City and County of Denver
Courtesy Briefing on 2019
Building and Fire Code
Amendments
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III. Technical Advisory Committees
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V. IBC / IEBC
VI. IFC / IFC-SC
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Thank you!

- The Mozingo Group
- Community members who served on committees
- City and County of Denver Staff
- Those who submitted proposals
- Denver Fire Department
- Denver Department of Public Health and Environment
- New Buildings Institute
The Denver Building and Fire Code establishes the minimum, mandatory standards for building construction in Denver. Denver's code is based on international standards for safe, habitable structures.

Denver Green Code
## Technical Advisory Committees

### IBC/IEBC:
- Alan Colussy
- Paul Schultz
- Stephen Sparrow
- Craig Johnson
- Jerry Maly
- Masoud Sabounchi
- Stephen Rondinelli
- Scott Prisco
- Eric Browning
- Gary Moore
- Chief FPE Tony Caro
- Juan Pasillas

### IRC:
- Adam Przeszlowski
- Kyle Jackson
- Matt Wallace
- Nathan Skrdla
- Sarah Kaplan
- Kate Hilberg
- Carrie Baron
- Jim Sobey
- Brian Jacobs
- Dave Renn
- Amir Abu-Jaber
- Casey Vesque

### IECC:
- Brandon Vandelaar
- Elizabeth Gillmor
- Nathan Kahre
- Paul Kriescher
- Paul Sweeney
- Sarah Kaplan
- Kevin Perri
- Scott Prisco
- Katrina Managan
- Christy Collins
- Keith Fox
- Carol Pafford
- Daniel Krausz
- Mike Walton

### IFC / IFC – SC:
- Michael Passas
- George McNeill
- Nathan Kahre
- Paul Kriescher
- Rob Geislinger
- Russell Holt
- Gregory Clair
- Tana M. Lane
- Chief FPE Tony Caro
- Robert Kmak
- Eric Browning
- Div Chief Almaguer
- Greg Bradshaw
- John M. McGovern
- Lyle Hays
- Mike Doyle
- Stephen Rondinelli
- Todd Daily
- David Kahn
- Ben Lombardo

### IgCC:
- Cheryl Hoffman
- Dane Sanders
- Jeff Keeley
- Nate Huyler
- Paul Hutton
- Paul Kriescher
- Penny Cole
- Rachel Bannon-Godfrey
- Aaron Esselink
- Jeff Tejral
- Chris Gleissner
- Sonrisa Lucero
- David Carlson
- Scott Prisco
- Jim Turner
- TC Bohnet
- Katrina Managan
- Christy Collins

### IMC / IPC / IFGC:
- Brian Kannady
- Mark Jelinske
- Michael Passas
- Sean Wyatt
- Danny Boncich
- Mike Montoya
- Troy Newman
- Charles Bartel
Timeline / Transition Period

- **Anticipated:** draft to City Council’s Land Use, Transportation, and Infrastructure committee on Dec. 3

- **Anticipated:** City Council second reading and vote on Dec. 23

- **When adopted:** four-month transition period between adoption date and effective date
2018 IBC / IEBC Amendments

David Renn
Committee & Public Proposals

International Building Code & Existing Building Code

- 11 voting members
- 121 IBC proposals submitted
- 17 IEBC proposals submitted

<table>
<thead>
<tr>
<th>Voting members</th>
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<tbody>
<tr>
<td>Alan Colussy - Architect - NAIOP</td>
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<td>Paul Schultz - Architect - OZ Architecture</td>
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<td>Stephen Sparrow - GC - Swinerton</td>
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<td>Craig Johnson - BOMA</td>
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<td>Jerry Maly - Struct. Engineer - SEAC</td>
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<td>Masoud Sabounchi - ACE/Consultant</td>
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<tr>
<td>Stephen Rondinelli - Architect/Consultant - AIA, SFPE, NFPA</td>
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City and County of Denver

- Scott Prisco - Building Official
- Eric Browning - A/S Supervisor
- Gary Moore - CPD Bldg. Inspector
- Chief FPE Tony Caro - Chief Fire Protection Engineer

Non-voting member
- Juan Pasillas
Chapter 3 – Use & Occupancy

306.2: New use under Group F-1

Greenhouses or buildings used to cultivate, grow, enrich or otherwise process agricultural plants or products where unique operations, system or hazard may exist that create significant fire and life safety hazards.

308.5.5: New section Family Child Care Homes

- 12 or fewer children receiving care
- Classified as Group I-4 or comply with IRC
- Specific IRC requirements to be discussed with IRC amendments
Chapter 3 – Use & Occupancy

310.6: New R-X Occupancy (community villages)

- Two or more detached sleeping units
- Occupants are primarily permanent in nature
- Permitted to be constructed per IRC (no sprinklers required)
- Community building with cooking & dining areas required for R-X projects
Chapter 4 – Special Requirements

429: New section for ‘Residential Group R-X’

- Sleeping unit size and max. occupant load
- Building separation (10 feet)
- Fire apparatus access roads
- Exterior stairway illumination
- Fire hydrants
- Accessibility (minimum number of Type B units)
- Plumbing fixtures (similar to dormitories)
- Cooking facilities
- Temporary buildings (up to 4 years)
403.5.2: Exception no longer deleted. Allows occupant self-evacuation elevator as an alternative to an additional exit stairway in a ‘super’ high-rise (height > 420-ft).

420.11: New section for ‘Group R-2 refuse collection areas’ requires collection areas at R-2 occupancies for recycling, compost and trash.
Chapter 5 – Heights & Areas

503.1.4.1: New amendment for enclosing elements of occupied roofs – adds exception to allow guards to exceed 48”.
Chapter 7 – Fire & Smoke Protection

705.2: Previous amendments for exterior wall projections have been removed in favor of IBC requirements.

705.2: New amendment allows balconies inset up to 4’ from the main exterior wall to be considered as projections.

707.5: New amendment allows a fire-resistance rated “lid” over exit passageways, instead of continuing fire barrier walls to slab above.

718.6: Removed amendment requiring draftstopping in floors and attics of metal-framed buildings.
Chapter 10 – Means of Egress

1004.1.2: Removed amendment regarding the occupant load factor of 3 SF/person at bars and similar uses.

1006.2.1.2: Removed amendment regarding exit access route divergence.

1004.9.1: Amendment revised to require posting of occupant load for assembly functions with 40 or more only in bars, taverns and similar area.

Table 1004.5: New amendment for business area OLF to require 150 gross or 100 net, whichever results in greatest occupant load.
Chapter 10 & Former Appendix Q

Appendix Q removed since the 2018 IBC now includes most of what was in Appendix Q.

403.5.3, 1023.9.2 & 1023.9.3: Amendments added for signage at locked stairway doors, since IBC doesn’t address.

1010.9.13: Amendment for securing elevator lobbies, since IBC doesn’t address.

Chapter 2: Appendix Q definitions moved to Chapter 2 amendments.
Chapter 11 – Accessibility

1105.1: New amendment requires public entrances to be equipped with a power operated door.

- Group A with Occupancy Load > 300
- Group B, M, R-1 with Occupancy Load > 500
1503.2.2: Amendment revised for mechanical equipment supports.

- Allows 8” platforms as an option for support (in addition to 8” curbs or legs)
- Includes exception for small equipment that allows legs with isolation pads to bear on roof membrane if warranty is not affected
2405.6.1: Revised amendment for fall protection at skylights that adds exceptions for skylights on 8” minimum curbs and skylights that have OSHA compliant guards.
Chapter 29 – Plumbing Fixtures & All-Gender Options

New amendments to allow “all-gender multi-user toilet rooms.”

- Builds on 2016 DBCA that requires single-user rooms to have all-gender signage
- Further increases inclusiveness for LGBTQ community, caregivers of elderly or people with disabilities, and families with small children
- Pulled forward from 2021 IBC but with increased requirements
Chapter 29 – Plumbing Fixtures & All-Gender Options

2902.7: All-gender multi-user toilet room requirements

- Minimum of 6 toilet compartments
- Exception for 3 toilet compartments + single-user toilet room
- Full height partitions and doors
- Exception allows walls to start within 4½” of floor and be 8’ minimum in height
- No sightlines when door is closed
Chapter 30 – Elevators

3007.6.1: Removed amendment that deleted exception that allows FSAE lobbies to access an exit stairway through a protected path

3008: Removed amendment that deleted section for occupant evacuation elevators
Chapter 33 – Safeguards During Construction

3307: Separates and updates the neighbor notification requirements for projects based on design compliance with the IRC or IBC. Allows contractor to document attempted contact for notification.
Appendix R – CO Title 9 Article 5 – Accessibility Standard

The design standard ANSI/ICC A117.1 has been coordinated with state statute in the Denver Amendments so that only one referenced edition is required for all elements of a project. All designs shall comply with the 2009 printing.

Note that review for permits through Denver does not include verification of federal (ADA, Title II, Title III, or FHA) compliance.
DBC Appendix U – Tall Wood Buildings

The Mass Timber Provisions approved for the 2021 IBC have been brought forward into the 2019 Denver Amendments.

Three new Types of Construction:
- IV-A has FRR equivalent to IA – no exposed mass timber
- IV-B has FRR equivalent to IB – limited exposed mass timber
- IV-C has FRR equivalent to IB – exposed mass timber

Heights up to 270’ and 18 stories
Substantial passive protection (gypsum wrap) of elements
Detailed special inspection requirements

Photo credit: UBC Media Relations
805.3.1: Previous amendment to IBC 1007.1.1 regarding conditions where scissor stairs can be considered two separate exits has been moved to the IEBC – no change in requirements.
2018 IFC / IFC-SC Amendments

Tony Caro
Committee & Public Proposals

International Fire Code

- 13 voting members
- 107 proposals submitted

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<tr>
<th>Voting members</th>
<th>IFC</th>
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<tr>
<td>Michael Passas</td>
<td>ACEC</td>
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<td>George McNeill</td>
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<td>BOMA</td>
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<td>Jaclyn Gorman</td>
<td>Denver Water</td>
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<td>Engineering consultant</td>
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<tr>
<td>R. Douglas Yester</td>
<td>Society of Fire Protection Engineers</td>
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<td>Rob Geislinger</td>
<td>Natl. Fire Sprinkler Assoc.</td>
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<td>Russell Holt</td>
<td>Conveyances</td>
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<td>Gregory Clair</td>
<td>Denver Public Schools</td>
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Committee & Public Proposals

International Fire Code – Smoke Control

- 9 voting members
- 30 proposals Submitted

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<tr>
<td>George Mcneill</td>
<td>Smoke Control – Controls/Balancing Industry</td>
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<tr>
<td>Greg Bradshaw</td>
<td>Fire Alarm/Electrical Contractor</td>
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<td>John M. McGovern</td>
<td>Mechanical Engineer</td>
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<td>Lyle Hays</td>
<td>Design Build - Engineer</td>
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<td>David Kahn</td>
<td>Mechanical Plan Review</td>
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Base IFC Changes

New IFC 319:
- Mobile Food Preparation Vehicles
- DFD has been permitting since 2015
- Tank venting requirements added
- CNG appliances will be allowed in addition to LPG

New IFC 916:
- Gas detection Systems
- Captures DFD Emergency Alarms

New IFC Chapter 12:
- Energy Systems
- Generators
- Batteries
- No longer based on electrolyte quantities

New IFC Appendices:
- “N” for Indoor Trade Shows & Exhibitions
- “K” for Existing Ambulatory Care Facilities
IFC 909 – Smoke Control

- Design rates (5 & 15) unchanged for all occupancy types

- Acceptance test – building balanced to demonstrate 40% sealed & 80% exhaust rate when makeup air afforded

- This provides testers and engineers guidance for balancing

- Makeup air could include HVAC running, open stairway or exterior doors, dynamic fans

- Fan reductions for stairways at 20% & 10% for hoistways
IFC 5707 – Mobile Fueling

- Operational permits
- Places parameters for where, how, when
- Anticipated that major on-line retailers will soon participate
- Limit switching to 30-gallon dispense quantity
- Vehicle limit to 1,200 gallons of I, II or III
- Not allowed on public right of way or inside buildings including parking garages
IFC 912 – FDC’s

- Retroactive
- Prevents theft
- Protects caps & swivels
- Prevent obstructions
- Operates off existing Denver Knox key
Chapter 12 – Energy Systems

- Will maintain annual ops permits
- Triggered at 8Kwh (similar to 50 gallon electrolyte)
- Emergency & Standby Power
- Solar Photovoltaic
- Fuel Cells
- Electrical Energy (all type of batteries)
IFC 919 – Elevators

- DFD currently running 8 entrapments daily (citywide)

- Calls consume personnel & equipment for extended periods of time, e.g., Chief Officer, Engine, Truck (9 personnel)

- New section requiring elevator mechanics to respond within 60-minutes or establish contact with Incident Commander

- DFD has been working with Elevator Industry for 6-years as a delegate of State of CO regulation (not typical nationwide)
Committee & Public Proposals

International Residential Code

- 11 voting members
- 26 proposals submitted

### Voting members
- Adam Przeszlowski, Structural Engineer
- Kyle Jackson, Structural Engineer
- Matt Wallace, KB Home - HBA
- Nathan Skrdla, Lyon Homes
- Sarah Kaplan, Kephart - AIA, HBA
- Kate Hilberg, Habitat for Humanity, architect
- Carrie Baron, Architect

### City and County of Denver
- Jim Sobey, Residential Plan Reviewer
- Brian Jacobs, CPD Bldg. Inspector
- Dave Renn, A/S Plan Reviewer
- Amir Abu-Jaber, Residential Plan Reviewer

### Non-voting member
- Casey Vesque, CPD Bldg. Inspector
Sections R103 through R114 are replaced in their entirety as follows:

- R104.9 Approved materials and equipment
- R105.2.2 Repairs
- R105.8 Responsibility
- R105.9 Preliminary inspection
- R106.1.2 Manufacturer’s installation instructions
- R106.1.3 Information on braced wall design
- R106.2 Site plan or plot plan
- R106.4 Amended construction documents
- R110.1 Use and occupancy
- R113.1 Unlawful acts

MODEL BUILDING CODE LANGUAGE REINSTATED
R101.2 Scope. The provisions of this code shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures not more than three stories above grade plane in height.
2019 DBCA Section R101.2

Exceptions:

2. The following shall be permitted to be constructed in accordance with this code without a fire sprinkler system:

2.2. Detached dwelling units used as a congregate living facility or a boarding house (transient or non-transient) with 10 or fewer occupants.
Exceptions:

2. The following shall be permitted to be constructed in accordance with this code without a fire sprinkler system:

   2.1. Lodging houses with five or fewer guestrooms and 10 or fewer total occupants.
Exceptions:

3. The following shall be permitted to be constructed in accordance with this code without a fire sprinkler system:

   Denver Revised Municipal Code Article II Chapter 33 licensed short-term rental residences.
Exceptions:

5. A Family Child Care Home (FCCH) complying with the provisions of Appendix Chapter M of the International Residential Code and located within a one-family dwelling, a dwelling unit of a side-by-side two-family dwelling, or a townhouse unit with frontage within 125 ft. (38.1m) of a street or fire access road. Such FCCH shall be permitted to be constructed in accordance with this code without a fire sprinkler system.
2019 DBCA Section R202 Definitions

Section R202 is modified by adding the following definitions:

FAMILY CHILD CARE HOME (FCCH)

- A dwelling unit in which care is provided on a regular basis, for less than 24-hrs at any time, in the provider’s place of residence, for two (2) or more children up to 18 years of age who are not directly related to the caregiver by blood, marriage, or adoption. The residents of the home under twelve (12) years of age who are on the premises, in addition to all unrelated children who are on the premises for supervision, are counted as children receiving care.
A regular Family Child Care Home provides care for no more than six (6) children, with no more than two (2) children under two and one-half (2-1/2) years of age. Care may be provided for two (2) additional children six (6) years of age and older who are enrolled in the first grade or above. The child-to-provider ratio shall be not more than six (6) children per provider.

A large Family Child Care Home provides care for no more than a total of twelve (12) children less than 18 years of age, with no more than three (3) children under two and one-half (2-1/2) years of age. There shall be a minimum of two providers.
Section R315.2.3 Family child care homes is added as follows:

R315.2.3 Family Child Care Homes

- The installation of combination CO alarms and detectors within Family Child Care Homes shall comply with Section 915.7.4 of the International Fire Code. These devices shall be powered by 110V or battery-operated provided with permanent integral 10-year lithium batteries.
Appendix M – Home Day Care

Appendix Section AM101.1 General is amended by adding the following sentence:

- Floor levels two or more stories above the ground-level story shall not be used for child care.

APPENDIX M PROVISIONS SIMILAR TO THOSE FOUND IN 2015 NFPA 101 CHAPTERS 16 & 17 FOR NEW AND EXISTING DAY-CARE HOMES
Appendix M – Home Day Care

Section AM103.1.4 Child care exits is added as follows:

AM103.1.4 Child care exits

- A floor level used for child care that is no more than four (4) feet measured vertically from adjacent ground level, may be considered a complying ground-level story.

APPENDIX M PROVISIONS SIMILAR TO THOSE FOUND IN 2015 NFPA 101 CHAPTERS 16 & 17 FOR NEW AND EXISTING DAY-CARE HOMES
Appendix M – Home Day Care

Section AM103.1.4 Child care exits is added as follows:

AM103.1.4 Child care exits

- All rooms used for child care shall possess access to two exits
Appendix M – Home Day Care

Section AM103.1.4 Child care exits is added as follows:

AM103.1.4 Child care exits

- The primary exit access shall be a door, stairway, or ramp providing a means of unobstructed travel to the outside of the dwelling unit at finished ground level.

- The secondary exit access shall be: (1) a door, stairway, or ramp providing a means of unobstructed travel to the outside of the dwelling unit at finished ground level that is independent of and remote from the primary exit access or, (2) an emergency escape and rescue opening conforming to the provisions of Section R310.2.

APPENDIX M PROVISIONS SIMILAR TO THOSE FOUND IN 2015 NFPA 101 CHAPTERS 16 & 17 FOR NEW AND EXISTING DAY-CARE HOMES
Appendix M – Home Day Care

Section AM103.1.4 Child care exits is added as follows:

**AM103.1.4 Child care exits**

- There shall be no dead-end corridors exceeding 20 ft in length

APPENDIX M PROVISIONS SIMILAR TO THOSE FOUND IN 2015 NFPA 101 CHAPTERS 16 & 17 FOR NEW AND EXISTING DAY-CARE HOMES
Appendix M – Home Day Care

AM103.1.4 Child care exits

In large Family Child Care Homes (FCCH), when the first level above the ground-level story is used for child care, the primary exit access shall be one of the following:

1. A door leading directly to the outside with access to finish ground level,
2. A door leading directly to an outside stairway going to finished ground level or,
3. An interior stairway leading directly to the outside with access to finished ground level. The interior stairway shall be separated from other stories by not less than ½-inch gypsum board or equivalent. The under-stair surface, including any intermediate landings shall be protected with ½-inch gypsum board or equivalent.
Appendix M – Home Day Care

Section AM103.5 Large Family Child Care Homes protection of vertical openings is added as follows.

AM103.5 Large Family Child Care Home protection of vertical openings.

- For large Family Child Care Homes, a door equipped with a self-closing or automatic-closing device shall be provided between the first story and the basement at the top of all stairways.
Appendix M – Home Day Care

Section AM103.5 Large Family Child Care Homes protection of vertical openings is added as follows.

AM103.5 Large Family Child Care Home protection of vertical openings.

- Where the story above the level of exit discharge is used for sleeping purposes, there shall be a door equipped with a self-closing or automatic-closing device at the top or the bottom of each stairway.
Section R202, TOWNHOUSE, is replaced as follows:

**TOWNHOUSE**

- A single-family dwelling unit constructed in a group of three or more attached units in which the unit extends from foundation to roof and has a yard or public way on the full length of one of the four principal sides and has a yard or public way on at least 50% of the length of another principal side.
Section R202, FIRE SEPARATION DISTANCE, is replaced as follows:

FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. To the closest interior lot line
2. To the center of a street, alley, or public way
3. To an imaginary line between two buildings or townhouses on the lot
2019 DBCA SECTION R302.1

FIRE-RESISTANT CONSTRUCTION

Section R302.1 Exterior walls is replaced in its entirety as follows:

R302.1 Exterior walls

- Construction, projections, openings and penetrations of exterior walls of dwellings, townhouses and accessory buildings shall comply with Table R302.1(1); or dwellings and townhouses equipped throughout with an automatic sprinkler system installed in accordance with Section P2904 shall comply with Table R302.1(2).
Section R302.1.1 Townhouse imaginary line is added as follows:

R302.1.1 Townhouse imaginary lines

- Assumed imaginary lines shall begin at the ends of the walls separating townhouses required by Section R302.2 of the International Residential Code and shall extend to a lot line or to another imaginary line.
Section R302.2.2 is replaced in its entirety as follows:

R302.2.2 Common walls

- Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing.
Section R302.2.2 is replaced in its entirety as follows:

R302.2.2 Common walls

Exception:

- Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two two-inch nominal thickness wood studs.
Section R202 is modified by adding the following definitions:

**SLEEPING ROOM**

- Any room used or intended to be used for sleeping purposes and any habitable space with a closet unless otherwise determined at the sole discretion of the building code official.
CEILING HEIGHT

Section R305.1 Minimum height is amended by adding Exception 4:

- The ceiling height in basements built prior to October 1990 shall be a minimum of 6 feet 8 inches, with a minimum clearance of 6 feet 4 inches to any ceiling projection caused by beams, ducts, or pipes. If unusual circumstances are present, ceiling heights lower than 6 feet 8 inches are subject to the approval of the Building Official.
Section R310.2.2 Window sill height is replaced in its entirety as follows:

R310.2.2 Window net clear opening height

- The bottom of the net clear opening shall be not more than 44 inches above the floor.
Section R312.1.2 Height is amended by adding the following sentence:

- Required guards at open-sided walking surfaces located greater than 72 inches above finished grade shall be not less than 36 inches (914 mm) in height as measured vertically above the adjacent walking surface, above any integral or built in, abutting raised horizontal surface, or the line connecting the nosings.
Section R903.2.6 Penetration of roof membrane is added as follows:

- Fasteners for exterior wall finishes shall not penetrate the manufacturer’s minimum required vertical extension of the roofing membrane at adjoining exterior walls.
COMBINATION WASTE AND VENT SYSTEMS

Section P3111.1 Type of fixture is amended by adding the following sentence:

- A combination waste and vent system shall not receive the discharge of a food waste disposer.
Section E3401.1 Applicability is amended by adding the following sentences:

- The National Electrical Code (NEC) as adopted by the State of Colorado.
Appendix F – Radon Control Methods

Appendix F contains provisions that are intended to mitigate the transfer of radon gases from the soil into dwelling units. Radon is a radioactive gas that has been identified as a cancer-causing agent and comes from the natural breakdown of uranium in soil, rock, and water.

Requires detailing and construction to resist radon entry and prepare the building for installation of active submembrane or subslab depressurization systems if required in the future.
Appendix Q – Tiny Houses

Appendix Q relaxes various requirements in the body of the code as they apply to houses that are 400 square feet in area or less. Attention is specifically paid to features such as compact stairs, including stair handrails and headroom, ladders, reduced ceiling heights in lofts and guard and emergency escape and rescue opening requirements at lofts.
2018 IMC / IPC / IFGC Amendments

Chuck Bartel
Committee & Public Proposals

International Mechanical, Plumbing, & Fuel Gas Codes

- 7 voting members
- 17 IMC proposals submitted
- 15 IPC proposals submitted
- 4 IFGC proposals submitted

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Recirculation of Air

Section 403.2.1 Item #1 has been replaced

1. Ventilation shall not be recirculated from one dwelling unit to another. Ventilation air shall not be recirculated between residential and nonresidential occupancies. Ventilation air shall not be recirculated between nonresidential occupancies of dissimilar use.
Grease Duct Enclosure Exception

Section 506.3.11 is amended by adding an exception:

**Exception 2.** A duct enclosure shall not be required for a grease duct that penetrates only an exterior wall and all of the following are true:

1. The grease duct does not penetrate, or pass through openings, gaps, or holes in rated or non-rated interior walls or shafts
2. The grease duct does not leave the tenant boundary
3. The grease duct shall be permitted to penetrate a non-fire-resistance-rated ceiling
Pollution Control Units (PCUs)

- Section 506.3.13.2 Termination through an exterior wall is amended by adding the following sentence:

  Exhaust outlets shall be permitted to terminate through exterior walls when a pollution-control unit is used. The pollution control unit shall have 95% efficiency at the particle size of .3 microns in accordance with ASHRAE Standard 52.2 or equivalent.

- Section 506.5.2 Pollution-control units is amended by adding items 16-21
Ceiling Radiation Dampers

Section 607.3.1 Damper testing is amended by adding the exception as follows:

Exception: When the fans associated with heating, ventilation, and air-conditioning systems are interlocked to shut down during a fire, then ceiling radiation dampers that have not been labeled for use within dynamic systems can be used within the associated systems.
Single-User & All-Gender Toilet Facilities

Section 403.1.2 Single-user toilet facility and bathing room fixtures is replaced in its entirety.

Section 403.7 All-gender multi-user toilet rooms and its subsections are added.

Conceptual layout of all-gender multi-user toilet room.
Section 1106.2.1 Alternative storm drain sizing is added:

Using sizing tables from the 2009 IPC
2018 IECC Amendments
2018 Denver Green Code

Denver Community Goals

Christy Collins
Denver Community Goals + Priorities

- Equity
- Respond to Climate Change
- Affordability
- Resiliency
- Health
- Inclusive
- Connected
- Safe
- Accessible
- Economically vibrant
- Active
- Authentic neighborhoods
Denver 80x50 Plan

GHG emissions 80% below 2005 levels by 2050
Homes + buildings = \textbf{63\%} of Denver’s GHG Emissions
40\% new by 2050

\textbf{GHG Emissions + Buildings}
Denver 2035 NZE New Buildings

- Five code cycles
- Implementation plan 2020
- IECC amendments
- Green Code, GBO
- Community stakeholders
1. Energy efficiency
2. Renewables
3. Electrification
4. Grid Stabilization

Collectively

Denver 2035 NZE New Buildings

Site Energy Use Intensity (EUI)

MEASURED FOR 365 DAYS

- SPACE HEATING
- PUMPS & FANS
- SPACE COOLING
- LIGHTING
- HOT WATER
- OTHER LOADS

ENERGY CONSUMPTION

ON-SITE ENERGY PRODUCTION

(kBtu / YEAR)

FLOOR AREA (SQ. FT.)
Existing Buildings + Xcel

Separate efforts

Community stakeholders
2018 IECC Denver Amendments

Denver’s Path To Net Zero Energy – Residential

Residential

Denver’s Code Today

Denver’s Goals

© New Buildings Institute
2018 Denver Green Code

Voluntary

Preview

Energy, water
waste, wellness
Aesthetics + Performance

Balance

Concept

Cohesive

AIA National
Accountability + defined responsibilities

Market + Regulations
2018 IECC Amendments

Jen Jaffke
Committee & Public Proposals

International Energy Conservation Code

- 14 voting members
- 81 proposals submitted

<table>
<thead>
<tr>
<th>Voting members</th>
<th>IECC</th>
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<tbody>
<tr>
<td>Brandon Vandelaar</td>
<td>Hensel Phelps</td>
</tr>
<tr>
<td>Elizabeth Gillmor</td>
<td>Energetics</td>
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<tr>
<td>Nathan Kahre</td>
<td>Thrive Homes - HBA</td>
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<td>Paul Kriescher</td>
<td>Lightly Treading</td>
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<td>Paul Sweeney</td>
<td>GE Johnson</td>
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<tr>
<td>Sarah Kaplan</td>
<td>Kephart - AIA, HBA</td>
</tr>
<tr>
<td>Kevin Perri</td>
<td>Noresco</td>
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<table>
<thead>
<tr>
<th>City and County of Denver</th>
<th>IECC</th>
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<tbody>
<tr>
<td>Scott Prisco</td>
<td>Building Official</td>
</tr>
<tr>
<td>Katrina Managan</td>
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<tr>
<td>Christy Collins</td>
<td>Green Buildings Specialist</td>
</tr>
<tr>
<td>Keith Fox</td>
<td>Mechanical plan review</td>
</tr>
<tr>
<td>Carol Pafford</td>
<td>Electrical plan review supervisor</td>
</tr>
<tr>
<td>Daniel Krausz</td>
<td>A/S plan review</td>
</tr>
<tr>
<td>Mike Walton</td>
<td>Residential plan review</td>
</tr>
</tbody>
</table>
Key changes to the IECC process

- Increased focus on **plan reviews** for IECC compliance
- Increased focus on **IECC compliance** measures in **field inspections**
- First step towards **Increased Energy Efficiency**
Key Factors in the Amendment Process

- We gathered a committee group of outside professionals who worked with us closely to monitor feasibility
- Attainable, affordable amendments was the top priority
- Goal to advance code without creating financial hardship
Key overall changes to the 2018 IECC

- Continuous Air Barriers and Sealing Details are Required
- Thermal Envelope continuous, testing now required
- R-2 is moving to the Commercial Code
- Increased Solar Readiness in new construction
Commercial: Code Compliance Path Options

IECC 2018 - Prescriptive Path
(COMcheck + **TWO** efficiency package options from C406)

IECC 2018 - Performance Path
(C407 + mandatory sections)
model energy cost must be 85% or less than reference design

ASHRAE 90.1 - Prescriptive Path

ASHRAE 90.1 - Performance Path (C401.2 Amended)
Appendix G

Energy Cost Budget or ECB method is no longer an accepted compliance path
Commercial: Efficiency Package Options

**TWO** options are now required for compliance per C406:

- **NEW** Enhanced Envelope Performance (C406.8)
- **NEW** Reduced Air Infiltration (C406.9)
- More Efficient HVAC
- Dedicated Outdoor Air System
- High Efficiency Service Hot Water
- Reduced Lighting Power
- Enhanced Lighting Controls
- On-site Renewables
Commercial: NEW Mandatory Requirements

- Mechanical and Ventilation
- Heating and Cooling Equipment
- Thermostatic Controls
- Duct and Pipe Insulation
- Air Barrier Location and Sealing Details
- Service Water Heating
- Lighting
- Solar Readiness
Commercial: Required in Construction Docs

Must be graphically shown on drawings and referenced (C103.2)

- **(NEW) Air Barrier and Air Sealing Details**, including **Air Barrier Location** (C103.2 item 12)
- Insulation materials & R-values
- Fenestration U-factors & SHGC
- Mechanical system design criteria
- HVAC equipment efficiencies
- Economizer description
- Equipment and system controls
- Lighting, fixture schedule with wattage and control narrative
Commercial

Thermal Envelope Updates:

Increased restrictions on Air Barriers (C402.5.1)

Continuous Thermal Envelopes and air leakage testing per ASTM E779 (C402.5.1.2.3)

Continuous Air Barrier on drawings and tested for in field inspections (C402.5.1.3)

Commissioning Report requirements (brought in from policy) (C408)
Commercial

Lighting / Electrical Changes:

Changes to **Lighting Power Allowances** for Interior and Exterior applications (C405.3.2)

Updated **Daylighting Controls** (C4.5.2.3)

**90%** of Luminaires in Multi-Family Dwelling Units must be **High Efficiency** (C405.1.1)

**Parking Garage** lighting controls (C405.2.7)
Commercial

Mechanical / Plumbing Changes:

- Upgraded Efficiencies required
- Increased Energy Recovery Systems (C403.7.4)
- Upgraded Fan Efficiencies (C403.8.6)
- Upgraded Service Water Heating efficiencies (C404.2.1)
Commercial

Changes to Renewables:

Solar Readiness
Drawings must indicate the Solar-ready zone (Appendix CA)

Increased Electric Vehicle (EV) Readiness (C405.10) – progressive requirements to promote electrification
Commercial

Electric Vehicle Definitions:

**EV Ready:**
A parking space provided with a dedicated branch circuit for EVSE, terminated at a receptacle at parking space.

**EV Capable:**
A parking space provided with conduit from the panelboard to the parking space, and space in the panelboard, but wire is not run to space.

**EVSE Installed:**
A parking space with EV supply equipment installed at the parking space.
Commercial

Electric Vehicle Requirements:
(now affect multiple occupancy types)
Group R Occupancies: (three or more dwelling units)

<table>
<thead>
<tr>
<th></th>
<th>Number of EV Ready Spaces</th>
<th>Number of EV Capable Spaces</th>
<th>Number of EVSE Installed Spaces</th>
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<tr>
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<td>1</td>
<td>None</td>
<td>None</td>
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<tr>
<td>2 to 9 spaces</td>
<td>1</td>
<td>20% of spaces</td>
<td>None</td>
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<tr>
<td>10 or more spaces</td>
<td>15% of spaces</td>
<td>Remainder of spaces</td>
<td>5% of spaces</td>
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Group A, B, E, I, M, S-2 Occupancies:

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Residential: Code Compliance Path Options

IECC 2018 - Prescriptive Path

IECC 2018 - Performance Path
(R405 + mandatory sections)

IECC 2018 - Energy Rating Index Path (ERI)

R-2 has moved to the Commercial Code (Group R)
Residential: Efficiency Package Options

Prescriptive path must select **ONE** compliance option (R407.1):

- Enhanced Envelope Performance
- More Efficient HVAC Performance
- High-efficiency Service Water Heating
- More efficient Thermal Distribution System
- Improved Air Leakage Standards
- Lighting Efficiency
Residential

Thermal Envelope Changes:

**Ducts** outside of Conditioned Space must be **Insulated** (R403.3.1)

Energy Rating Index Path
Maximum ERI = 56
Residential

Lighting / Electrical Changes:

90% High Efficacy Lamps required (R404.1)

Increases to Lighting Efficiency - Interior and Exterior
Residential

Changes to Renewables:

Solar Readiness
Drawings must indicate the Solar Ready Zone
(Appendix RA)

Increased Electric Vehicle (EV) Readiness in Multi-Family Residential (Table R404.2.2)
Residential

Electric Vehicle Requirements:

**Group R Occupancies:** (all dwelling units)

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2018 Denver Green Code

Christy Collins
**Committee & Public Proposals**

**International Green Construction Code**  
(Baseline for Denver Green Code)

- 18 members

**Process:**
- Started with 2018 IgCC
- Tailored each section to Denver
- Balanced mandatory + optional requirements for Denver

<table>
<thead>
<tr>
<th>Members</th>
<th>IgCC</th>
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</thead>
<tbody>
<tr>
<td>Cheryl Hoffman</td>
<td>Hensel Phelps</td>
</tr>
<tr>
<td>Dane Sanders</td>
<td>Clayton Associates</td>
</tr>
<tr>
<td>Jeff Keeley</td>
<td>Craft Companies - HBA</td>
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<tr>
<td>Nate Huyler</td>
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<td>Penny Cole</td>
<td>DLR Group</td>
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<tr>
<td>Rachel Bannon-Godfrey</td>
<td>Stantec</td>
</tr>
<tr>
<td>Aaron Esselink</td>
<td>Xcel Energy</td>
</tr>
<tr>
<td>Jeff Tejral</td>
<td>Denver Water</td>
</tr>
</tbody>
</table>

**City and County of Denver**

- Chris Gleissner: Project Coordination Supervisor
- Sonrisa Lucero: Office of Sustainability
- David Carlson: CPD Electrical Plan Reviewer
- Scott Prisco: CPD Building Official
- Jim Turner: Public Works Engineer Supervisor
- TC Bohnet: SUDP Plan Review Supervisor
- Katrina Managan: DDPHE Climate Smart Buildings Team Lead
- Christy Collins: Green Buildings Specialist
Denver Green Code Purpose

- Denver community priorities
- Base code preview
- Stretch code
- Support NZE new buildings 2035
- Leadership
Denver Green Code Incentives

- Five (5) commercial pilots
- Residential
- Recognition
- Expedited permitting
Denver Green Code Opportunities

- Learning strengths + opportunities
- Evaluating potential resources
Denver Green Code Development

Community stakeholders

nbi new buildings institute

DENVER THE MILE HIGH CITY

THE Mozingo CODE GROUP LLC

2018 IgCC

Denver specific
Denver Green Code Requirements

- Chapter specific
- Mandatory + options
- Prescriptive or performance
- Denver achievable
Chapter 1 – Scope + Administration

Commercial + Residential

Compliance Options:

1. Denver Green Code
2. LEED Platinum
3. Net Zero Energy
4. Passive House + Non-energy DGC
Chapter 4 – Residential Energy Efficiency

New + Alterations

- Passive House
- Net Zero Energy + electric (*new only)
- ERI <50 + electric
Chapter 5 – Site Sustainability

- Preconstruction site evaluation
- Stormwater
- Heat island
- Light pollution
- Electric vehicles
- Site waste
- Soil amendment
Chapter 6 – Water Use Efficiency

- Potable + nonpotable
- Site + building
- Measurement + data
- On-site water treatment
Chapter 6 – Water Use Efficiency

- Irrigation
- Plumbing fixtures
- Appliances
- Water features
- Specialties
Chapter 7 – Energy Efficiency

Prescriptive

or

Performance: 10% better
Chapter 7 – Energy Efficiency

- Stretch code
- Outcomes
- Actual energy use
- Performance requirements
Chapter 7 – Energy Efficiency

- On-site solar ready
- Metering
- Demand response
Chapter 7 – Energy Efficiency

- Opaque envelope + fenestration U-values
- Air infiltration rates
- Equipment efficiency
- Duct leakage + insulation
- Lighting
- Appliances
Chapter 8 – Indoor Environmental Quality

- Ventilation
- Filtration
- Building pressure
- Humidity
- Soil-Gas
- Acoustics
- Glare
- Daylighting
- VOCs
Chapter 9 – Materials + Resources

Construction + waste diversion:

- Refrigerants
- Mercury
- Recyclables
- Regional
- Biobased
- Reporting
Chapter 10 – Construction + Plans for Operation

Construction

- Systems functional + performance testing
- Commissioning
- IAQ
- Waste diversion tracking
Chapter 10 – Construction + Plans for Operation

Operations Plans

- Building water + energy
- Maintenance
- Transportation management
- Tenants
DENVER'S GREEN BUILDINGS ORDINANCE

A Green Buildings Ordinance was approved by Denver City Council on October 29, 2018, and took effect Friday, November 2, 2018.

On November 15, 2018, Community Planning and Development (CPD) held an open house discussing the flexible options available for buildings under the new ordinance.

Building Permits for Projects under the Green Buildings Ordinance
Download slide deck (PDF)
Download summary (PDF)

Download the ordinance

Rules and Regulations
CPD and the Denver Department of Public Health & the Environment (DDPHE) have jointly adopted administrative rules and regulations for implementing the green buildings requirements.

- Read the rules and regulations (PDF) - final & adopted
Thank you!

Contact us: denvergov.org/DS