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

GB/T 25451-2010

**PHWR fuel element coating-measurement of thickness-beta
backscatter method**

重水堆核电厂燃料元件涂层厚度测量 β 射线背散射法

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Foreword

The standard proposed by China National Nuclear Corporation. This standard by the National Standardization Technical Committee on Nuclear Energy (SAC/TC58) centralized. This standard was drafted. China North Nuclear Fuel Limited. The main drafters. Zhang Junjie, Li Aijun, Qi Junying, Zhang Jie, Han Ping Shan. CANDU nuclear power plant fuel element coating thickness measurement beta-ray backscatter method

1 Scope

GB/T 25451-2010 is the Chinese national standard on phwr fuel element coating-measurement of thickness-beta backscatter method, 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 10 November 2010 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 May 2011. 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 CANDU nuclear power plant measuring fuel element cladding tube wall thickness of the graphite coating and the support bottom surface, the side of the isolation block Method summary beryllium coating thickness, standard samples, equipment and means for measuring the environmental conditions, measurement procedures and so on. This standard applies to CANDU nuclear power plant fuel element cladding tube wall

graphite coating thickness measurement and support the bottom surface, the side of the isolation block Beryllium coating thickness measurements in a range of (0 ~ 30) μm .

2 Terms and definitions

The following terms and definitions apply to this standard.

2.1 The thickness of the equivalent standard thickness equivalent standard Under the same conditions, a substance of beta-ray backscatter count rate and zirconium tube wall thickness of certain graphite coating of beta-ray backscatter gauge Data rates are equal, then the substance is a graphite coating thickness equivalent standards.

2.2 Matrix substrate The coating material is coated directly.

3 Method summary

beta-ray radiation emitted by the source into the coating from the substrate and coating are backscattered part of the rays, these rays are Geiger - Maitreya Counter coating thickness will vary and there are different after receiving the count rate, thickness according to the received scattered count rate to display the corresponding Coating thickness.

4.1.1 Beryllium coating

4.1.1.1 making different thickness beryllium coating sample (bearing pad can be coated with beryllium samples can also be coated zirconium plate beryllium sample) 8 to

10 And an uncoated bearing pad.

4.1.1.2 Under the same conditions, with a coating thickness gauge scattering samples were measured count rates.

4.1.1.3 select two samples as a measure of the remaining samples by other methods (such as optical microscopy measurements) Measurement of Coating thickness.

4.1.1.4 According to the test results and make the corresponding scattering curves count rate and the coating thickness.

4.1.1.5 drawn two standard coating thickness measurements according to the curve, use one of them as a standard, as another validation criteria. Standard samples

4.1.2 Graphite coating

4.1.2.1 Production of graphite coating thickness of different samples (with zirconia coating as a graphite coating thickness equivalent standard, can also be stainless steel Materials such as the thickness of the equivalent standard) 8 to 10 and a non-coated zirconium tubes.

4.1.2.2 Press 4.1.1.2 ~

4.1.1.5 executed.

4.2 Calibration standard sample Verify calibration with standard equipment, and then measured using a standard thickness value, if you are using a standard thickness measurement value and the nominal value of the deviation $3\mu\text{m}$ within the scope of the use of the standard can be used.