

ADDENDA

**ANSI/ASHRAE/IES Addendum b to
ANSI/ASHRAE/IES Standard 90.1-2019**

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by ASHRAE and the American National Standards Institute on March 31, 2021, and by the Illuminating Engineering Society on March 15, 2021.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (<https://www.ashrae.org/continuous-maintenance>).

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ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

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- c. offering constructive criticism for improving the Standard, or
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FOREWORD

When cost-effective, demand control ventilation (DCV) should be required for occupied spaces, considering the required outdoor air for ventilation based on number of people in the space, varying space sizes, use of energy recovery equipment, and climate zone. The current requirement has a threshold based only on space size and space occupancy. This proposal seeks to more effectively align DCV requirements with all other relevant variables to produce a cost-effective solution.

The single-threshold parameters are replaced by a table where the floor area threshold requirement is based on climate zone and occupant outdoor airflow rates per 1000 ft² (100 m²) determined in accordance with ASHRAE Standard 62.1. The requirements are grouped by occupant outdoor airflow component ranges (cfm/1000 ft² [L/s/100 m²]) based on default parameters in Standard 62.1. While the exact value for a particular space type varies, the three groups in the table generally correspond to (a) retail, break rooms, or bank lobbies; (b) classrooms or conference rooms; and (c) lecture halls, theatre, or assembly.

The exhaust air energy recovery exception was removed and replaced with higher floor-area thresholds in the table. The exception for design outdoor airflow less than 750 cfm was also removed, as this factor is accounted for in the cost-effectiveness analysis. One new exception was added to account for spaces that are not allowed to reduce outdoor airflow per the requirements in ASHRAE Standard 170, other applicable codes, or accreditation standards.

The net effect of these changes will increase the cost of construction. Because an economizer or motorized dampers are already required by this section, the cost to add a sensor and wiring is expected to be \$300 or less per unit. A present value allowance of \$63 is added to the cost to allow for replacement of up to 50% of sensor elements halfway through the measure life. The square footage thresholds in the table result in cost effectiveness for a 15-year life control measure based on a calculated discounted payback of less than 11.8 years.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strike-through~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum b to Standard 90.1-2019

Modify the standard as shown (I-P units).

6.4.3.8 Ventilation Controls for High-Occupancy Areas. Demand control ventilation (DCV) is required for spaces larger than ~~500 ft² and with a design occupancy for ventilation of ≥25 people per 1000 ft² of the floor area shown in Table 6.4.3.8 based on an occupant outdoor airflow component in cfm per 1000 ft²~~ and served by systems with one or more of the following:

- a. Air economizer.
- b. Automatic modulating control of outdoor air damper.
- c. Design outdoor airflow greater than 3000 cfm.

Exceptions to 6.4.3.8:

1. ~~Systems with exhaust air energy recovery complying with and where required by Section 6.5.6.1.~~
2. Multiple-zone systems without DDC of individual zones communicating with a central control panel.
3. ~~Systems with a design outdoor airflow less than 750 cfm.~~
24. Spaces where >75% of the space design outdoor airflow is required for makeup air that is exhausted from the space or transfer air that is required for makeup air that is exhausted from other spaces.
35. Spaces with one of the following occupancy categories as defined in ASHRAE Standard 62.1: correctional cells, daycare sickrooms, science labs, barbers, beauty and nail salons, and bowling alley seating.

Table 6.4.3.8 Demand Control Ventilation (DCV) Floor Area Thresholds

Climate Zone	Occupant Outdoor Airflow Component (cfm/1000 ft²)^a					
	100 to 199	200 to 399	≥400	100 to 199	200 to 399	≥400
	Minimum Space Floor Area in ft² where DCV Is Required					
Areas without Exhaust Air Energy Recovery	Areas with Exhaust Air Energy Recovery^b					
7, 8	<u>400</u>	<u>200</u>	<u>150</u>	<u>800</u>	<u>400</u>	<u>250</u>
5A, 6A, 6B	<u>600</u>	<u>250</u>	<u>150</u>	<u>1400</u>	<u>900</u>	<u>400</u>
0A, 0B, 1B, 3A, 4A, 5B, 5C	<u>800</u>	<u>400</u>	<u>250</u>	<u>2000</u>	<u>1000</u>	<u>500</u>
2A, 2B, 4C	<u>1100</u>	<u>600</u>	<u>300</u>	<u>2300</u>	<u>1100</u>	<u>600</u>
3B, 4B	<u>1500</u>	<u>700</u>	<u>400</u>	<u>5200</u>	<u>2350</u>	<u>1250</u>
1A	<u>2400</u>	<u>1100</u>	<u>600</u>	<u>5800</u>	<u>2600</u>	<u>1400</u>
3C	<u>7000</u>	<u>3000</u>	<u>1700</u>	<u>12000</u>	<u>6000</u>	<u>3000</u>

a. Occupant outdoor airflow component in cfm per 1000 ft² shall be calculated as the product of default occupant density and outdoor airflow rate per occupant (R_p) as shown in Table 6.2.2.1 of ASHRAE Standard 62.1.

b. Where exhaust air energy recovery is required by Section 6.5.6.1.

4. *Spaces where the requirements of ASHRAE Standard 170, applicable codes, or applicable accreditation standards do not allow the reduction of outdoor airflow.*

Modify the standard as shown (SI units).

6.4.3.8 Ventilation Controls for High-Occupancy Areas. Demand control ventilation (DCV) is required for spaces larger than 50 m² and with a design occupancy for ventilation of ≥25 people per 100 m² of the floor area shown in Table 6.4.3.8 based on an occupant outdoor airflow component in L/s per 100 m² and served by systems with one or more of the following:

- a. Air economizer.
- b. Automatic modulating control of outdoor air damper.
- c. Design outdoor airflow greater than 1500 L/s.

Exceptions to 6.4.3.8:

1. ~~Systems with exhaust air energy recovery complying with and where required by Section 6.5.6.1.~~
2. Multiple-zone systems without DDC of individual zones communicating with a central control panel.
3. ~~Systems with a design outdoor airflow less than 375 L/s.~~
24. *Spaces where >75% of the space design outdoor airflow is required for makeup air that is exhausted from the space or transfer air that is required for makeup air that is exhausted from other spaces.*
35. *Spaces with one of the following occupancy categories as defined in ASHRAE Standard 62.1: correctional cells, daycare sickrooms, science labs, barbers, beauty and nail salons, and bowling alley seating.*
4. *Spaces where the requirements of ASHRAE Standard 170, applicable codes, or applicable accreditation standards do not allow the reduction of outdoor airflow.*

Table 6.4.3.8 Demand Control Ventilation (DCV) Floor Area Thresholds

Climate Zone	<u>Occupant Outdoor Airflow Component ([L/s]/100 m²)^a</u>					
	<u>50 to 99</u>	<u>100 to 199</u>	<u>≥200</u>	<u>50 to 99</u>	<u>100 to 199</u>	<u>≥200</u>
	<u>Minimum Space Floor Area in m² where DCV Is Required</u>					
<u>Areas Without Exhaust Air Energy Recovery</u>		<u>Areas with Exhaust Air Energy Recovery^b</u>				
7, 8	<u>40</u>	<u>20</u>	<u>15</u>	<u>80</u>	<u>40</u>	<u>25</u>
5A, 6A, 6B	<u>60</u>	<u>25</u>	<u>15</u>	<u>140</u>	<u>90</u>	<u>40</u>
0A, 0B, 1B, 3A, 4A, 5B, 5C	<u>80</u>	<u>40</u>	<u>25</u>	<u>200</u>	<u>100</u>	<u>50</u>
2A, 2B, 4C	<u>110</u>	<u>60</u>	<u>30</u>	<u>230</u>	<u>110</u>	<u>60</u>
3B, 4B	<u>150</u>	<u>70</u>	<u>40</u>	<u>520</u>	<u>235</u>	<u>125</u>
1A	<u>240</u>	<u>110</u>	<u>60</u>	<u>580</u>	<u>260</u>	<u>140</u>
3C	<u>700</u>	<u>300</u>	<u>170</u>	<u>1200</u>	<u>600</u>	<u>300</u>

a. Occupant outdoor airflow component in L/s per 100 m² shall be calculated as the product of default occupant density and outdoor airflow rate per occupant (R_p) as shown in Table 6.2.2.1 of ASHRAE Standard 62.1.

b. Where exhaust air energy recovery is required by Section 6.5.6.1.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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