



DENVER AMENDMENT PROPOSAL FORM FOR PROPOSALS TO THE 2019 DENVER BUILDING CODE AMENDMENTS AND THE 2021 INTERNATIONAL CODES

DENVER
THE MILE HIGH CITY

2021 CODE DEVELOPMENT CYCLE

1) **Name:** Kristen Salinas **Date:** 9/14/2021
Email: ksalinas@noresco.com **Representing (organization or self):** Denver
City Staff Proposal (check box):

2) One proposal per this document is to be provided with clear and concise information.

Is a separate graphic file provided (“X” to answer): ___ Yes or X No

3) Highlight the code and acronym that applies to the proposal

<u>Acronym</u>	<u>Code Name</u>	<u>Acronym</u>	<u>Code Name</u>
DBC-AP	Denver Building Code–Administrative Provisions	IPC	International Plumbing Code
IBC	International Building Code	IRC	International Residential Code
IECC	International Energy Conservation Code	IFGC	International Fuel Gas Code
IEBC	International Existing Building Code	IMC	International Mechanical Code
IFC	International Fire Code	DGC	Denver Green Code

AMENDMENT PROPOSAL

Please provide all the following items in your amendment proposal.

Code Sections/Tables/Figures Proposed for Revision:

Instructions: If the proposal is for a new section, indicate (new), otherwise enter applicable code section.

NEW
Out of DGC into Mandatory Code

Proposal:

Instructions: Show the proposal using ~~strikeout~~, underline format.

Place an “X” next to the choice that best defines your proposal: ___ Revision X New Text ___ Delete/Substitute X Deletion

Code Placement: To be determined:

automatic: self-acting, operating by its own mechanism when actuated by some nonmanual influence, such as a change in current strength, pressure, temperature, or mechanical configuration.

site: a contiguous area of land that is under the ownership or control of one entity.

smart controller (weather-based irrigation controller): a device that estimates or measures depletion of water from the soil moisture reservoir and operates an irrigation system to replenish water as needed while minimizing excess.

evapotranspiration (ET): the sum of evaporation from soil and *plant* surfaces and transpiration of water through leaf stomata.

ET_c: *evapotranspiration* of the *plant* material derived by multiplying *ET_o* by the appropriate *plant* factor or coefficient.

ET_o: reference *evapotranspiration* for a cool-season grass as calculated by the standardized Penman-Monteith equation based on weather-station data.

irrigation adequacy: a representation of how well irrigation meets the needs of the *plant* material. This reflects the percentage of required water for turf or *plant* material supplied by rainfall and controller-scheduled irrigations.

irrigation excess: a representation of the amount of irrigation water applied beyond the needs of the *plant* material. This reflects the percentage of water applied in excess of 100% of required water.

landscape establishment period: a time period, beginning on the date of completion of permanent plantings and not exceeding 18 months, intended to allow the permanent landscape to become sufficiently established to remain viable.

irrigation station: a set of irrigation emission devices supplied water by a single control valve. Also referred to as an “irrigation zone.”

hydrozone: an irrigated area of landscape in which the plants have similar water needs and are irrigated by the same type of emission devices.

plants:

- a. adapted plants: plants that reliably grow well in a given habitat with minimal attention from humans in the form of winter protection, pest protection, water irrigation, or fertilization once root systems are established in the soil. Adapted plants are considered to be low maintenance but not invasive.
- b. invasive plants: species of plants that are not native to the building project site and that cause or are likely to cause environmental harm. At a minimum, the list of invasive species for a building project site includes plants included in city, county, and regional lists and state and federal noxious weeds laws.
- c. native plants: plants that adapted to a given area during a defined time period and are not invasive. In America, the term often refers to plants growing in a region prior to the time of settlement by people of European descent.
- d. rainfall-ET_c compatible plants: plants with documented ET_c rates and having all of the following characteristics: (1) not native or invasive to the local geographic area of the site; (2) after the landscape establishment period, do not require supplemental annual irrigation, based on the ten-year average annual rainfall of the local climate and based on 80% of the plant's ET_c.

Controls. Where any irrigation system for the project site uses an automatic controller, the system shall be controlled by a qualifying automatic smart controller that uses evapotranspiration (ET) and weather data to adjust irrigation schedules and that complies with the minimum requirements. The system shall be controlled by weather-based data or soil moisture sensor that automatically shuts off the system after a predetermined amount of rainfall or sensed moisture in the soil. Qualifying smart controllers shall be labeled according to USEPA WaterSense Specification for Weather-Based Irrigation Controllers or tested in accordance with Irrigation Association SWAT Climatologically Based Controllers, 8th Testing Protocol. Smart controllers that use ET data shall provide the following irrigation amounts:

- a. Irrigation adequacy—80% minimum

ET_c.

- b. Irrigation excess—not to exceed 10% of ET_c.

Exception: A temporary irrigation system used exclusively for the establishment of new landscape shall be exempt from this requirement. Temporary irrigation systems shall be removed or permanently disabled at such time as the landscape establishment period has expired.

The following settings and schedule for the irrigation control system shall be posted on or adjacent to the controller:

- a. Precipitation rate of each irrigation station.
- b. Plant factors for each hydrozone.
- c. Soil type.
- d. Rain sensor settings.
- e. Soil moisture sensor settings, where installed.
- f. Peak demand schedule, including run times, cycle starts, and soak times.
- g. Maximum runtimes to prevent water runoff.

Delete from DGC:

~~601.3.1.2.2 (6.3.1.2.2) Controls.~~ Where any irrigation system for the project site uses an automatic controller, the system shall be controlled by a qualifying smart controller that uses evapotranspiration (ET) and weather data to adjust irrigation schedules and that complies with the minimum requirements. The system shall be controlled by weather-based data or soil moisture sensor that automatically shuts off the system after a predetermined amount of rainfall or sensed moisture in the soil. Qualifying smart controllers shall be labeled according to USEPA WaterSense Specification for Weather-Based Irrigation Controllers or tested in accordance with Irrigation Association SWAT Climatologically Based Controllers, 8th Testing Protocol. Smart controllers that use ET data shall provide the following irrigation amounts:

- a. Irrigation adequacy—80% minimum

~~ET_e~~

~~b. Irrigation excess — not to exceed 10% of ET_e .~~

~~**Exception:** A temporary irrigation system used exclusively for the establishment of new landscape shall be exempt from this requirement. Temporary irrigation systems shall be removed or permanently disabled at such time as the *landscape establishment period* has expired.~~

~~**601.3.1.2.2.2 (6.3.1.2.2.1).** The following settings and schedule for the irrigation control system shall be posted on or adjacent to the controller:~~

~~a. Precipitation rate of each *irrigation station*.~~

~~b. *Plant* factors for each *hydrozone*.~~

~~c. Soil type.~~

~~d. Rain sensor settings.~~

~~e. Soil moisture sensor settings, where installed.~~

~~f. Peak demand schedule, including run times, cycle starts, and soak times.~~

~~g. Maximum runtimes to prevent water runoff.~~

Supporting Information (Required):

All proposals must include a written explanation and justification as to how they address physical, environmental, and/or customary characteristics that are specific to the City and County of Denver. The following questions must be answered for a proposal to be considered.

- Purpose: What does your proposal achieve?

When an automatic irrigation system is used, a smart controller must be installed to sense soil moisture and considers weather data to adjust irrigation schedules.

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- Reason: Why is your proposal necessary?

Reduces water waste outdoors while keeping landscapes healthy.

- Substantiation: Why is your proposal valid? (i.e. technical justification)

EPA estimates that more than 28 million homes across the United States have in-ground sprinkler systems that typically schedule watering with a clock-based controller. Irrigation schedules are often set to water at the height of the growing season, and the homeowner may not adjust the schedule to reflect seasonal changes or changes in plant watering needs. As an alternative to a clock-based controller, weather-based irrigation controllers can make irrigation schedule adjustments more convenient and water-efficient, by using local weather data and landscape conditions to tailor the amount, frequency, and timing of landscape watering. Weather-based irrigation controllers can be stand-alone controllers or “add-on” or “plug-in” devices that can be used in conjunction with an existing clock-based controller to help it water more efficiently.

Replacing a standard clock-based controller with a WaterSense labeled weather-based irrigation controller can save an average home nearly 7,600 gallons of water annually. If every home in the United States with an automatic sprinkler system installed and properly operated a WaterSense labeled controller, we could save \$2.5 billion in water costs and 220 billion gallons of water across the country annually from not overwatering lawns and landscapes.

Proposal 67- Mandatory Irrigation Controls

Bibliography and Access to Materials (as needed when substantiating material is associated with the amendment proposal):

<https://www.irrigation.org/IA/FileUploads/SWAT/Climate-Based-Controllers-Testing-Protocol-Version-8-September-2008.pdf>

<https://www.epa.gov/watersense/weather-based-irrigation-controllers>

Other Regulations Proposed to be Affected

***For proposals to delete content from the 2019 Denver Green Code in conjunction with adding it to other mandatory Denver codes and/or regulations, only.**

Please identify which other mandatory codes or regulations are suggested to be updated (if any) to accept relocated content.

Referenced Standards:

List any new referenced standards that are proposed to be referenced in the code.

Impact:

How will this proposal impact cost and restrictiveness of code? ("X" answer for each item below)

Cost of construction: Increase ___ Decrease ___ No Impact

Cost of design: ___ Increase ___ Decrease No Impact

Restrictiveness: Increase ___ Decrease ___ No Impact

Departmental Impact (City use only):

This amendment proposal increases/decreases/is neutral to the cost of plans review.

This amendment increases/decreases/is neutral to the cost of inspections.