Code Amendment Proposal Form
For public amendments proposed to the 2018 editions of the International Codes

Instructions: Upload this form and all accompanying documentation at www.denvergov.org/BuildingCode. If you are submitting your proposal on a separate sheet, make sure it includes all information requested below.

All proposals must be received by April 26, 2019.

CONTACT INFORMATION
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AMENDMENT PROPOSAL
Please use a separate form for each proposal.

1) Code(s) associated with this proposal. Please use acronym: DBC-Appendix S (NFPA 415)
   If you submitted a separate coordination change to another code, please indicate which code:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Code Name</th>
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<tbody>
<tr>
<td>(e.g., DBC-IBC, DBC-IEBC)</td>
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<td>IGCC</td>
<td>International Green Construction Code</td>
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<td>BC</td>
<td>International Building Code</td>
<td>IMC</td>
<td>International Mechanical Code</td>
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<td>EBC</td>
<td>International Existing Building Code</td>
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<tr>
<td>ECC</td>
<td>International Energy Conservation Code</td>
<td>IRC</td>
<td>International Residential Code</td>
</tr>
</tbody>
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2) Please check here if a separate graphic file is provided: ☐
   Graphics may also be embedded within your proposal below.

3) Use this template to submit your proposal or attach a separate file, but please include all items requested below in your proposal. The only formatting needed is BOLDING, STRIKEOUT AND UNDERLINING. Please do not provide additional formatting such as tabs, columns, etc., as this will be done by CPD.

DBCIBC

**Code Sections/Tables/Figures Proposed for Revision:**
DBC Appendix S Sections 4.6.1

**Note:** If the proposal is for a new section, indicate (new).

Proposal:
Revise as follows:
4.6.1 Requirements. A smoke control system shall be provided to serve airport terminal buildings. Smoke exhaust locations shall be configured in order to provide a feasible environment for the evacuation or relocation of occupants prevent accumulation of smoke in any area of the airport terminal building. The smoke control system shall be activated in accordance with Section 4.6.6. Where a space or corridor exceeds 20 ft (6.1m) in length and is connected to an atrium or airport terminal area that has separate smoke control zones, provide supply air to the space or corridor at the furthest location from the point of connection to the atrium or airport terminal area. Tenant spaces less than 5,000 ft2 (465m2) and open to the Airport Terminal Building shall
be incorporated into the Airport Terminal Building smoke control exhaust operating sequence. Smoke control systems shall comply with Sections 4.6.1 through 4.6.7.

Exceptions:
1. Ramp service and nonpublic ramp level tenant areas of airport terminal building.
2. Unenclosed bag handling tenant areas of airport terminal building.
3. Permanently fixed aircraft loading walkways when separated by one-hour rated assemblies.

Revise as follows:

4.6.2 Design criteria: The smoke control equipment for the airport terminal building shall be independent of that serving tenant spaces of 5,000 ft² (465 m²) or more. The airport terminal building smoke removal system shall provide at least four air changes per hour or 20,000 cfm (9.4 m³/s) from each smoke zone minimum:
1. The smoke control equipment for the in the airport terminal building shall be independent of that serving tenant spaces of 5,000 ft² (465 m²) or more.
2. Airport terminal buildings communicating spaces that connects 2 floors or more shall be provided with smoke exhaust systems. The smoke exhaust system shall achieve a prescriptive exhaust rated of at least four air changes per hour or 20,000 cfm (9.4 m³/s) from each smoke zone, whichever is greater. In lieu of a prescriptive exhaust rate, it is permitted to provide smoke exhaust system designed per NFPA 92, to keep the height of the lowest horizontal surface of the smoke layer interface not less than 6 feet above a walking surface that forms a portion of a required egress system within the smoke zone, for at least 20 minutes or 1.5 times the calculated egress time, whichever is greater.
3. For spaces that are one-story in height and are separated from spaces connecting 2 floors or more, floor depressurization system shall be provided so that in the event of a fire the smoke zone in alarm can maintained a negative pressure of 0.10 inch of water (25 Pa) to the adjacent areas outside the smoke zone in alarm.
4. The depressurization or the smoke exhaust is not required for individual spaces that are not commonly occupied multiple occupants.
5. The depressurization or the smoke exhaust is not required for individual rooms that are protected by rated or smoke proof enclosures.
6. Alternations to existing areas provided with existing smoke control systems shall maintain the existing smoke management scheme unless changes are requested by the Denver Building or Fire Department.
7. Extension of the existing smoke control system and existing smoke management scheme to new areas shall be permitted when it is approved by the Denver Building and Fire Departments.

Add new text as follows:

4.6.3 Tenant Spaces and similar rooms adjoining the Passenger terminal: All continuous tenant spaces adjoining the airport terminal building which exceed 5,000 ft² (465 m²) shall be a separate smoke control zone per Section 4.6.1. Continuous tenant spaces are tenant spaces that are not separated by full height 1 hour rated walls and share a common air communication volume (i.e. plenum).

Note: Show the proposal using strikeout, underline format. At the start of each section, give one of the following instructions:
- Revise as follows:
- Add new text as follows:
- Delete and substitute as follows:
- Delete without substitution:

Supporting Information:

Purpose:

Section 4.6.1: The existing amendment language is technically unachievable and cannot be enforced – “prevent ACCUMULATION of smoke in ANY AREA of the airport terminal buildings”- these captioned words are the objectives that are impossible to meet.

Section 4.6.2: The language added to clarify the design criteria for new smoke control systems and the alteration/addition to the existing smoke control systems. It also identifies that smoke exhaust method is used for new spaces that connects multiple floors; zoned smoke control (depressurization in the fire zone) method is used for new single level spaces that are separated from spaces communicating with multiple floors. For the exhaust method, language is added to match the typical method and criteria used in IBC/IFC. Furthermore, it clarifies there is no need to provide any smoke exhaust or depressurization for areas and rooms that are not commonly occupied by multiple people or that are protected by rated or smoke proof enclosures – these rooms are individual private offices, electrical rooms, etc.

Section 4.6.3: Additional language was added to clarify the definition of “continuous tenant spaces”.
Reasons:
Section 4.6.1: No matter the types of the smoke control system to be used. It is no technically impossible to prevent “ACCUMULATION of smoke in ANY AREA”. The purpose of zoned smoke control or pressurization systems is to keep smoke within a zone or keep smoke out from a zone. The purpose of exhaust method is to exhaust smoke out to maintain a smoke layer height for a certain period of time. The purpose of air flow method is to push smoke out from an area. None of these validated smoke management method can prevent the accumulation of smoke in any area. Smoke will accumulate at the area of fire origin. The immediate vicinity of the fire will always has smoke accumulation.

Section 4.6.2:
1. The existing airport terminal building includes large open spaces (Jeppesen Terminal Building AGTS platform & L5-6, pedestrian walkway connecting the Terminal Building to Conc. A, Conc. A/B/C’s AGTS platform & L2-L3). These are the spaces most resemble an atrium. Thus smoke exhaust method is the most appropriate method to manage the smoke. Adding references to performance based design criteria (smoke layer height) allows the design to align with method widely used in all parts of the U.S. Instead of requiring smoke exhaust system in atrium connecting 3 levels or more, the proposed code language is more stringent as it requires smoke exhaust when 2 levels are connected.
2. For new spaces that are only single level in height, smoke exhaust method will not effective exhaust out smoke. Zone smoke control method (depressurize the smoke zone in fire) should be used to stop smoke from spreading into adjacent zones or areas outside the smoke zone in fire.
3. Exhaust or depressurization methods will not be practical for small spaces that is largely separated from the majority of the floor space. For rooms that are already protected by rated or smoke proofed enclosures, providing exhaust or depressurization jeopardize the integrity of the rated or smoke proofed enclosure. These enclosures are provided in order to keep smoke and heat outside these rooms or contain smoke or heat within these rooms.
4. Since the majority of the terminal building is protected by the existing smoke control systems, it could be more practical to all the existing smoke control method to extend to additions that openly communicating with these existing spaces. Similarly, alteration of the existing smoke control system should not change the basic operating scheme and criteria. Languages are added to allow the designers have the avenue to continue the design used for the existing system.

Section 4.6.3: It is possible to have a situation that a group of tenant spaces, where each is less than 5,000 ft², forms a series of adjoining tenant spaces with aggregate area of larger than 5,000 ft² while they are separated from each other by full height walls. Due to the lack of clarification, these tenant spaces could be considered as continuous tenant spaces. However, each of these spaces or collectively the entire tenant spaces do not present the same hazard as a group of tenant space communicating with each other.

Substantiation:
Sections 4.6.1 and 4.6.2:
1. The zoned smoke control is to “limit the extent of smoke spread beyond the smoke zone”¹. In fact, “it is beyond the capability of smoke control to make condition tenable in the smoke zone, and it is intended that occupants evacuate the smoke zone as soon as possible”¹.
2. “It should be understood that a smoke control system cannot maintain tenable condition within the immediate area of fire origin”².
3. “Essentially, there are three methods of mechanical or active smoke control that can be used separately or in combination within a design: pressurization, exhaust and opposed airflow. Of course, all of these active approaches can be used in combination with the passive method. Typically, the mechanical pressurization method is used in high-rise buildings when pressurizing shafts (interior exit stairways or elevator hoistways) and for zoned smoke control. Pressurization is not practical in large open spaces such as atriums or malls, since it is difficult to develop the required pressure differences due to the large volume of the space. The exhaust method is typically used in large open spaces such as atriums and malls. The opposed airflow method, which basically uses a velocity of air horizontally to slow the movement of smoke, is typically applied in combination with either a pressurization method or exhaust method within hallways or openings into atriums and malls. The application of each of these methods will be dependent on the specifics of the building design. Smoke control within a building is fundamentally an architecturally driven problem. Different architectural geometries first dictate the need, or lack thereof, for smoke control, and then define the bounds of available solutions to the problem.”²
2. Section 909.1 commentary, 2018 IFC Code and Commentary, 2018

**Note:** This section MUST include these items:
- **Purpose:** State the purpose of the proposed amendment to physical, environmental and customary characteristics that are specific to the City and County of Denver (e.g., clarify the code; revise outdated material; substitute new or revised material for physical, environmental and customary characteristics; add new requirements to the code; delete current requirements, etc. to reflect physical, environmental and customary characteristics that are specific to the City and County of Denver)
- **Reasons:** Clearly justify the change to current code provisions, stating why the proposal is necessary to reflect physical, environmental and customary characteristics that are specific to the City and County of Denver. Proposals that add or delete requirements shall be supported by a logical explanation that clearly shows why the current code does not reflect physical, environmental and customary characteristics that are specific to the City and County of Denver and explains how such proposal will improve the code.
- **Substantiation:** Substantiate the proposed amendment based on technical information and substantiation. Substantiation provided which is reviewed and determined as not germane to the technical issues addressed in the proposed amendment shall be identified as such.
- **Bibliography:** Include a bibliography when substantiating material is associated with the amendment proposal. The proponent shall make the substantiating materials available for review.

**Referenced Standards:**
NA

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

**Impact:**
No gross increase or decrease of cost or rigorous using these new NFPA standards. Using these latest standards allow the building industry to advance to the latest best practices, which should generator a gross enhancement on fire life safety.

**Note:** Discuss the impact of this proposal in this section AND indicate the impact of this amendment proposal for each of the following:
- The effect of the proposal on the cost of construction: ☒ No Effect
- The effect of the proposal on the cost of design: ☒ No Effect
- Is the proposal more or less restrictive than the I-codes: ☒ More

**Departmental Impact:** (To be filled out by CPD staff)

**Note:** CITY STAFF ONLY. Discuss the impact of this proposal in this section AND indicate the impact of this amendment proposal for each of the following:
- The effect of the proposal on the cost of review: ☐ Increase ☐ Reduce ☒ No Effect
- The effect of the proposal on the cost of enforcement/inspection: ☐ Increase ☐ Reduce ☒ No Effect