International Standard

ISO 17597

Test method for measuring in-duct airborne microorganisms inactivation/removal effectiveness (AMIRE)

Méthode d'essai pour mesurer l'efficacité d'inactivation/ d'élimination des micro-organismes en suspension dans l'air (AMIRE) en conduit

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First edition
2026-11

Reference number
ISO 17597:2026(en)

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Published in Switzerland

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This document was prepared by Technical Committee ISO/TC 142, *Cleaning equipment for air and other gases.*

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Introduction

Airborne microorganisms, including pathogens, spread readily through indoor air, and can cause a variety of diseases. A number of removal and deactivation technologies have been developed to deal with this situation.

Relevant existing standards include ASHRAE 185.1, ISO 16890, ISO 29463, ISO 10121 and ISO 15714.

However, none of these existing standards are fully relevant for the wide variety of different technologies used for the removal and deactivation of airborne microorganisms. In the case of ASHRAE 185.1 and ISO 15714, the test is specified only for UV devices and does not include mechanical filtration and other technologies.

There is currently no internationally accepted method for measuring the inactivation/removal effectiveness of air disinfection devices that are mounted in heating, ventilation and air-conditioning (HVAC) systems other than UV-based ones.

This document provides a laboratory test method for microorganism inactivation/removal. It builds on existing standards such as the ones listed above and broadens the scope to cover specific types of microorganism inactivation/removal devices in air ducts.

The airborne microorganism inactivation/removal effectiveness is based on an evaluation of the ability of the duct-mounted air-filtering devices to capture or inactivate bacteria, moulds or viruses with common particle sizes. By measuring the inactivation/removal effectiveness, the quality level of the product can be assessed.

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Test method for measuring in-duct airborne microorganisms inactivation/removal effectiveness (AMIRE)

WARNING — The test given in this document shall be performed by expert staff trained and certified to handle microorganism-related techniques. Leakage from test equipment may release microorganisms into the laboratory air. National and international safety procedures for working with infectious biomaterials shall be followed to prevent contamination of apparatus, working place or environment. Microorganisms used in the tests shall be handled with caution while wearing protective equipment suitable for biosafety level.

1 Scope

This document specifies a method that evaluates inactivation/removal effectiveness against airborne microorganisms in air cleaning devices. This method includes detailed requirements for the test rig, and simulates the air flowrate of the devices. The method also covers data acquisition, analysis, and reporting of results. Additionally, this document provides a normative procedure (see Annex A) for determining the effect of dust loading on the inactivation and removal effectiveness.

This document is applicable to in-duct air cleaning devices, such as air filters set up in a heating, ventilation and air-conditioning (HVAC) system in commercial, institutional and office buildings, also in-duct air-purifying systems, or air sterilizers in these buildings. It applies to testing conducted under controlled laboratory conditions using specific surrogate test microorganisms (bacteria, moulds and viruses).

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This document does not apply to

— air cleaning devices intended for portable or standalone room use, which are addressed by ISO 16000-36 and the IEC 63086 series,

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— devices evaluated solely for the physical removal of non-biological particulate matter, which are covered by the ISO 16890 series, and

— clinical, medical or industrial cleanroom applications requiring specific pathogenic testing.

Furthermore, it does not cover the detailed assessment of ultraviolet (UV) dose evaluation exclusively for in-duct ultraviolet germicidal irradiation (UVGI) devices, which is covered by ISO 15714 and ASHRAE 185.1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15957, *Test dusts for evaluating air cleaning equipment*

ISO 29464, *Cleaning of air and other gases — Vocabulary*

ISO 16890-2:2022, *Air filters for general ventilation — Part 2: Measurement of fractional efficiency and air flow resistance*

ISO 16890-3:2024, *Air filters for general ventilation — Part 3: Determination of the gravimetric efficiency and the air flow resistance versus the mass of test dust captured*

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