

2021 I-Codes Significant Changes

The 2021 body of International Codes and amendments have been adopted by The City of Fort Collins April 15th, 2022.

Purpose: Following is a summary overview of the significant changes from the 2018 body of I-Codes to the 2021 body of I-Codes and local amendments.

2021 International Building Code (IBC)

Local amendments:

105.2 MEP work exempt from permit is added back into the code. Had been amended out for many years.

114.4 Work without the required permit changes to civil infraction.

503.1.2.1 Code section added for building across/on a property line of common owned property.

Chapter 9 removed and now references the Fire Code as adopted by PFA (Fire Dept).

1107 When new electric vehicle parking spaces are required/provided 5% must be accessible spaces.

1608.2 Ground snow loading for roofs has changed to 35psf. GSL allows reductions and when reduced produces approx. 30psf which is the minimum needed in our area.

2902.2 New commercial single-user restrooms are required to be gender-neutral. Multi-user restrooms can be gender-neutral when meeting certain privacy requirements.

3604 New electrical vehicle charging for all new buildings. A percentage of parking spaces must be provided with 3 different levels of electric vehicle charging per the occupancy and number of spaces.

IBC Code body changes:

404.10 New requirements for interior exit stairs in an atrium.

406.6.4 New requirements for enclosed parking garages with mechanical access door entry.

407.2.7 New requirements for domestic cooking in I-2 (nursing home) occupancies.

411 New requirements for amusement areas such as Panic Rooms.

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420.8 New requirements for domestic cooking in I-1 (assisted living facility) occupancies.

Chapter 5 New mass wood/timber type of construction (type 4-A, 4-B, & 4-C)

506 New frontage (yard) allowable area increase chart.

601 & 602 New fire resistance requirements for mass wood type 4 (A, B, C) construction type.

717.4 New fire and smoke damper access and identification requirements.

1010.2.4 New exterior court building re-entry exiting requirements.

1110.2.2 New type of accessible toilet room called assisted toileting and design requirements.

1505.9 New roofing fire classification for solar PV panels of roofs.

1605 / 1606 / 1607 New structural load details.

2209 New steel storage rack requirements.

2303.4 New truss diagonal bracing requirements.

2304.10 Update to wood fastener schedule.

3115 New requirements for shipping containers used as buildings.

3313 / 3314 New water supply requirements during construction for firefighting.

2021 International Residential Code (IRC)

Local amendments:

R113.4 Violations of the code are changed to civil infraction instead of criminal.

Table R301.2 Roof ground snow load changed from 30 to 35 psf. Climate criteria outdoor summer design dry-bulb temp changed from 90 to 91, cooling temp difference changed from 15 to 16.

R320.3 Is a new section that requires a half bathroom on the first floor of any dwelling that has habitable space on the first story for accessible visitability and has some design criteria.

R331.4 Electric vehicle charging circuit and wiring must be installed in garage to electric panel.

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R408.3.1 Now basement under floor ventilation has a prescriptive path instead of requiring ENG.

R507.4 New deck post height table.

R702.7 Vapor retarders on the interior of side of framed walls is now optional, not required.

Chapter 11 This chapter has been deleted and now refers to IECC residential chapter.

M1402.4 All new electric heat systems require ground source heat pump or cold climate heat pump.

P2903.2 Water closet (toilet) flush changes from 1.28 gpf to 1.1 gpf.

IRC electrical chapter are amended out to require all electrical comply with current NEC.

IRC Code body changes:

R310 Emergency escape and rescue openings (egress windows) now require a 3ft wide path from the well opening to the public way. May require a well cover to pass over/on. A 36" wide opening is required when the well is located under a deck/cantilever or other obstruction. Window opening min size is now reduced for existing dwellings from 5 to 4 sq. ft.

R320 Requires townhouses with 4 or more units must meet IBC chapter 11 accessibility requirements.

R324 Adds an exception for BIPV systems that remove the fire dept access path requirements.

R326 Limits the area of habitable attics and requires a fire sprinkler system.

R328 New section regulating energy storage systems.

R507 Decks shall be designed with normal live load or snow load, whichever is greater.

R507.10 Deck guards must be supported by deck framing and joists.

R507.3.1 Deck footing sizes have been revised.

R704 New framing/support requirements for roof overhang soffits.

R905.4.4.1 Metal roof shingles have new wind resistance requirements.

R905.16 PV solar roof shingle classification requirements.

M2101 Additional requirements for hydronic piping systems.

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G2403 New definition of Public Utility vs private part of gas line/service.

G2414.8.3 Thread joint sealant now required on threaded gas line joints.

G2447.2 Commercial cooking appliances are not allowed in dwellings even if engineered.

P2503.5.1 Plumbing waste/vent rough water test requires 10ft of head pressure. Our amendment allows test by water, air, or vacuum for all pipe materials.

P2708.4 & P2713.3 requires shower/tub valves be rated to meet lower gpm flow rates of the fixture.

P2904 Updates & revisions to the residential fire sprinkler system to align with 13D.

P2905.3 Length of hot water piping from source to fixture is 100ft max.

P3011 Adds new requirements for plumbing waste liner systems to repair existing sewer lines.

2021 International Energy Conservation Code (IECC)

COMMERCIAL

***C103.2 Information on Construction Documents:** Added energy compliance path and the location of the air barrier to list of details that must be on the plans.

C202 General definitions: Added definitions for All-Electric Building, Electric Heat, and Mixed-Fuel Building.

***C301.1 General:** Revised Climate Zones in Figure C301.1 and Table C301.1 to update the climate zones to correspond with the release of ASHRAE Standard 169-2013".

***C303.1.2 Insulation Mark Installation:** Revised language to require an insulation certificate on site if the R value label for insulation is not visible.

***Chapter 4 items listed as (Mandatory):** the word mandatory was removed from the entire chapter. Mandatory always meant that the specific item could not be traded off if someone used a trade-off path of compliance. Instead of saying "mandatory", a table of "required" items has been placed in the Performance Path Section of C407 to list those items that cannot be traded off in that pathway. Otherwise, all items not listed as (Performance) are required if using the prescriptive approach.

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C401.1.1 Building Electrification: Added that all newly constructed *buildings* shall be constructed as an *all-electric building* or a *mixed-fuel building* that is pre-wired for future electric space heating, water heating, cooking, and clothes drying equipment.

***C401.2.1 International Energy Conservation Code:** One of the changes to these sections simply clarifies that there is a prescriptive path, a performance path, and then a separate Section 401.2.2 for the option of ASHRAE 90.1. The Sections tell you which code sections to comply with in each instance. Exempts out existing buildings that comply with Chapter C5. (no technical changes, only cleanup of layout)

***C401.2.1 #1 Prescriptive Compliance:** Allows dwelling and sleeping units in R-2 buildings over 3 stories with systems that do not serve multiple units are to not be required to comply with the commercial chapter of the IECC as long as they comply with R406 Energy Rating Index path of the residential chapter.

***C401.3 Thermal Envelope Certificate:** Adding new section to require a permanent certificate to commercial buildings that will record basic information related to the building thermal envelope like the certificate required in residential buildings.

***C402.1.1 Low Energy Buildings and Greenhouses:** Adding the term “greenhouse” to the title of the section and removing it as an exception so that they now must comply with the code.

***C402.1.1.1 Greenhouses:** Adding new section for conditioned greenhouses. Adding skylight and vertical fenestration U factor table to section. Provides exception for low energy use or unconditioned greenhouses.

***C402.1.2 Equipment buildings:** Increasing sq ft of exempt buildings from 500 to 1200 sq ft. and clarifying that it is for electric equipment.

Table C402.1.3 Insulation R-value Table: (appropriate matching changes made to U/C/F factor table)

Climate Zone 5: Changing R value of attic insulation from R38 to R49 (all other occupancies), Changing R value of Mass wall insulation from R11.4ci to R13ci and R13.3ci to R13 ci, Changing R value of wall insulation in metal buildings from R13 + R13ci to R13 + R15ci (group R); Changing R value of insulation in metal framed buildings from R13 + R7.5ci to R13 + R10ci; Changing R value of insulation in wood framed walls from R13 + R3.8ci or R20 to R15 + R7.5ci or R20 + R5ci; Changing R value of insulation for below grade walls from R7.5 to R10ci (Group R); Changing R value of insulation for mass floors from R10 to R14.6; Changing R value of insulation for mass floors from R12.5 to R16.7 (group R); Added floor

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insulation – steel joist to R30+7.5ci, Changing slab edge insulation for unheated slabs from R10 to R15 and from R10 to R20 (Group R).

***Table C402.1.3 Footnote g:** Revised wording to add “full under” slab.

***Table C402.1.4 Insulation U factor Table:** Deleted multiple f factors for heated slabs and changed to one F factor to make it easier to use COMcheck.

***Table C402.4 U factor & SHGC fenestration table:** lowered most of the U factor and SHGC values for fixed and operable windows and entrance doors in climate zones 1-8. values. Also changed SHGC values to be dependent on whether the fenestration is fixed or operable instead of by orientation.

C402.5.1.5 Building Envelope Performance Verification requires an air barrier and air sealing inspection report be provided to the building owner or owner’s agent at the time of framing and insulation inspection. This makes sure the contracted air tightness test firm has input on details that ensure the building meets the required air tightness requirement.

C402.5.2 Dwelling and sleeping unit enclosure testing changed to require buildings that have fewer than eight units, each unit shall be tested. For buildings with eight or more units, 20% of the units shall be tested including one of each unit type and approximately an equal number on each floor.

C402.5.6 Doors and access openings to shafts, chutes, stairways, and elevator lobbies requires that doors and access openings on vertical walls from conditioned space to unconditioned attic space shall be insulated to a minimum of R-7.

C403.12.3.1 Protection of piping insulation added a provision that paint products and similar applications that require maintenance shall not be permitted.

C405.2.5 Specific application controls now includes an exception for buildings undergoing an occupancy change to R-1 and that have eight or less sleeping units.

C405.2.7.3 Lighting Setback removed language that only applied to luminaires that are only greater than 78 watts and a height of 24 feet or less so the reduction of total wattage by 50% where activity has not been detected for 15 min or more applies to all lighting.

C405.2.8 Parking garage lighting control: New section requires occupant sensor control or automatic time-switch shutoff, light reduction by not less than 50% when no activity detected within 15 minutes, lighting zones of no more than 3,600 sq ft, lighting used for eye adaptation at covered vehicle entrances and exits must be controlled separately by controls that automatically reduce lighting by 50% from

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sunset to sunrise, power to luminaires within 30 feet of the perimeter wall openings must automatically reduce in response to daylight by 50%.

***Table C405.3.2(1) Interior lighting power allowances building area method:** Revised all LPD watts per sq ft to be more in line with what is in space by space method. most wattage allowances were decreased, while a few were increased.

***Table C405.3.2(2) Interior lighting power allowances space by space method:** Revised LPD watts to increase stringency/reduce wattage in most space types.

***C405.4 Lighting for plant growth and maintenance:** New section requiring that at least 95% of the permanently installed luminaires used for plant growth and maintenance have specific higher efficiency lighting as defined in accordance with ANSI/ASABE S640.

C405.12 (and subsections) Energy Monitoring: Added new mandatory requirement to measure/monitor/record/report energy consumption in new buildings with greater than or equal to 600 amp electric service. Added exceptions for R-2 occupancies and individual tenant spaces that have their own utility services and meters and have less than 5000 square feet of conditioned floor area.

C406 Additional Efficiency Package Options: This code section was completely revised to make it into a point-based system, requiring that new buildings achieve a total of 10 credits from the various tables.

C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements: lowered the required building gross from the previously amended 25,000 square feet to 15,000 sq feet or less.

C409 Integrated Design Assistance: A new compliance path was added to include a submittal option for those participating in The City of Fort Collins Integrated Design Assistance Program. Typical submittals fall under the ASHRAE 90.1 Appendix G Performance Rating Method.

APPENDIX CB SOLAR READY ZONE – COMMERCIAL: Appendix adopted in its entirety. All buildings must comply with the appendix. This applies to roof areas that are five stories or less and that orient between 110 degrees and 270 degrees of true north.

EXISTING BUILDINGS

C501.2 Compliance: An exception to C402.2.4 Slab-on-grade (SOG) floors was added to exempt SOG insulation requirements for existing building projects where it would require demolition of existing permanent building construction components.

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RESIDENTIAL

***R103.2 Information on Construction Documents:** Requires that the construction documents now specify somewhere which path of compliance was chosen for the project. (ie: Prescriptive, Total UA Alternative, Total Building Performance, ERI)

***Chapter 4 items listed as (Mandatory):** The word mandatory was removed throughout the entire chapter. Mandatory always meant that that specific item could not be traded off if someone used a trade-off path of compliance. Instead of saying “mandatory”, a table of “required” items has been placed in the Simulated Performance Approach and the Energy Rating Index Approach to list those items that cannot be traded off in those pathways. Otherwise, all items are required if using the prescriptive approach.

R401.2.5 Additional Energy Efficiency: New Section is added to bring in a requirement to pick a path of compliance and then also pick an additional efficiency package on top of that to meet the efficiency requirements of the building. There are several options to choose from. This is like the additional efficiency package options of C406 for commercial (prior to 2021 edition which is now points based for commercial). See Section R408 below for the full requirements.

Table R402.1.3 Insulation Minimum R-Values and Fenestration Requirements: Fenestration U-factor lowered from 0.30 to 0.28 or 0.25 for wall elevations where glazing area is more than 30% of the wall area. SHGC changed from NA to maximum SHGC of 0.35. Ceiling insulation changed from R49 to R60. Wall insulation PRESCRIPTIVE options are now R30, or R20+5ci (ci=continuous insulation), or R13+10ci, or R0+20ci, or R23+3ci. Adds an additional option for basement walls so that there is a cavity plus continuous option. Slab insulation requirements are revised to increase depth of insulation from 2 to 4 feet or to top of footing. Floor insulation increased from R30 to R38. An option was added for cavity plus continuous insulation (R13+5ci) for basements and crawlspaces.

R402.2.4 Access Hatches and Doors: revised the vertical door section to entries from conditioned to unconditioned spaces that are not required to be a swinging door and shall be less than or equal to U-0.10 or have an average insulation R-value of R-10 or greater.

Table R402.4.1.1 Air Barrier, Air Sealing and Insulation Installation: Includes several additions and clarifications, one of which is Walls, where in the criteria ‘exterior’ was removed – The junction of the top plate and the top of walls that are adjacent to an unconditioned space (ie: attic) shall be sealed.

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R402.4.1.2 Testing: Added an option to comply with air tightness testing (blower door) by either meeting an air leakage rate of 3 ACH50 or by meeting an air leakage rate of 0.16 CFM/50 per square foot of dwelling unit enclosure area. Multifamily dwelling units are still required to be tested and meet an air leakage rate that does not exceed 0.30 CFM/50 per square foot of dwelling unit enclosure area.

R402.5 Maximum Fenestration U-Factor and SHGC: change from a maximum area weighted U-value of 0.48 to 0.32 for vertical fenestration and an SHGC of 0.35.

R403.3.6 Duct Leakage: A requirement is added (by removing the exception) to mandate all ducts be tested, including those inside the thermal envelope. City of Fort Collins amended testing of all duct systems total leakage be less than or equal to 4.0 cubic feet per minute per 100 square feet of conditioned floor area.

R403.4.1 Protection of piping insulation: Added a provision that paint products and similar applications that require maintenance shall not be permitted.

***R403.5 Service hot water systems:** A Water heating equipment section is added that lists allowed water heater types, as well as a table (Minimum uniform energy factor for storage gas water heaters).

***R404.1 Lighting equipment:** Changed from not less than 90 percent to All permanently installed lighting fixtures must be high efficacy.

***R404.1.1 Exterior lighting:** New section for exterior lighting of R2, R3 and R4 buildings that requires them to meet commercial exterior lighting provisions.

***R404.2 Interior lighting controls:** New section is brought in that will require either a dimmer, occupant sensor or other control that is built into the fixture to be installed in all lighting. But provides an exception for lighting controls in bathrooms, hallways, exterior lighting fixtures, lighting designed for safety or security. Also, a section that specifies exterior lighting controls must be automatic if over 30 watts of lighting is installed.

R404.4 Occupant sensor controls: New section added that requires multifamily *buildings, occupant sensor controls* shall be provided to automatically reduce connected lighting power by not less than 50 percent during periods when no occupants are present in common corridors and common enclosed stairwells. Exceptions exist for control of battery back-up, emergency lighting and exit signage.

R404.5 Electric readiness: New section added that requires buildings be constructed with electric appliances (heat pumps space and water heating, electric cooking equipment and clothes dryers) *or* be

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pre-wired to support these types of systems. Electrical requirements are included within this section. An exception exists to provide conduit with pull string sized to accommodate future electrical appliances.

R404.5.6 Space heating for electrification: A new requirement that space heating equipment shall be constructed with a ground-source electric heat pump or an electric cold climate heat pump specifically designed to heat at the Winter Outdoor, Design Dry-Bulb temp defined in Section 301.5 of this code or pre-wired to support the aforementioned electric heat pump system. Electric resistance strip heat shall only serve as defrost, emergency back-up heat or supplemental heat at outdoor temperatures less than or equal to 15°F.

TABLE R405.4.2(1) Service water heating (Plumbing Compactness): Applicable to all residential compliance paths is the requirement that hot water distribution systems meet the following compactness requirements: One story buildings – All hot water sources and hot water fixtures shall be within a rectangle that has a square foot area no more than 60% of the total conditioned floor area of the home/dwelling.

Two story buildings shall be no more than 30% of the total conditioned floor area.

Stacked Multifamily apartment style units shall be no more than 70% of the total conditioned floor area. Exceptions apply.

***R408 Additional Efficiency Package Options:** New section added requiring choosing one additional energy efficiency measure on top of those within the chosen compliance path (ie: Prescriptive, Total UA Alt, Total Building Performance, ERI). It is mandatory, no matter which path you choose so it cannot be traded off. This is like the old C406 in the 2012-2018 code for commercial. Options include a 5% better Total UA (commonly verified by REScheck), high efficient HVAC equipment, more efficient water heating, more efficient duct system or improved air sealing and ventilation system combo.

EXISTING BUILDINGS

R501.2 Compliance: An exception to R402.2.9 Slab-on-grade (SOG) floors was added to exempt SOG insulation requirements for existing building projects where it would require demolition of existing permanent building construction components.

R502.4 Compliance: A new section was added requiring that additions shall be deemed to comply where the existing building plus the addition does not use more energy than the existing building. Exceptions exist for unaltered portions of the building if the existing building was constructed to the 2009 International Energy Conservation Code or later, or if the addition is less than 30% of the conditioned

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floor area of the existing building, or if the building has undergone documented efficiency upgrades to the envelope/shell within the last 10 years.

Reporting details on how to show compliance exist within code section **R502.4 Compliance**.

APPENDIX RB SOLAR-READY PROVISIONS –DETACHED ONE AND TWO-FAMILY DWELLINGS AND TOWNHOUSES: Appendix adopted in its entirety. New detached one- and two-family dwellings and townhouses with not less than 600 sq ft of roof area oriented between 110 degrees and 270 degrees of true north must comply with Appendix RB SOLAR-READY PROVISIONS.

*Language borrowed from the Colorado Energy Office Building Energy Codes / Energy Code Adoption Toolkit site.

<https://energyoffice.colorado.gov/climate-energy/energy-policy/building-energy-codes/energy-code-adoption-toolkit>

2021 International Mechanical Code (IMC)

Local amendments:

403.3.2.1 Updated code language for required dwelling unit outside air.

918.1.2 New section requiring heat pump system be used when heating with electric system.

IMC Code body changes:

307.2.1.1 Added code language for disposal of condensate drain discharge.

401.4 & 501.3.1 New section to recognize and regulate a new kind of factory built combo exhaust and air intake fitting with no separation between the two openings.

403.3 Several new changes to outside air ventilation.

502.20 The required exhaust system for nail salon manicure/pedicure station must be continuous.

504.4.1 Clothes dryer vent termination must 3ft min from any opening into the building.

507.1 New section allows smoker ovens with integral exhaust to omit a type I hood.

514.2 Using energy recovery ventilation in type II hood is now allowed.

607.5.2 Allows flexible duct air connector to be nonmetallic when meeting certain criteria.

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608.1 Requires HVAC systems be adjustable to achieve design airflow & a test/balance (TAB) is required.

1105.9 Refrigeration rooms larger than 1000 sq. ft. now require 2 exits.

1107-1110 New refrigerant piping requirements.

2021 International Fuel Gas Code (IFGC)

Local amendments:

No local amendment changes.

IFGC Code body changes:

402.7 Press-fit joints allowed for high pressure systems.

403.8.3 Thread joint sealants required on threaded on pipe joints.

404.5 Only specific types of fittings are allowed in concealed locations.

503.10.7 Where appliance vent connectors are joined together, an approved manufactured tee or wye must be used. A field-built tee or wye is not allowed anymore.

614.7 Clothes dryers located in a closet that exhaust more than 200cfm must provide a make-up-air opening into the closet of 100 sq. inches min.

618.6 Return air can't be pulled from a mechanical room where the furnace is located.

2021 International Existing Building Code (IEBC)

Local amendments:

708.1, 809.1, & 907.1 Requires alterations in which there will be a change of occupancy and increase in energy usage, must meet the requirements of the IECC. This fixes the conflicting sections in the IECC and IEBC.

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IEBC Code body changes:

101.2.1 Clarifies where work is regulated by the Fire Code (IFC) chapter 11, it shall comply with both codes.

115 Revises the language and requirements of unsafe structures and equipment.

202 Revises definition of Change of occupancy.

306 Accessibility for existing buildings has been changed and revised.

307 & 308 New section for smoke alarm and carbon monoxide requirements.

309 New section for replacement of exterior wall covering and wall envelopes.

501.3 Altered health care facilities must comply with NFPA 99.

502.6 E occupancy classroom additions acoustics shall be provided to comply with 808 of ICC A117.1.

503.14 Alterations in I-2 occupancy sleeping area must add smoke compartments.

503.17 Doors with locks to stop intruders in E, B, & I-4 occ must comply with 1010.2.8.

503.18 When alteration work area exceeds 50% of bldg & has an elevator, 2-way com system required.

505 In R-2 and R-3 occ, new requirements for windows that have opening control devices.

506 Change of occ to R that requires egress win, smaller 4 sq.ft opening size is allowed.

803.2.3 In I-2 occ, a fire sprinkler system is required in the work area.

803.2.5 In some occupancies listed in IBC 903, work areas with more than 1 tenant and occ load more than 30, a fire sprinkler system required in work area.

803.4.1.2 Fire alarm required in work area of I-1 or I-2 occ.

904 In many cases a level 3 alteration will require a fire sprinkler system in the work area.

1509 Water supply for fire-fighting required when combustible bldg. material arrives on site.

2021 International Swimming Pool and Spa Code (ISPSC)**Code body changes:**

- 109** Give authority to the code official to approve connection or disconnection of utilities.
- 305.1** Temp construction fence required for in-ground pool until the permanent barrier is installed.
- 305.3** The barrier/fence door/gate requirements have been revised.
- 307** The inside of Non-residential pools must have a color finish that does not obscure objects or surfaces in the pool.
- 307.1.4** Pool lifts installed for accessibility into the pool must meet several new standards.
- 311.3** Water velocity in suction and return piping must meet a maximum fps.
- 324** A new section regulating pool equipment rooms.
- 325** Indoor public pool air-handling systems must comply with ASHRAE 62.1.
- 407** Circulation systems section has been revised.
- 504.2** Spa jets must be limited by a cycle timer of 10 min max.
- 609** Dressing and sanitary facilities in aquatic rec facilities as been revised.
- 612** A new section for regulating interactive water play features.

2021 International Property Maintenance Code (IPMC)**Local amendments:**

Many of the amendments from the 2006 IPMC have been retained and inserted into the 2021.

- 109.3** Violations of the code are changed from criminal to civil infraction.
- 302.3.1** Walkway surface change in elevation is ½" max. (sidewalk tripper).

Code body changes:

- 704.1.1** Fire protection and life safety systems must be maintained and operating as designed.

Colorado Plumbing Code (currently 2018 IPC)**Commercial****Local amendments:**

604.4 Non-metered public, lavatory faucets are prohibited. All public lavatory faucets must be metered, in accordance with table 604.4.

Residential**Local amendments:**

604.4 Water closets in new developments must be 1.1 gallon per flush (GPF) or less, 600 MaP score or more, and Water Sense Labeled. Existing residential dwellings and new and remodeled commercial developments can install 1.28 GPF.