SLOVENSKI STANDARD
SIST EN ISO 14644-10:2013

01-maj-2013

Čiste sobe in podobna nadzorovana okolja - 10. del: Klasifikacija čistosti površine na osnovi koncentracije onesnaževal (ISO 14644-10:2013)

Cleanrooms and associated controlled environments - Part 10: Classification of surface cleanliness by chemical concentration (ISO 14644-10:2013)

Reinräume und zugehörige Reinraumbereiche - Teil 10: Klassifizierung der chemischen Oberflächenreinheit (ISO 14644-10:2013)

Salles propres et environnements maîtrisés apparentés - Partie 10: Classification de la propreté chimique des surfaces (ISO 14644-10:2013)

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ICS:

13.040.35	Brezprašni prostori in povezana nadzorovana okolja	Cleanrooms and associated controlled environments

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English Version

Cleanrooms and associated controlled environments - Part 10: Classification of surface cleanliness by chemical concentration (ISO 14644-10:2013)

Salles propres et environnements maîtrisés apparentés - Partie 10: Classification de la propreté chimique des surfaces (ISO 14644-10:2013)

Reinräume und zugehörige Reinraumbereiche - Teil 10: Klassifizierung der chemischen Oberflächenreinheit (ISO 14644-10:2013)

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Foreword

This document (EN ISO 14644-10:2013) has been prepared by Technical Committee ISO/TC 209 "Cleanrooms and associated controlled environments" in collaboration with Technical Committee CEN/TC 243 “Cleanroom technology” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 14644-10:2013 has been approved by CEN as EN ISO 14644-10:2013 without any modification.

INTERNATIONAL STANDARD

ISO 14644-10

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Cleanrooms and associated controlled environments —

Part 10: Classification of surface cleanliness by chemical concentration

Salles propres et environnements maîtrisés apparentés —
Partie 10: Classification de la propreté chimique des surfaces

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 14644-10 was prepared by Technical Committee ISO/TC 209, *Cleanrooms and associated controlled environments*.

ISO 14644 consists of the following parts, under the general title *Cleanrooms and associated controlled environments*:

— *Part 1: Classification of air cleanliness by particle concentration*

— *Part 2: Specifications for testing and monitoring to prove continued compliance with* ISO 14644-1

— *Part 3: Test methods*

— *Part 4: Design, construction and start-up*

— *Part 5: Operations*

— *Part 6: Vocabulary*

— *Part 7: Separative devices (clean air hoods, glove boxes, isolators, mini-environments)*

— *Part 8: Classification of air cleanliness by chemical concentration (ACC)*

— *Part 9: Classification of surface cleanliness by particle concentration*

— *Part 10: Classification of surface cleanliness by chemical concentration*

The following part is under preparation:

— *Part 12: Classification of air cleanliness by nanoscale particle concentration*

Cleaning of surfaces to achieve defined levels of cleanliness in terms of particle and chemical classifications will form the subject of a future Part 13.

Cleanrooms and associated controlled environments —

Part 10: Classification of surface cleanliness by chemical concentration

1 Scope

This part of ISO 14644 defines the classification system for cleanliness of surfaces in cleanrooms with regard to the presence of chemical compounds or elements (including molecules, ions, atoms and particles). This part of ISO 14644 is applicable to all solid surfaces in cleanrooms and associated controlled environments such as walls, ceilings, floors, working environment, tools, equipment and devices.

NOTE 1 For the purpose of this part of ISO 14644, consideration is only given to the chemical characteristics of a particle. The physical properties of the particle are not considered and this part of ISO 14644 does not cover the interaction between the contamination and the surface.

NOTE 2 This part of ISO 14644 does not include the contamination generation process and any time-dependent influences (deposition, sedimentation, ageing, etc.) or process-dependent activities such as transportation and handling. Neither does it include guidance on statistical quality control techniques to ensure compliance.

2 Normative references

The following referenced documents are recommended for the application 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 14644-1:—[1], *Cleanrooms and associated controlled environments — Part 1: Classification of air cleanliness by particle concentration*

ISO 14644-6, *Cleanrooms and associated controlled environments — Part 6: Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14644-6 and the following apply.

3.1
air cleanliness by chemical concentration
ACC
level, expressed as an ISO Class *N*, which represents the maximum allowable concentration of a given chemical species or group of chemical species, expressed in grams per cubic metre (g/m^3)

Note 1 to entry: This definition does not include macromolecules of biological origin, which are judged to be particles.

3.2
contaminant category
common name for a group of compounds with a specific and similar deleterious effect when deposited on the surface of interest

1) To be published. (Revision of ISO 14644-1:1999.)

3.3
chemical contamination
chemical (non-particulate) substances that can have a deleterious effect on the product, process or equipment

3.4
solid surface
boundary between the solid phase and a second phase

3.5
surface
boundary between two phases

Note 1 to entry: One of the phases is normally a solid phase and the other a gas, a liquid or another solid.

3.6
surface cleanliness by chemical concentration
SCC
condition of a surface with respect to its chemical concentration

3.7
surface cleanliness by chemical concentration class
N_{SCC}
common logarithm (to the base of 10) of the chemical concentration on a surface in grams per square metre (g/m^2)

4 Classification

4.1 Principles for establishing classification of clean surfaces in cleanrooms and controlled environments

Classification shall be specified by use of a classification descriptor. This descriptor is designated "ISO-SCC" and specifies the maximum total chemical concentration permitted on a surface for an individual chemical substance or group of substances. The classification of SCC is based upon the concentration of chemicals on a surface as calculated using Formula (1) (given in 4.2) and expressed in g/m^2. For calculation of the class, all other units shall be converted to g/m^2. In specific cases where low concentrations need to be specified, the maximum allowable concentration of chemicals on a surface may be expressed in atoms per square centimetre, ISO-$SCC_{\_atomic}$, using Formula (2) in 4.4.

4.2 Classification for surface cleanliness by chemical concentration

The SCC class shall be designated by a classification number, N_{SCC}, where N_{SCC} is the common logarithm index of concentration C_{SCC}, expressed in g/m^2. The SCC class statement shall always be connected with a chemical substance or group of substances to which it is related. Intermediate concentrations may be specified, with 0,1 being the smallest permitted increment of N_{SCC}. C_{SCC} is determined from Formula (1), in terms of N_{SCC}:

$$C_{SCC} = 10^{N_{SCC}} \tag{1}$$

Therefore, $N_{SCC} = \log_{10} C_{SCC}$.

C_{SCC}, the maximum allowable concentration of the specified chemical substance or group of substances, is expressed in g/m^2. The measured chemical concentration on a surface shall not exceed the maximum allowable concentration of SCC, C_{SCC} to satisfy the predetermined SCC that is agreed between the customer and supplier.

In all cases, N_{SCC} class numbers shall include the negative sign.

NOTE 1 An SCC class number is only valid in connection with a descriptor (see 4.3).

NOTE 2 For converting from gravimetric concentration (g/m^2) to numeric concentration (number of atoms, molecules or ions per unit area), see 4.4.

Table 1 and Figure 1 further illustrate the ISO-SCC classification as a function of chemical concentration on a surface.

Note also the parameters listed in Annex B that influence classification.

Table 1 — ISO-SCC classes

ISO-SCC class	Concentration (g/m^2)	Concentration ($\mu g/cm^2$)	Concentration (ng/cm^2)
0	10^{0}	10^{6}	10^{9}
−1	10^{-1}	10^{5}	10^{8}
−2	10^{-2}	10^{4}	10^{7}
−3	10^{-3}	10^{3}	10^{6}
−4	10^{-4}	10^{2}	10^{5}
−5	10^{-5}	10^{1}	10^{4}
−6	10^{-6}	10^{0}	10^{3}
−7	10^{-7}	10^{-1}	10^{2}
−8	10^{-8}	10^{-2}	10^{1}
−9	10^{-9}	10^{-3}	10^{0}
−10	10^{-10}	10^{-4}	10^{-1}
−11	10^{-11}	10^{-5}	10^{-2}
−12	10^{-12}	10^{-6}	10^{-3}