

---

---

**Cleanrooms and associated controlled environments —**

**Part 3:  
Test methods**

*Salles propres et environnements maîtrisés apparentés —  
Partie 3: Méthodes d'essai*



Reference number  
ISO 14644-3:2019(E)

© ISO 2019

# Contents

Page

<b>Foreword</b>	<b>iv</b>
<b>Introduction</b>	<b>v</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>1</b>
3.1 General terms	1
3.2 Terms related to airborne particles	3
3.3 Terms related to air filters and systems	3
3.4 Terms related to airflow and other physical states	4
3.5 Terms related to electrostatic measurement	5
3.6 Terms related to measuring apparatus and measuring conditions	5
3.7 Terms related to occupancy states	6
<b>4 Test procedures</b>	<b>6</b>
4.1 Cleanroom tests	6
4.1.1 General	6
4.1.2 Supporting tests	7
4.2 Principle	7
4.2.1 Air pressure difference test	7
4.2.2 Airflow test	7
4.2.3 Airflow direction test and visualization	8
4.2.4 Recovery test	8
4.2.5 Temperature test	8
4.2.6 Humidity test	8
4.2.7 Installed filter system leakage tests	8
4.2.8 Containment leak test	8
4.2.9 Electrostatic and ion generator tests	8
4.2.10 Particle deposition test	8
4.2.11 Segregation test	9
<b>5 Test reports</b>	<b>9</b>
<b>Annex A (informative) Choice of supporting tests and checklist</b>	<b>10</b>
<b>Annex B (informative) Supporting test methods</b>	<b>14</b>
<b>Annex C (informative) Test apparatus</b>	<b>44</b>
<b>Bibliography</b>	<b>52</b>

## Introduction

Cleanrooms and associated controlled environments provide control of contamination to levels appropriate for accomplishing contamination-sensitive activities. Products and processes that benefit from the control of airborne contamination include those in such industries as aerospace, microelectronics, pharmaceuticals, medical devices, healthcare and food.

This document sets out appropriate test methods for measuring the performance of a cleanroom, a clean zone or an associated controlled environment, including separative devices and controlled zones, together with all associated structures, air treatment systems, services and utilities.

**NOTE** Not all cleanroom parameter test procedures are shown in this document. The procedure and apparatus for the test carried out for the air cleanliness classes by particle concentration and for macroparticles are provided in ISO 14644-1,<sup>[1]</sup> and specifications for monitoring air cleanliness by nanoscale particle concentrations are provided in ISO 14644-12.<sup>[8]</sup> The procedures and apparatus to characterize other parameters, of concern in cleanrooms and clean zones used for specific products or processes, are discussed elsewhere in other documents prepared by ISO/TC 209 [for example, procedures for control and measurement of viable materials (ISO 14698 series), testing cleanroom functionality (ISO 14644-4<sup>[3]</sup>), and testing of separative devices (ISO 14644-7<sup>[4]</sup>)]. In addition, other standards can be considered to be applicable. Other cleanliness attribute levels can be determined using ISO 14644-8<sup>[5]</sup> (levels of air cleanliness by chemicals), ISO 14644-9<sup>[6]</sup> (levels of surface cleanliness by particle concentration) and ISO 14644-10<sup>[7]</sup> (levels of surface cleanliness by chemical concentration).