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**Vacuum technology - Vacuum gauges - Specifications for hot  
cathode ionization gauges**

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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 equivalent to ISO 27894:2009 "Specification for Hot Cathode Ionization Vacuum Gauges for Vacuum Technology Vacuum Gauges":

Please note that some contents of this document may refer to patents: The issuing agency of this document assumes no responsibility for identifying patents:

### Introduction

Ionization vacuum gauge is a common instrument for measuring high vacuum and ultra-high vacuum: In the high vacuum and ultra-high vacuum environment of known temperature, the true

The flow of ions collected by the air gauge is proportional to the gas density and pressure: High-speed electrons collide with ionized neutral gas molecules to produce ions, electrons

It is generated by a self-sustained discharge or an electron-emitting cathode: In commercial ionization gauges, the electron emitting cathode is a hot wire, also called a "hot cathode":

Pole", which realizes electron emission through the principle of thermal emission:

Due to the self-sustained discharge of the ionization vacuum gauge in the cross electromagnetic field, the non-linear characteristics between the discharge current and the gas density make it calibrated

Quite cumbersome: Therefore, in the pressure range of high vacuum and ultra-high vacuum, the "hot cathode" ionization vacuum gauge with better measurement linearity can be used

Passed by value:

If the ionization vacuum gauge is used for value transmission and accurate measurement in the range of high vacuum and ultra-high vacuum, the relevant parameters and uncertainty values of the vacuum gauge must be

essential and will be described in this document: Therefore, when using an ionization vacuum gauge as a reference standard, this document is to ISO /T S3567

Replenish:

Vacuum Technology Vacuum Gauge

Specification for hot cathode ionization vacuum gauges

## 1 Scope

This document defines terms related to hot cathode ionization vacuum gauges and specifies the specific parameters to be given by the manufacturer of hot cathode ionization vacuum gauges:

and the components of measurement uncertainty that need to be considered when operating these instruments: The reason is as follows:

- a) This document updates some terms and definitions given in ISO 3529-3:1981:
- b) Hot cathode ionization vacuum gauges are usually used as reference standards, and this document specifies the

Information on proper calibration of vacuum gauges for high vacuum: Traceable pressure for high and ultra-high vacuum using ionization gauges

When measuring, it is suitable to quote the information containing the relevant parameters and characteristics of the vacuum gauge in the manufacturer's instructions:

- c) This document also lists important uncertainty components associated with ionization gauge pressure measurements, and also gives these uncertainties

Guidelines for the evaluation of weight: For some current or future vacuum gauges, the list of uncertainty components may not be comprehensive:

- d) When the ionization vacuum gauge is used as a reference standard, this document is a supplement to ISO /T S3567 and ISO /T S27893:

## 2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text: Among them, dated references

For documents, only the version corresponding to the date is applicable to this document;

for undated reference documents, the latest version (including all amendments) is applicable to

this document:

GB/T 27418-2017 Evaluation and Expression of Measurement Uncertainty (ISO /IEC Guide98-3:2008, MOD)

Note: There is no technical difference between the referenced content of GB/T 27418-2017 and the referenced content of ISO /IEC Guide98-3:2008:

ISO /T S3567 Calibration for direct comparison of vacuum gauges with standard vacuum gauges (Vacuumgauges-Calibrationbydirect

Note: GB/T 34873-2017 Vacuum gauge and standard vacuum gauge direct comparison calibration (ISO 3567:2011, IDT)

### 3 Terms and Definitions

The following terms and definitions apply to this document:

3:1 Definition of part components

3:1:1

Gaugehead

regulation gaugetube

The component of a vacuum gauge that is exposed to vacuum:

[Source: ISO 3529-3:1981, with modifications]

Note: The gauge head of the hot cathode ionization vacuum gauge contains at least one cathode or filament, anode, collector and corresponding electric vacuum feedthrough, see Figure A:1 in Appendix A: