



ADDENDA

**ANSI/ASHRAE Addendum g to
ANSI/ASHRAE Standard 161-2007**

Air Quality within Commercial Aircraft

Approved by the ASHRAE Standards Committee on June 22, 2013; by the ASHRAE Board of Directors on June 26, 2013; and by the American National Standards Institute on June 27, 2013.

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) or in paper form from the Manager of Standards.

The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

© 2013 ASHRAE

ISSN 1041-2336



ASHRAE Standing Standard Project Committee 161
Cognizant TCs: TC 9.3, Transportation Air Conditioning, and TC 4.3, Ventilation Requirements and Infiltration
SPLS Liaison: Steven J. Emmerich

Steven J. Tochilin, <i>Chair*</i>	Gary Steven Dutt*	Erik Kuiper
Paul A. Lebbin, <i>Vice Chair*</i>	Houshang Ferdows	Michael Massoni
Peggy Bendfeldt	Richard B. Fox*	Christopher S. McDaniel
Andreas Bezold	John Mitchell Hall*	Judith Murawski*
Frank Martin Brehany*	Michael Holland*	Jianlei Niu
Brian Buchanan	Byron W. Jones*	Robert C. Rebsamen
Karen J. Bull*	Joshua B. Kelton*	Herbert Suitner*
Graeme John Cleary		Christine Q. Sun
Waller S. Clements		Chris Witkowski

*Denotes members of voting status when the document was approved for publication

ASHRAE STANDARDS COMMITTEE 2012–2013

Kenneth W. Cooper, <i>Chair</i>	Julie M. Ferguson	Janice C. Peterson
William F. Walter, <i>Vice-Chair</i>	Krishnan Gowri	Heather L. Platt
Douglass S. Abramson	Cecily M. Grzywacz	Ira G. Poston
Karim Amrane	Richard L. Hall	Douglas T. Reindl
Charles S. Barnaby	Rita M. Harrold	James R. Tauby
Hoy R. Bohanon, Jr.	Adam W. Hinge	James K. Vallort
Steven F. Bruning	Debra H. Kennoy	Craig P. Wray
David R. Conover	Jay A. Kohler	Charles H. Culp, III, <i>BOD ExO</i>
Steven J. Emmerich	Rick A. Larson	Constantinos A. Balaras, <i>CO</i>
	Mark P. Modera	

Stephanie C. Reiniche, *Manager of Standards*

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of ASHRAE. *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this standard as an ANS, as “substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution.” Compliance with this standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

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

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Manager of Standards of ASHRAE should be contacted for:

- a. interpretation of the contents of this Standard,
- b. participation in the next review of the Standard,
- c. offering constructive criticism for improving the Standard, or
- d. permission to reprint portions of the Standard.

DISCLAIMER

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE's Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This addendum adds a definition for *pack burn* and provides additional guidance regarding appropriate cleaning procedures for aircraft environmental control systems.

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

Addendum g to Standard 161-2007

Add the following definition to Section 3.

pack burn: the practice of operating the air-conditioning packs and/or pneumatic system at a high temperature setting intended to clean suspected contamination from the inside of the high pressure environmental control components.

Revise Section 8.2 under “Remedies” as follows.

~~(ii) Porous surfaces (e.g., acoustic liners) or high surface area components (e.g., ozone converters and air filters) where contaminants can be deposited and retained should either be replaced or cleaned, as appropriate, following ECS contamination. Pack burnout may temporarily remove odors but will not clean the surface (i.e., the secondary source) of contaminants because the temperatures are not high enough to remove oil or hydraulic fluid components, leaving a residue of tars and other hydrocarbons. Occupants should not be put at risk of being exposed to contaminants during a pack burnout. Passengers and crew should not be on board during a pack burnout. Maintenance workers should select PPE per NIOSH Publication 2005-100 if at risk of exposure to contaminants from pack burnout. The APUs and ducts, form system inlets to the airparks, should be inspected following ECS contamination, and if a buildup of residue is noted, then systems should be cleaned (e.g. high pressure washing, steam cleaning). At least as often as at major service intervals, a total system cleaning should be considered.~~

(ii) If a buildup of residue is noted in the APU/engines, air-conditioning packs, and ducts, then the affected components shall either be removed and cleaned, or replaced to prevent additional contamination. If the pack burn air is not dumped overboard, then passengers and crew shall not be on board during a pack burn. Maintenance workers shall be educated on the need to avoid exposure to contaminants in the bleed air system during pack burn and associated system inspection and cleaning procedures. When it is not possible to effectively clean airborne contaminants that deposit on high surface-area components such as acoustical duct lining, water separator coalescer bags, ozone converters, and heat exchangers, then those components shall be removed and either cleaned or replaced. See also Section A.3, “ECS Cleaning Procedures.”

(v) Ground-based air supply systems/equipment (including high and low pressure) shall be inspected and serviced at least every three months in order to prevent the contamination of aircraft systems and to ensure the integrity of the equipment.

Renumber the current item A3 in Informative Appendix A as A4 and renumber the subsections A3.1–A3.20 as A4.1–A4.20. Insert this language as A3.

A3. ECS CLEANING PROCEDURES

Procedures to remove contaminants from the ECS are provided in respective aircraft maintenance manuals and airline policy/procedures manuals. Such procedures may include duct replacement and duct cleaning, including pack burn procedures, described below.

A3.1 Pack burn. See also Section 8.2, “Remedies” (ii). When the source/location of contaminated air-supply systems is investigated, suitable, on-ground analytical instruments are recommended to assist maintenance employees. The APU/engines, air-conditioning packs, and ducts should be inspected following suspected ECS contamination and at major service intervals. For highly inaccessible system components upstream of the air-conditioning packs, a pack burn may help to clean some surfaces, but is not the preferred method of cleaning. It may temporarily remove odors, but even upstream of the packs, the temperatures are not necessarily high enough to remove some oil or hydraulic fluid components from the ducts, which may leave a residue of tar and other hydrocarbons. Also, to avoid additional contamination of the distribution ducting downstream of the air-conditioning packs, the packs and the ducting upstream should be isolated from the rest of the system and the high temperature air should be dumped overboard and not routed through the downstream distribution ducting and delivered to occupied areas.

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.

