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PEOPLE'S REPUBLIC OF CHINA**

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**Vacuum gauges - Definitions and specifications for quadrupole
mass spectrometers**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

The translation method used in this standard is equivalent to ISO 14291.2012 "Definition and Specification of Vacuum Gauge Quadrupole Mass Spectrometer".

This standard was proposed by the China Machinery Industry Federation.

This standard is under the jurisdiction of the National Vacuum Technology Standardization Technical Committee (SAC/TC18).

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Hunan Vigor Magnetic Fluid Co., Ltd., Huizhou Feike New Material Co., Ltd., Shenyang Vacuum Technology Research Institute Co., Ltd.

Introduction

Quadrupole mass spectrometer (QMS) can now not only be used in vacuum leak detection and residual gas analysis, but also as a quantitative analysis instrument

In process control such as physical and chemical vapor deposition, and etching.

Factors such as total pressure, mixed gas composition, instrument parameter settings, and environmental conditions will all affect the measurement results and measurement uncertainty of the quadrupole mass spectrometer.

Degree has an important impact. Therefore, the calibration of the quadrupole mass spectrometer cannot cover all applications, and the calibration must meet specific conditions of use or

Standardized conditions.

At the same time, in order to facilitate users to compare the performance of quadrupole mass spectrometers produced by different manufacturers, and to be able to use the instrument correctly, it is necessary to use this standard.

Standardization.

This standard has taken the first step to establish the direction of the standard calibration process of quadrupole mass spectrometers by standardizing terms and parameters.

Definition and specification of vacuum gauge quadrupole mass spectrometer

1 Scope

This standard defines the terms related to quadrupole mass spectrometers and specifies the parameters required in the manufacturer's instructions for normal calibration and analysis.

Guarantee of pressure measurement quality.

This standard applies to quadrupole mass spectrometers equipped with electron bombardment ion sources. Such a quadrupole mass spectrometer is usually used to measure the mass-to-charge ratio

(m/z) Substances less than 300. Equipped with other types of ion sources such as chemical ionization, photoionization, field ionization, etc., and are mainly used for detection

A quadrupole mass spectrometer for specific organic substances with a mass-to-charge ratio (m/z) greater than 300 is not within the scope of this standard.

2 Terms and definitions

The following terms and definitions apply to this document.

2.1 Components

2.1.1

Quadrupole mass spectrometer; QMS

The axially incident ions enter a quadrupole lens system composed of four electrodes (usually rods).

A mass spectrometer that allows only ions with a certain mass-to-charge ratio to pass through a current electric field.

[ISO 3529-3:1981[2], definition 3.5.2.2]

Note. Such a quadrupole mass spectrometer consists of a sensor head and an electronic control unit.

2.1.2

Sensorhead

Analyzertube

Sensor

Sensor unit

Sensinghead

Gaugehead

Regulate gaugehead

An integral part including ion source, quadrupole mass filter and ion detector.

2.1.3

Ionsource

The part of a quadrupole mass spectrometer that ionizes gas molecules and atoms into ions.

Note. In order to generate positive ions, the ion source generally uses electron bombardment ionization.

2.1.3.1

Open ion source openionsource

The ion source with high conductivity to the surrounding vacuum environment is usually designed as an open grid structure.

Note. All functional parts of the ion source are exposed to the same vacuum area.