CONTENTS
ANSI/ASHRAE Standard 161-2023
Air Quality within Commercial Aircraft

NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

(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

The environment aboard commercial aircraft is different than that found in other spaces commonly occupied by people. Occupant density is typically high, and occupant activity levels range from almost completely sedentary (passengers) to very active (flight attendants). Aircraft passengers and crew make up a wide cross section of the general population, ranging from the very young to the very old, from the healthy to the infirm, and from frequent fliers to inexperienced fliers. In addition, the aircraft must be regarded as both a public place (passengers) and a workplace (crew). A unique aspect of the aircraft environment is that, unlike many other indoor environments, including those for some other modes of transportation, occupants cannot remove themselves from the environment. The controlled atmosphere aboard the aircraft in flight is at a lower pressure and relative humidity than that found in many other environments. Further, unlike other indoor environments, the outside air intended for ventilation is first compressed and heated in the aircraft engines/APU or electrically driven compressor, creating the potential for engine-sourced and entrained compounds to contaminate the cabin air.

This standard addresses these unique characteristics of aircraft cabin environments as well as characteristics that are common to many other indoor environments. The scope of this standard references Title 14 CFR 25 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. The term "commercial aircraft," as used in this standard, refers to aircraft engaged in common carriage as defined in the Airworthiness Inspector's Handbook, Order 8300.10, Volume 2, Chapter 60, Section 5.

This 2023 edition of this standard includes changes listed in Informative Appendix B. Standard 161 is updated using ASHRAE's continuous maintenance procedures. Per these procedures, the standard is continuously revised by addenda that are publicly reviewed, approved by ASHRAE and ANSI, and published and posted for free on the ASHRAE website. Instructions and forms for submitting a proposed change can be found at the end of the standard.

1. PURPOSE

This standard defines the requirements for air quality in air-carrier aircraft and specifies methods for measurement and testing in order to establish compliance with the standard.

2. SCOPE

2.1 This standard applies to commercial passenger air-carrier aircraft carrying 20 or more passengers and certified under Title 14 CFR Part 25[1].

2.2 This standard considers chemical, physical, and biological contaminants as well as moisture, temperature, pressure, and other factors that may affect air quality.

2.3 Because this standard cannot take into account every variable, especially those relating to safe operation of the aircraft, the diversity of sources and types of contaminants in aircraft cabin air, and the range of susceptibility in the population, compliance with this standard will not necessarily ensure acceptable aircraft cabin air quality for everyone.

3. DEFINITIONS

air, ambient: the outside air surrounding the aircraft.

air, engine bleed: air extracted from the compressor stages of gas turbine propulsion engines and auxiliary power units.

air, outside: as used in this standard, this term always refers to ambient air supplied to the aircraft cabin by the environmental control system.

air, recirculated: air from the aircraft passenger cabin that is reused as part of the supply air.

air, supply: air delivered to the aircraft cabin and used for pressurization, ventilation, temperature control, and humidity control.

air-conditioning system (packs): a part of the environmental control system, typically pneumatically powered, that provides cooling and heating for aircraft cabin temperature control.

aircraft, commercial: an aircraft engaged in common carriage according to FAA AC120-12A [2].