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Cleanrooms and associated controlled environments —

Part 13: Cleaning of surfaces to achieve defined levels of cleanliness in terms of particle and chemical classifications

Salles propres et environnements maîtrisés apparentés —

Partie 13: Nettoyage des surfaces afin d'obtenir des niveaux de propreté par rapport aux classifications particulaire et chimique

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Contents

Page

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 209, *Cleanrooms and associated controlled environments*.

A list of all parts in the ISO 14644 series can be found on the ISO website.

Introduction

The term surface refers to the interface between two phases. For the purpose of this document, the surface is a solid. A “clean surface” is where one or more of the contamination categories (particles, chemical) are under control due to cleaning/decontamination. The degree of cleanliness is specified in the corresponding surface cleanliness classifications (see ISO 14644-9 and ISO 14644-10). Different cleaning methods are necessary depending on the degree of cleanliness (cleanliness class) required. This document gives guidance on the selection of cleaning methods to achieve specified cleanliness levels. For the selection procedure, the aspects of surface description, cleanliness specifications, types of contamination, cleaning techniques, material compatibility, and assessment methodology are taken into consideration. Most of the methods are suitable for removal of more than one contamination category at the same time; therefore, a common standard for the selection of a cleaning method for both particles, as well as chemical contamination, is needed.

Cleanrooms and associated controlled environments —

Part 13:
Cleaning of surfaces to achieve defined levels of cleanliness in terms of particle and chemical classifications

1 Scope

This document gives guidelines for cleaning to a specified degree on cleanroom surfaces, surfaces of equipment in a cleanroom and surfaces of materials in a cleanroom. Under consideration are all surfaces (external or internal) that are of interest. It provides guidance on the assessment of cleaning methods for achieving the required surface cleanliness by particle concentration (SCP) and surface cleanliness by chemical concentration (SCC) classes and which techniques should be considered to achieve these specified levels.

The appropriateness of cleaning techniques will make reference to the cleanliness classes and associated test methods found in ISO 14644-9 and ISO 14644-10.

The following matters of general guidance will be provided:

— expected surface cleanliness levels;

— suitability of cleaning methods;

— compatibility of surfaces with the cleaning technique;

— assessment of cleaning appropriateness.

The following will be excluded from this document:

— classification of cleaning methods;

— product produced within a cleanroom;

— specific surface-related cleaning methods;

— detailed description of cleaning mechanisms, methods and procedures of various cleaning methods;

— detailed material characteristics;

— description of damage mechanisms by cleaning processes and time-dependent effects;

— references to interactive bonding forces between contaminants and surfaces or generation processes that are usually time-dependent and process-dependent;

— other characteristics of particles such as electrostatic charge, ionic charges, etc.;

— chemical reactions between molecular contaminants and surfaces;

— microbiological aspects of surface cleanliness;

— radioactive aspects of contamination;

— health and safety considerations;

— environmental aspects such as waste disposal, emissions, etc.;

— selection and use of statistical methods.

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 14644-8, *Cleanrooms and associated controlled environments — Part 8: Classification of air cleanliness by chemical concentration (ACC)*

ISO 14644-9, *Cleanrooms and associated controlled environments — Part 9: Classification of surface cleanliness by particle concentration*

ISO 14644-10, *Cleanrooms and associated controlled environments — Part 10: Classification of surface cleanliness by chemical concentration*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14644-9, ISO 14644-10 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
cleanliness
<of a solid surface>condition of a solid surface where the amount of *contamination* (3.4) (particle, chemical) is controlled to a specific level

3.2
cleaning appropriateness
relation between the required *cleanliness* (3.1) and the accomplished cleanliness under controlled conditions

Note 1 to entry: In some languages, the term cleaning efficacy is used to indicate cleaning appropriateness.

Note 2 to entry: In case of real operational conditions or monitoring, the term cleaning effectiveness is used.

3.3
cleaning efficiency
fraction of specific contaminants removed from a surface by a cleaning process

Note 1 to entry: The fraction is determined by the accomplished surface cleanliness in respect to the initial surface cleanliness.

3.4
contamination
unwanted matter in an undesirable location

3.5
particle
minute piece of matter with defined physical boundaries

[SOURCE: ISO 14644-1:2015, 3.2.1]