

ICS 27.120

CCS F48



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

GB/T 11813-2008

Replacing GB/T 11813-1996

Helium leak testing of nuclear fuel rod for PWR

压水堆燃料棒氦质谱检漏

Issued on: July 2, 2008

Implemented on: April 1, 2009

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

Table of Contents

- 1 Scope
- 2 Normative references
- 3 Terms and Definitions
- 4 Method summary
- 5 Materials and equipment

Foreword

This standard replaces GB/T 11813-1996 "PWR fuel rods helium leak." This standard compared with GB/T 11813-1996, the main changes are as follows:

- a) increasing the normative references a chapter;
- b) increase in personnel and measurement requirements of the chapter;
- c) modify the leak measurement time requirements;
- d) to modify the system determines the background value of the standard;
- e) increase the standard leak calibration control and leak detection system according to the requirements of the end;
- f) increased determination method of measuring time. The Standard Appendix A, Appendix B, Appendix C is a normative appendix. The standard proposed by China National Nuclear Corporation. This standard by the National Standardization Technical Committee of nuclear energy. This standard was drafted. China Jianzhong Nuclear Fuel Limited. The main drafters of this standard. Yang-high, Guoxu Lin, Cao Hui, Guo Chunhai. This standard replaces the standards previously issued as follows:

--- GB 11813-1989, GB/T 11813-1996. PWR fuel rods helium leak

1 Scope

GB/T 11813-2008 is the Chinese national standard on helium leak testing of nuclear fuel rod for pwr, in the field of energy and heat transfer engineering. 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 2 July 2008 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 April 2009. Classification: ICS

27.120, CCS F48. 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 standard specifies the PWR fuel rods (hereinafter referred to as "fuel") calculated sealing performance helium leak detection methods and results And judgment. This standard applies to the fuel rod sealing performance testing, leak detection rate range is $1 \times 10^{-11} \text{ Pa} \cdot \text{m}^3/\text{s} \sim 1 \times 10^{-7} \text{ Pa} \cdot \text{m}^3/\text{s}$. PWR control rods, burnable poison rods, neutron source rod like helium leak may also refer to this standard.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. For dated references, subsequent Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to the agreement are based on research Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard. GB/T 4844.2 pure helium

GB/T 8979 nitrogen, high purity nitrogen and ultra pure nitrogen

3 Terms and Definitions

The following terms and definitions apply to this standard.

3.1 When the use of the fuel rod fabrication charged helium gas leak as shown sealing performance test method.

3.2 After the fuel rods placed in a vacuum vessel, filled with a predetermined pressure of helium, helium gas into the interior of the fuel rod from the drain hole or crevice, then Helium leak methods.

3.3 When the fuel rod cladding or weld tube end plugs and penetrating defects exist, since helium seal welded play helium leak detectors can detect the Leak rate determination value only waste time elapsed. Appendix A leak longest time press OK.

4 Method summary

This standard is based on the principle of mass spectrometry, using helium leak detectors, detector and vacuum system, standard leak, etc., of the fuel rods Leak sealing performance. According to the leak rate and leak detection system allows measurement of the deviation of the fuel rods sealed design techniques on the performance requirements, according Appendix B to determine the fuel leak rate determination scrap value. When the fuel leak rate is less than the value of the scrap judgment sealing performance is qualified;

otherwise unqualified.

5 Materials and equipment

5.1 Helium, GB/T 4844.2, qualified.

5.2 Industrial liquid nitrogen.

5.3 Industrial nitrogen, GB/T 8979.

5.4 helium leak detectors, sensitivity better than $1 \times 10^{-11} \text{Pa} \cdot \text{m}^3/\text{s}$.

5.5 Standard leak, quartz nitrided film series standard leak chamber with helium leak rate in the range of technical conditions allow fuel leak rate