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Cabin air filtration: Helping to protect occupants from infectious diseases

Karen Bull*

Pall Europe Ltd., Portsmouth, Hants PO6 1TD, UK

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Summary

Presentation made at the Aviation Health Conference, London, November 2006. In modern aircraft, the air in the cabin is provided by the environmental control system (ECS) and consists of approximately 50% outside air (engine 'bleed air') mixed with approximately 50% filtered, recirculated air. This paper describes how modern aircraft cabin air filters are effective at removing airborne particulate contamination (such as bacteria and viruses) from the recirculated air system. It also describes one of the technological solutions that is currently available to treat any odours or volatile organic compounds (VOCs) that may be present in the aircraft ECS. © 2007 Elsevier Ltd. All rights reserved.

Introduction

Pall Aerospace has been involved in aircraft cabin air filtration since the Airbus A300-600/A310 and Boeing 747 programmes in the 1980s. More recently, Pall Aerospace has participated in several EC funded projects focusing on cabin air quality and part of this research work included a review of the air filtration and air removal technologies currently available. Pall are also an active member of the ASHRAE committee that is writing the Standard 161 and Guideline—Air Quality Within Commercial Aircraft.

In modern aircraft, the air in the cabin is provided by the environmental control system (ECS) which is designed to control the cabin pressure, cabin temperature, maintain air

quality and filter/dissipate any particulate matter, smoke and odours that are present in the cabin.¹

In a typical cabin air recirculation system, the air supplied into the cabin consists of approximately 50% outside air from either the engine's compressor stage (engine 'bleed air') or the auxiliary power unit (APU) which is mixed with approximately 50% of filtered, recirculated air. (Note, however, that some aircraft designs are now moving to 'bleed air free' ECS. One future aircraft ECS design incorporates an independent air compressor system instead of the engine compressor system for processing outside air.)

High efficiency particulate air (HEPA) filters are located in the cabin air recirculation loop and these are usually rated at 99.99% sodium flame test efficiency or the equivalent 99.97% DOP (di-octyl phthalate) efficiency.

This presentation focuses on how these cabin air filters are effective at removing airborne contamination from the recirculated air on modern commercial aircraft.

*Tel.: +4423 92 303627.

E-mail address: karen_bull@europe.pall.com