

ICS 13.040.35
CCS C 70



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 25915.17-2024

**Cleanrooms and associated controlled environments - Part 17:
Particle deposition rate applications**

洁净室及相关受控环境 第17部分：粒子沉积速率应用

(English Translation)

Issued on: August 23, 2024

Implemented on: August 23, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is part 17 of GB/T 25915 Cleanrooms and Related Controlled Environments. GB/T 25915 has been published for the following part.

- Part 1: Classification of air cleanliness levels according to particle concentration;
- Part 2: Monitoring of particle concentration in clean room air;
- Part 3: Detection methods;
- Part 4: Design, construction and start-up;
- Part 5: Operation;
- Part 6: Vocabulary;

- Part 7: Isolation devices (clean air hoods, glove boxes, isolators, microenvironments);
- Part 8: Classification of air cleanliness (ACC) levels according to chemical concentration;
- Part 9: Classification of surface cleanliness levels according to particle concentration;
- Part 10: Classification of surface cleanliness levels according to chemical concentration;
- Part 12: Technical requirements for monitoring the concentration of nanoparticles in the air;
- Part 13: Surface cleaning to meet particle and chemical cleanliness requirements;
- Part 14: Assessment of equipment suitability according to particle concentration;
- Part 15: Assessment of suitability of equipment and materials according to concentration of gaseous chemicals;
- Part 16: Improving the energy efficiency of clean rooms and air purification devices;
- Part 17: Application of particle deposition rate.

This document is equivalent to ISO 14644-17:2021 "Cleanrooms and related controlled environments Part 17: Application of particle deposition rates".

Introduction

GB/T 25915 adopts the ISO 14644 series of standards. The settings of each part are consistent with international standards and are intended to consist of 18 parts.

- Part 1: Classification of air cleanliness levels according to particle concentration. The purpose is to distinguish the degree of particle contamination.
- Part 2: Monitoring of particle concentration in clean room air. The purpose is to guide the monitoring of particle contamination to avoid possible contamination risk.
- Part 3: Detection methods. The purpose is to guide the detection of various pollution and related environmental factors in clean rooms.
- Part 4: Design, construction and startup. The purpose is to guide the design, construction and startup of clean rooms.
- Part 5: Operation. The purpose is to guide the operation of the clean room.
- Part 6: Vocabulary. The purpose is to unify and standardize technical terms.
- Part 7: Isolation devices (clean hoods, glove boxes, isolators, microenvironments). The purpose is to propose basic this requirement.
- Part 8: Classification of air cleanliness (ACC) levels by chemical concentration. The purpose is to distinguish the degree of chemical pollution in the air.

--- Part 9: Classification of surface cleanliness levels according to particle concentration. The purpose is to distinguish the degree of surface particle contamination.

--- Part 10: Classification of surface cleanliness levels according to chemical concentration. The purpose is to distinguish the degree of chemical contamination on the surface.

--- Part 12: Technical requirements for monitoring the concentration of nanoparticles in the air. The purpose is to propose the detection of nano-scale particle pollution Require.

--- Part 13: Surface cleaning to achieve particle and chemical cleanliness requirements. The purpose is to provide cleaning requirements for surfaces within clean rooms to Avoid possible risks of particle and chemical contamination.

--- Part 14: Assessment of equipment suitability by particle concentration. The purpose is to assess the possible particle contamination that may be generated in the clean room by the relevant equipment.

Tests to determine the suitability of the equipment.

--- Part 15: Assessment of the suitability of equipment and materials according to the concentration of gaseous chemicals. The purpose is to assess the suitability of equipment and materials by assessing the possible Tests that generate gaseous chemical contamination in clean rooms to determine the suitability of equipment and materials.

--- Part 16: Improving the energy efficiency of clean rooms and air purification equipment. The goal is to reduce clean room energy consumption and the resulting global impact.

--- Part 17: Application of particle deposition rate. The purpose is to provide a method for evaluating the particle cleanliness of sensitive surfaces of products and to give Classification standards related to surface large particle settling pollution.

--- Part 18: Evaluation of the suitability of consumables. The purpose is to evaluate the appropriate use of consumables in clean rooms, clean areas or controlled areas.

--- Part 21: Suspended particle sampling technology. The purpose is to sample suspended particles in clean areas, reduce sampling errors and particle loss.

Cleanrooms and related controlled environments are used to control contamination to levels suitable for accomplishing contamination-sensitive activities. Products that benefit from contamination control Products and processes include those in industries such as aerospace, microelectronics, optics, nuclear, food, healthcare, pharmaceuticals and medical devices.

GB/T 25915.1-2021 considers the air particles in the clean room and classifies the cleanliness of the clean room by the maximum allowable concentration.

This document is based on the Netherlands the VCCN Guide 9 considers the particle deposition rate on surfaces in cleanrooms. The Importance of Particle Deposition Rate

(PDR) the probability of suspended particles contaminating vulnerable surfaces (such as finished products) is directly related to PDR.

GB/T 25915.3-2024 describes the method for determining the deposition of particles larger than or equal to 0.1 μm . In this document, the focus is on it is the deposition rate of large particles larger than 5 μm on the surface and its application in clean room contamination control.

In a clean room, people, machinery, tools and process activities generate particles of various sizes and spread in the clean room through airflow.

According to GB/T 25915.1-2021, in clean rooms with a cleanliness level of ISO 5 or better and related controlled environments, particles larger than the concentration of particles with a diameter of 5 μm is zero or extremely low. However, due to different industries and process activities, particles may appear on the surface during the dynamic operation of the clean room.

The particle size of the particles is 5 μm ~500 μm or even larger, which exceeds the particle size limit of the cleanliness classification in GB/T 25915.1-2021.

Although this is an accidental phenomenon, there are sedimentation losses at the sampling entrance, in the sampling tube, and in the particle counter, so large particles in the air cannot be detected.

Large particles can cause contamination problems and the presence and deposition of large particles on vulnerable surfaces is best determined by measuring the PDR on the surface.

Ability.

When the particle size is less than 5 μm , it is removed by the clean room ventilation system. However, for particles with a size greater than 10 μm , more than 50% of the particles will settle on the surface. When the particle size is greater than 40 μm , the deposition rate reaches more than 90%. The main deposition mechanism of particles of this size is gravity.

However, air turbulence and electrostatic adsorption can also cause deposition. These deposited particles will not be redistributed by the clean room airflow, but can be transported by people walking.

Resuspension occurs due to movement and cleaning actions. Therefore, it is necessary to remove these particles by cleaning.

The particles with a size larger than 5 μm and their resuspension in the clean room are mainly related to human or mechanical activities.

In the dynamic state, there is almost no activity, particles with a diameter greater than 5 μm rarely diffuse, their concentration is close to zero, and no significant deposition occurs.