



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



## 2021 CODE DEVELOPMENT CYCLE

1) **Name:** CCD Staff **Date:** 07/01/2021  
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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	<b>IMC</b>	<b>International Mechanical Code</b>
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:**  
**IMC Chapter 4 – Sections 401.4, 403.1, 403.3, 403.3.1, 403.3.2, 403.3.2.1**  
**Chapter 5 – 501.3.1 Location of exhaust outlets**

**Proposal:**  
 X Revision  New Text  Delete/Substitute  Deletion

**401.4 Intake opening location.** Air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening. Separation is not required between intake air openings and living space exhaust air openings of an individual dwelling unit or sleeping unit where ~~an approved~~ factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the fan manufacturer's instructions.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment.

**403.1 Ventilation system.** Mechanical ventilation shall be provided by a method of supply air and return or exhaust air ~~except that mechanical ventilation air requirements for Group R-2, R-3 and R-4 occupancies shall be provided by an exhaust system, supply system or combination thereof.~~ The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing negative or positive pressure. The system to convey ventilation air shall be designed and installed in accordance with Chapter 6.

**403.3 Outdoor air and local exhaust airflow rates.** Group R-2, R-3 and R-4 occupancies ~~three stories and less in height above grade plane~~ shall be provided with outdoor air and local exhaust in accordance with Section 403.3.2. Other buildings intended to be occupied shall be provided with outdoor air and local exhaust in accordance with Section 403.3.1.

**403.3.1 Other buildings intended to be occupied.** The design of local exhaust systems and ventilation systems for outdoor air for occupancies other than Group R-2, R-3 and R-4 ~~three stories and less above grade plane~~ shall comply with Sections 403.3.1.1 through 403.3.1.4.

**403.3.2 Group R-2, R-3 and R-4 occupancies, ~~three stories and less.~~** The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 occupancies ~~three stories and less in height above grade plane~~ shall comply with Sections 403.3.2.1 through 403.3.2.5.

**403.3.2.1 Outdoor air for dwelling units.** ~~An *balanced outdoor air* ventilation system consisting of a mechanical exhaust system, supply system or combination thereof~~ shall be installed to provide outdoor air for each dwelling unit ~~Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system.~~ The *outdoor air balanced* ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.013A_{floor} + 7.5(N_{br} + 1)$$

where:

$Q_{OA}$  = outdoor airflow rate, cfm

$A_{floor}$  = conditioned floor area, ft<sup>2</sup>

$N_{br}$  = number of bedrooms; not to be less than one

**Exceptions: Modify Exception #2 as follows (all other exceptions remain unchanged):**

2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9

shall be reduced by 30 percent provided that ~~both of~~ the following conditions ~~apply:~~ applies:

2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

2.1.1. Living room.

2.1.2. Dining room.

2.1.3. Kitchen.

~~2.2. The whole house ventilation system is a balanced ventilation system.~~

**501.3.1 Location of exhaust outlets is modified by amending #3 as follows (all other language in this section remains unchanged):**

3. For all environmental air exhaust: 3 feet (914 mm) from property lines; 3 feet (914 mm) from operable openings into buildings for all occupancies other than Group U; and 10 feet (3048 mm) from mechanical air intakes. Such exhaust shall not be considered hazardous or noxious. Separation is not required between intake air openings and living space exhaust air openings of an individual dwelling unit or sleeping unit where ~~an approved~~ factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the fan manufacturer's instructions.

**Supporting Information (Required):**

This proposal accomplishes a couple of things. First, in Section 403.1, it removes the option for supply only or exhaust only ventilation and requires all units to have balanced ventilation. When building tighter building thermal envelopes, especially those meeting CCD's Energy and Green provisions, it becomes necessary to have balanced ventilation in order to get adequate ventilation into the buildings or units with less strain on the thermal envelope itself. The tighter the building envelope, the greater the pressure differential caused by operating unbalanced ventilation systems. Increasing the pressure differential across the building envelope and between dwelling units and common areas can increase the energy use of fans, cause whistling around doors and windows, increase the driving force associated with the transfer of air across designated air barriers, and increase the deposition of moisture within the building envelope.

In all of the sections, we have removed the reference to R2's, R3's and R4's "Three stories or less in height above grade plane". Last code cycle, the CCD Energy Code amendments made all of these occupancies "commercial" per the IECC provisions so there is no longer a need to delineate between the number of stories since they are all treated the same now in the Energy provisions.

However, in doing this, it also does allow us to look at R2's, R3's and R4s slightly different than all other commercial occupancies, requiring balanced mechanical ventilation for all dwelling units without the option for unbalanced ventilation that you might see otherwise. This would require these occupancies to utilize Equation 4-9 for minimum continuous outdoor airflow instead of the more complicated designs as found for other occupancies under Section 403.3.1.1

The airflow equation has been revised to align more closely with the 2021 IMC, what is expected for the 2024 IMC (based on IMC Committee approval of RM15-21), and ASHRAE 62.2. The 2021 IMC equation was originally developed for leaky, detached, single-family homes and is not appropriate for tight, attached R-2, R-3, and R-4 dwelling units.

The proposal removes the requirement for factory-built intake/exhaust combination termination fitting to receive special approval prior to use. Removing the requirement for special approval will help reduce costs and time associated with specification of these terminations that are designed to provide greater architectural flexibility and reduce the number of penetrations (and associated leaks) in the building envelope. This action is aligned with the IMC Committee's approval of M16-21 and reflects the language that is expected to be within the 2024 IMC.

Finally, we remove exception 2.2 from Section 403.3.2.1 because all systems will be balanced so this is not needed. It still allows the 30% reduction in ventilation rate for the specific ducted system referenced in 2.1.

**Other Regulations Proposed to be Affected**

N/A

**Referenced Standards:**

N/A

**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. Neutral

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