humidity:	50% winter and summer
Indoor Design Temperature for Heating:	70° F
Indoor Design Temperature for Cooling:	75° F
Heating Temperature Difference (HTD):	69° F
Cooling Temperature Difference (CTD):	16° F
Cooling Load Temperature Difference (CLTD):	21.0° F
SHGC:	SHGC taken directly from sticker on glass.
<i>While not required per Table 402.1.1 of the IECC the SHGC is still required data for Manual J.</i>	<i>If not known, either use default per 2006 IECC Table 102.2(3) or equation $SHGC = .87 \times SC$ (shading coefficient) under A4-5 of Manual J.</i>
Altitude Correction Factor (ACF):	0.84
Moisture Content:	68.2
Air Density:	0.063
Wind Velocity Value:	15 mph for heating
Wind Velocity Value:	7.5 mph for cooling