

ICS 77.100.20
CCS G 86



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

GB/T 4844-2011

**Pure Helium, High Pure Helium and Ultra Pure Helium
(English Translation)**

Issued on: December 30, 2011

Implemented on: October 1, 2012

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China**

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Foreword

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

This Standard replaces GB 4844.2-1995, Pure Helium and GB/T 4844.3-1995, High Purity Helium. This Standard integrates the content of GB 4844.2-1995 and GB/T 4844.3-1995. Compared with GB 4844.2-1995 and GB/T 4844.3-1995, the major technical changes of this Standard, in addition to editorial changes, are as follows.

- the application scope is modified and ultra pure helium and liquid helium are added (see Article 1; Article 1 of GB 4844.2-1995 and Article 1 of GB/T 4844.3-1995);
- the normative references are modified (see Article 2; Article 2 of GB 4844.2-1995 and Article 2 of GB/T 4844-1995);
- the specifications for pure helium and high pure helium are modified and the specifications for ultra pure helium are added (Table 1; Table 1 of GB 4844.2-1995 and Table 1 of GB/T 4844.3-1995);
- the test methods are modified (see Article 5; Article 4 of GB 4844.2-1995 and Article 5 of GB/T 4844.3-1995);
- the technical content of packaging, storage and transportation of products is modified (see Article 6; Article 5 of GB 4844.2-1995 and Article 6 of GB/T 4844.3-1995);

-- the safety warnings about helium are added (see 6.2);

-- the volume conversion coefficient K value of helium at different temperature under the pressure of 16.5 MPa ~ 30.0 MPa (see Table B.2, Table B.3 and Table B.4).

This Standard was proposed by China Petroleum and Chemical Industry Association.

This Standard shall be under the jurisdiction of the National Standardization Technical Committee on Gases (SAC/TC 206).

The drafting organizations of this Part. Southwest Research and Design Institute of Chemical Industry, Chengdu Natural Gas General Plant, Shanghai Huaai Chromatography Co., Ltd., Beijing AP BAIF Gases Industry Co., Ltd., Xi'an Dingyan Technology Co., Ltd.

1 Application Scope

This Standard specifies the specifications, inspection rules, test methods, and product packaging, marking, storage and transportation and safety warnings of gaseous helium and liquid helium.

This Standard applies to pure helium, high pure helium and ultra pure helium which are extracted using the cryogenic method and mainly used for light-guide fibre, laser, welding and cutting, diving breathing, cryogenic superconductor, supercharge, cleaning, protective gas and so on.

Molecular formula. He.

Relative molecular mass. 4.002 602 (according to 2007 International Relative Atomic Masses).

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to this Part.

GB 190, Packing Symbol of Dangerous Goods

GB 5099, Seamless Steel Gas Cylinders

GB/T 5832.1, Gas Analysis - Determination of Moisture - Part 1. Electrolytic Method

GB/T 5832.2, Gas Analysis - Determination of Moisture - Part 2. Dew Point Method

GB/T 5832.3, Determination of Moisture in Gases - Part 3. The Method of Cavity Ring-down Spectroscopy

GB 7144, Coloured Cylinder Mark for Gases

GB 14194, Rules for Filling of Permanent Gas Cylinders

JB/T 5905, Cryogenic Liquid Containers Insulated with Evacuated Multilayer Insulations

JB 6898, Storage and Shipping Device for Low Temperature Liquid - Safety Use Manual

in Annex A to this Standard shall be used as the arbitration method.

5.3.1 Determination of water content in pure helium and high pure helium

As specified in GB/T 5832.1 or GB/T 5832.2. In case of any dispute in the test result, the method specified in GB/T 5832.2 shall be used as the arbitration method.

5.3.2 Determination of water content in ultra pure helium

As specified in GB/T 5832.3.

6 Packaging, Marking, Storage and Transportation

and Safety Warnings

6.1.1 The packaging, storage and transportation of helium shall be as specified in

Supervision Regulation on Safety for Gas Cylinder and Supervision Regulation on Safety Technology for Stationary Pressure Vessel.

6.1.2 The gas cylinders for helium shall be as specified in GB 5099; the imported

helium cylinders shall conform to the relevant national regulations.

6.1.3 The packing containers of liquid helium shall be as specified in JB/T 5905; the

imported helium cylinders shall conform to the relevant national regulations.

6.1.4 The large-volume seamless steel gas cylinders and unit load cylinders shall
conform to relevant regulations.

6.1.5 The packing marks of helium shall be as specified in GB 190. The coloured
cylinder marks for helium shall be as specified in GB 7144.

6.1.7 The minimum pressure of bottled helium shall not be lower than 97% of the
nominal working pressure of gas cylinders at 20°C. The accuracy of pressure gauges
used for measurement shall not be lower than grade 1.5. The residual pressure of the
helium cylinders returned to factory shall not be lower than 0.2 MPa.

6.1.8 See Annex B for the volume calculation of helium under the conditions of
20°C
and 101.3 MPa.

6.1.9 Before the delivery of bottled helium, examine the nozzle and neck of gas
cylinders to confirm there is no leakage; put on the cylinder cap and vibration control
ring.

A.2.2 Carrier gas. high pure helium or ultra pure helium; its neon content shall be
one order of magnitude lower than that specified in Table 1.

A.2.3 Purifier. capable of purifying all component contents in helium carrier gas to
one order of magnitude lower than that specified for ultra pure helium in Table 1.

A.2.4 Standard specimen. prepared by using helium as base gas. All component
contents in the standard specimen for the analysis of pure helium shall be similar to
those specified in Table 1. All component contents (volume fraction) in the standard
specimen for the analysis of high pure helium and ultra pure helium are $1 \times 10^{-6} \sim 5 \times 10^{-6}$.

A.3 Determination conditions