



# ADDENDA

**ANSI/ASHRAE Addendum b to  
ANSI/ASHRAE Standard 161-2013**

# **Air Quality within Commercial Aircraft**

Approved by the ASHRAE Standards Committee on January 28, 2017; by the ASHRAE Tech Council on February 1, 2017; and by the American National Standards Institute on February 2, 2017.

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. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or in paper form from the Senior Manager of Standards.

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**ASHRAE Standing Standard Project Committee 161**  
**Cognizant TC: 9.3 (Lead), Transportation Air Conditioning and**  
**4.3 (Co-Cognizant), Ventilation Requirements and Infiltration**  
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## FOREWORD

*Addendum b updates the normative references and revises Section 8.10 (formerly titled “Pesticides”) with more emphasis on nonchemical methods of insect control on aircraft.*

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

### Addendum b to Standard 161-2013

*Revise Section 4 as shown.*

## 4. COMPLIANCE

To comply with this standard, the requirements of Sections 5, 6, 7, 8, and 9 shall be met. This standard is intended to be independent of specific aircraft systems and equipment. Applying this standard requires some knowledge of common aircraft environmental control systems and equipment.

*Revise Section 8.10 as shown. The remainder of Section 8.10 is unchanged.*

### 8.10 Pesticides Disinsection Methods to Comply with Relevant Quarantine Regulations

Control Measures	
<b>Design</b>	[ . . . ]
<b>Maintenance</b>	[ . . . ]
<b>Operation</b>	<ul style="list-style-type: none"> <li>a. To ensure that <u>disinsection is justified spraying is necessary</u>, governments that enforce <u>spraying disinsection rules</u> on arriving aircraft shall be asked <u>at least annually</u> for documentation <u>according to ICAO Standard 2.23<sup>22</sup></u> <u>at least annually</u> on the threats posed by imported insects.</li> <li>b. When the aircraft systems permit, air packs shall be operated with the highest available flow of outside air during the 24 hours following residual application, when occupied. (See U.S. Navy Shipboard Pest Control Manual<sup>2321</sup> for related information.)</li> <li>c. Air packs shall be operated on the highest flow setting after in-flight spraying.</li> <li>d. <u>Nonchemical methods of disinsection are preferred, but if chemical methods are used then R</u>outing schedules of sprayed aircraft shall be reviewed <u>with the intent and should be modified</u> to minimize the number of pesticide applications and minimize the number of residually treated aircraft operated on <u>domestic flights that do not require disinsection (CADHS 2003)<sup>2422</sup></u>.</li> </ul>
<b>Remedies</b>	[ . . . ]

Descriptions of common environmental controls systems and equipment may be found in Chapter 4012 of th 20072015 ASHRAE Handbook—HVAC Applications.<sup>3</sup>

*Revise Section 5.2 as shown. The remainder of Section 5.2 is unchanged.*

**5.2 Temperature.** Temperature design and operating requirements for thermal comfort in the aircraft cabin are specified in Table 5.2. The criteria are based on aircraft environmental control system (ECS) engineering design experience and on ANSI/ASHRAE Standard 55-~~2004~~2013,<sup>5</sup> including recognition of the influence of occupants’ activity level, the proximity to sources of cooling or heating (e.g., doors, galley ovens), and the season of the year on the perception of thermal comfort.

[ . . . ]

*Revise footnote “a” in Table 5.2 as shown. The remainder of Table 5.2 is unchanged.*

a. See ANSI/ASHRAE Standard 55-~~2004~~2013<sup>5</sup> for measurement and calculation of operative temperatures in this table.

*Revise Section 6.3.3 as shown.*

**6.3.3 Building Air Quality.** If the source of supply air during ground operations is the interior of the airport terminal or some other building, then the air in the building space from which the air is drawn shall meet the requirements of ANSI/ASHRAE Standard 62.1-~~2004~~2016.<sup>8</sup>

**Revise Section 9.1 as shown.**

**9.1 Thermal Measurements.** Thermal environmental parameters, including air temperature, surface temperatures, operative temperature, relative humidity, and air speed shall be determined in accordance with Section 7 of ANSI/ASHRAE Standard 55-20042013,<sup>5</sup> *Thermal Environmental Conditions for Human Occupancy*.

**Revise Section 10 as shown. Renumber the references as applicable.**

## 10. REFERENCES

1. FAA, 1996. Code of Federal Regulations, Title 14 Aeronautics and Space, U.S. Federal Aviation Administration, Department of Transportation, Part 25 Airworthiness Standards: Transport Category Airplanes. Although the scope of this standard references 14CFR25 to define the category of aircraft to which the standard applies, it is not intended to exclude aircraft of the same category certified in other jurisdictions.
2. FAA Airworthiness Inspector's Handbook, Order 8300:10, Volume 2, Chapter 60, Section 5, US Federal Aviation Administration, Department of Transportation, US Government Printing Office, Washington, DC, October, 2006.
3. ~~2007~~2015 *ASHRAE Handbook—HVAC Applications*, Chapter ~~40~~12, Aircraft, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta.
4. FAA, 1996. Code of Federal Regulations, Title 14 Aeronautics and Space, U.S. Federal Aviation Administration, Department of Transportation, Part 25, Airworthiness Standards: Transport Category Airplanes, Section 841, Pressurized Cabins, Amdt. 25-87, U.S. Government Printing Office, Washington, DC.
5. ANSI/ASHRAE Standard 55-20042013, *Thermal Environmental Conditions for Human Occupancy*, American Society for Heating, Refrigerating and Air-Conditioning Engineers, Atlanta.
6. IEST-RP-~~C0007.2~~CC007.2: Institute of Environmental Science and Technology, *Recommended Practice for Efficiency Test Method for High Efficiency Filters Testing ULPA Filters*, 940 East Northwest Highway, Mt. Prospect, IL 60056, 2007.
7. EN-1822-1: European Standard High Efficiency Air Filters (EPA, HEPA and ULPA)—Part 1: *Classification, Performance Testing, Markings*. CEN Central Secretariat: rue de Strassart, 36, B-1050 Brussels, 2009 Edition.
8. ANSI/ASHRAE Standard 62.1-20042016, *Ventilation for Acceptable Indoor Air Quality*, American Society for Heating, Refrigerating and Air-Conditioning Engineers, Atlanta.
9. FAA, 1998. Code of Federal Regulations, Title 14 Aeronautics and Space, U.S. Federal Aviation Administration, Department of Transportation, Part 25, Airworthiness Standards: Transport Category Airplanes, Section 832 Cabin Ozone Concentration, Amdt. 25-94, U.S. Government Printing Office, Washington, DC.
10. FAA, 1996. Code of Federal Regulations, Title 14 Aeronautics and Space, U.S. Federal Aviation Administration, Department of Transportation, Part 121, Operating Requirements: Domestic, Flag and Supplemental Operations, Section 578 Cabin Ozone Concentration, Amdt. 121-251, U.S. Government Printing Office, Washington, DC.
11. FAA, 1980. U.S. Federal Aviation Administration, Department of Transportation. Advisory Circular 120-38: *Transport Category Airplanes Cabin Ozone Concentrations*. U.S. Government Printing Office, Washington, DC.
12. SHK, 2001. Report RL 2001:41e “Accident investigation into incident onboard aircraft SE-DRE during flight between Stockholm and Malmö M county, Sweden. Case L-102/99.” Statens Haverikommission Board of Accident Investigation, Stockholm, Sweden.
13. NIOSH, 2004. U.S. National Institute for Occupational Safety & Health, Department of Health & Human Services. NIOSH Publication 2005-100: *Respirator Selection Logic*, Chapter III: Respirator Selection Logic Sequence. Cincinnati, OH.
14. FAA, 2000. U.S. Federal Aviation Administration, Department of Transportation. Advisory Circular 150-5300-14: *Design of Aircraft Deicing Facilities*; see also earlier versions published in 1993 and 1999. U.S. Government Printing Office, Washington, DC.
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156. FAA, 1996. Code of Federal Regulations, Title 14 Aeronautics and Space, U.S. Federal Aviation Administration, Department of Transportation, Part 382, Operating Requirements: Domestic, Flag and Supplemental Operations, Section 51: Communicable diseases. U.S. Government Printing Office, Washington, DC.
167. FAA, 2001. Code of Federal Regulations, Title 14 Aeronautics and Space, U.S. Federal Aviation Administration, Department of Transportation, Part 121, Operating Requirements: Domestic, Flag and Supplemental Operations, Section 801: Crewmember training for in-flight medical events. U.S. Government Printing Office, Washington, DC.
178. CDC, 2003. Code of Federal Regulations, Title 42 Public Health, U.S. Centers for Disease Control and Prevention, Department of Health and Human Services, Part 71, Foreign Quarantine, Section 1: Definitions. U.S. Government Printing Office, Washington, DC.
189. CDC, 2003. Code of Federal Regulations, Title 42 Public Health, U.S. Centers for Disease Control and Prevention, Department of Health and Human Services, Part 71, Foreign Quarantine, Section 21: Radio

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204. ICAO, 2004. 12th Meeting of the Facilitation (FAL) Division of the International Civil Aviation Organization, Working Paper 117 (FAL/12-WP/117), Cairo, Egypt.
- ~~22.~~ ICAO, 2002. 11th Ed., Annex 9 to the Convention on International Civil Aviation: Facilitation, Section D. "Disinsection of aircraft." Montreal, Canada.
- ~~213.~~ DOD, 2003. *U.S. Navy Shipboard Pest Control Manual*, Chapter 2: Shipboard Pests. U.S. Navy Disease Vector Ecology Control Center, Department of Defense, Bangor, WA.
- ~~224.~~ CADHS, 2003. California Department of Health Services Occupational Health Branch (2003) *Investigative report: Occupational illness among flight attendants due to aircraft disinsection*, Oakland, CA. Sutton, PM; Vergara, X; Beckman, J et al. "Pesticide illness among flight attendants due to aircraft disinsection." *Am J Ind Med*, 50: 345-56, 2007.
235. IATA, 2006. *Dangerous Goods Regulations*, 47th Edition. International Air Transport Association, Geneva, Switzerland.
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## **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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