

ICS 19.040
CCS K04



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

GB/T 10593.4-2025

**Method of the measuring environmental parameters for electric
and electronic products - Part 4: Condensation**

电工电子产品环境参数测量方法 第4部分：凝露

Issued on: August 1, 2025

Implemented on: February 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of China**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and Definitions	1
4 General	1
5 Image Measurement	1
6 Relative humidity measurement	2
7 Dew point temperature measurement method	2
6 Table B.2 Capillary pore diameters of common electrical and electronic product related materials Table C.1 Critical impedance data for different comb tooth spacings..	8

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 4 of GB/T 10593 "Methods of measurement of environmental parameters of electrical and electronic products". GB/T 10593 has been published. The following parts.

3. Vibration data processing and summarization;

5. Corrosive gases. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document is proposed and coordinated by the National Technical Committee for Standardization of Environmental Conditions and Environmental Testing for Electrical and Electronic Products (SAC/TC8). This document was drafted by: China Electric Power Research Institute Co., Ltd., State Grid Jiangxi Electric Power Co., Ltd. Electric Power Research Institute, Beijing Great Wall Metrology and Testing Technology Research Institute of China Aviation Industry Corporation, Jiangsu Tomilo High-end Equipment Co., Ltd., Goldwind Science & Technology Co., Ltd. Co., Ltd., Zhejiang Academy of Quality Science, China Yangtze Power Co., Ltd., China Southern Power Grid Integrated Energy Co., Ltd., Kingfa Science & Technology Co., Ltd., Tsinghua University Shenzhen International Graduate School, Guangdong Power Grid Co., Ltd. Electric Power Research Institute, Beijing Aerospace Science and Technology Co., Ltd. University of Aeronautics and Astronautics, AVIC Great Wall Metrology and Testing (Tianjin) Co., Ltd., Shanghai Institute of Metrology and Testing Technology, and China Institute of Testing Technology. The main drafters of this document are. Wang Jun, Long Guohua, He Meng, Lian Zhaocai, Zhang

Jingyi, Chen Chuan, Zhang Hongyu, Yi Yawen, Tai Bin, Li Sheng, Liu Xin, Xiang Li, Zhu Chen, Chen Tian, Wang Xilin, Wang Linli, Wu Sa, Lü Guoyi, Zhang Ailiang, Yang Xiujie, Qin Hao, Chen Wei, Wang Jing, Jia Zhidong, Liang Yongchun, Zhao Wei, Wang Xiaohong, and Ren Honglei.

GB/T 10593 "Measurement Methods of Environmental Parameters of Electrical and Electronic Products" series of standards mainly focus on the environmental parameters that affect the performance of electrical and electronic products. The measurement of numbers is planned to consist of six parts.

1.Vibration. This part mainly focuses on the measurement of vibration parameters of electrical and electronic products to guide the impact of these environmental parameters on electrical and electronic products. Impact analysis of sub-product performance.

2.Salt spray. This part is mainly aimed at the measurement of salt spray parameters in the environment of electrical and electronic products to guide the measurement of salt spray environment. Corrosion protection of electrical and electronic products, environmental optimization control, etc.

3.Vibration data processing and summarization. This part mainly analyzes the environmental vibration parameter data processing in detail so as to Analyze vibration parameters and guide the control of vibration conditions in the safe service environment of electrical and electronic products.

4.Condensation. This part mainly focuses on the measurement of condensation parameters in the environment of electrical and electronic products to guide the The humidity of the product is controlled to ensure safe service, reducing the possibility of malfunctions such as short circuits and failure of electronic components caused by condensation.

5.Corrosive gases. This part mainly focuses on sulfur dioxide, hydrogen sulfide, ammonia, nitrogen oxides, etc. that cause electrical and electronic products to The measurement of trace gas concentrations that may cause corrosion of products is used to guide the environmental control and corrosion protection design of electrical and electronic products.

6.Dust and sand. This part focuses on the measurement of dust and sand parameters of electrical and electronic products to guide the safe service of products in dust and sand environments. and control of sand conditions. Measurement methods for environmental parameters of electrical and electronic products Part

1 Scope

GB/T 10593.4-2025 is the Chinese national standard on method of the measuring environmental parameters for electric and electronic products - part 4: condensation, in the field of testing. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification

calls it up - which in practice is how most foreign buyers meet it. It was issued on 1 August 2025 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 February 2026. Classification: ICS 19.040, CCS K04. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes the measurement method of condensation environment parameters of electrical and electronic products, including image measurement method, relative humidity measurement Method, dew point temperature measurement method and impedance measurement method. This document is applicable to the measurement of condensation environmental parameters in places where electrical and electronic products are used.

2 Normative references

This document has no normative references.

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 condensation When the surface temperature of an object is lower than the dew point temperature of the surrounding air, water vapor precipitates on the surface of the object, that is, water changes from gaseous state to Condensed liquid. [Source: GB/T 20625-2024, 3.3.24, modified]

3.2 deliquesce Some solid substances absorb or adsorb moisture from the air, making the surface gradually moist and lubricated, that is, liquid water appears on the surface of the object. Phenomenon, the phenomenon that a substance changes from a solid state to a solution of the substance.

4 General

In the natural environment, the most common cause of condensation is low-temperature condensation. When the temperature of an object is lower than the dew point temperature of the air, low-temperature condensation occurs. Condensation is related to the dew point temperature, and the dew point temperature of the air is directly related to the relative humidity and ambient temperature of the environment, and is also related to the surface state of the object, the deposition Salt and other factors are indirectly related. For example, near the ocean or salt lake, the surface of objects is prone to salt deliquescence due to the attachment of salt, causing condensation on the surface of objects. The critical humidity of condensation of common salts (i.e. deliquescent humidity) under different temperature

conditions is as shown in Appendix A. The surface structure, roughness and other conditions of the object affect the occurrence of condensation. The calculation of the critical humidity of condensation for different capillary pore diameters should comply with the provisions of Appendix B.

5 Image measurement method

The video monitoring method is used to observe the condensation on the surface of the object for a long time. This method can monitor and measure the condensation formation process and duration, and can Measure the condensation droplet diameter and size distribution based on the image. Recommended video surveillance system, using digital camera with image resolution of at least 1 million pixels and image capture speed of at least 10 frames per second