

ICS 27.120.99

CCS F 24



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

GB/T 28548-2012

**Technical guideline for primary circuit hydraulic tests in nuclear
power plants**

核电厂主回路水压试验技术导则

Issued on: June 29, 2012

Implemented on: November 1, 2012

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine;
Standardization Administration of the PRC**

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Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules. This standard is proposed and managed by the China Electricity Council. This standard was drafted. Suzhou Thermal Power Research Institute Co., Ltd., Guangdong Nuclear Power Engineering Co., Ltd., Guangdong Power Research Institute, Zhejiang Electric Power Test & Research Institute, Sichuan power industry adjustment tests. The main drafters of this standard. Li Jing, Liu Yong, Yu Yang, Sun Jingyi, Cao Xinming, Xu Qisheng, Chang Wu Miao, Xu Bo, Li En, Chen Xiaowei, Sun Quanrong, YANG Yan bamboo. Nuclear factory owner loop hydrostatic test technical guidelines

1 Scope

China's national technical guideline for the hydraulic testing of the primary circuit of a nuclear power plant. It specifies the methods, the technical requirements and the acceptance criteria for the primary circuit hydrostatic test by which the integrity of the primary pressure boundary, and the quality of the manufacture and installation of the equipment forming it, are confirmed as adequate for long-term stable operation and for compliance with nuclear safety requirements. It applies to the first primary circuit hydrostatic test of a pressurised water reactor plant during the commissioning phase. The primary circuit is the boundary that holds the reactor coolant, and its failure is the initiating event that the whole design of the plant is arranged around. Before the reactor is loaded, that boundary is proved: the circuit is filled, vented, heated to a specified temperature and pressurised well above its operating pressure, held, and examined. It is the only occasion on which the completed circuit - vessel, steam generators, pressuriser, pumps, piping, welds, supports and every valve, instrument and drain connection on it - is loaded as one system by anyone. The test is also, by its nature, a single opportunity. It is performed once on a new plant, on a circuit that will never again be accessible in the same condition, and a fault found afterwards is found in a radioactive system. So the guideline covers the preparation of the circuit and its isolation, the water chemistry, the temperature to which the circuit must be brought before pressurisation and why, the rate of pressurisation and depressurisation, the hold periods, the examination during the hold, and the acceptance

criteria. Issued on 29 June 2012 and in force since 1 November 2012.

This standard specifies the PWR nuclear factory owner loop hydrostatic testing methods, technical requirements and acceptance criteria, confirmed after the main circuit pressure boundary Integrity and quality of equipment manufacturing and installation of quality to meet the long-term stable operation of the unit and nuclear safety norms. This standard applies to pressurized water reactor nuclear power plant for the first time to start the main loop hydrostatic test commissioning phase.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

GB/T 16702-1996 of PWR nuclear island mechanical equipment design specifications

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Overpressure protection device over-pressureprotectiondevice During the main loop hydrostatic testing, monitoring the main circuit system pressure and provide protection for the main circuit system devices.

3.2 Standard gauge standardpressuregauge Standard gauge for measuring the main circuit hydrostatic test pressure, the measurement range is generally 0 ~ 40MPa, accuracy is not less than 0.2.

4 Technical requirements of hydraulic test

4.1 Test pressure The pilot pressure requirements, shall be determined in accordance with appropriate technical specifications and should be consistent with GB/T 16702-1996 B5120 first chapter Regulations.

4.2 Test temperature The test temperature should in principle not be less than the brittle transition temperature of the material plus limits of 33 °C (TNDT 33 °C).

4.3 tightness test Should be implemented at least twice during the primary circuit pressure test leakage test, before the prescribed tightness test platform to test, should heat Discharging the operating system platform to conduct a preliminary test. Allow 4.4 "temperature - pressure" range Hydrostatic testing process, should boost rate control according to the requirements of the relevant technical specifications, down rate and temperature gradient.