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

DL/T 711-2019

Replacing DL/T 711-1999

Turbine regulation security system test guidelines

汽轮机调节保安系统试验导则

(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009 "Guidelines for Standardization Work Part 1: Standard Structure and Compilation".

Please note that certain contents of this document may involve patents. The issuing agency of this document is not responsible for identifying these patents.

This standard replaces DL/T 711-1999 "Guidelines for the Test of Steam Turbine Regulating and Control System", and is compared with DL/T 711-1999 except for editorial changes the main technical changes are as follows.

- a) The reference standard of the original standard has been updated;
- b) Some terms and definitions of the original standard have been updated;
- c) Deleted part of the specifications and requirements of the original standard for the pure hydraulic adjustment security system;
- d) Deleted the original standard test method for the pure hydraulic regulation security system;
- e) Added DEH simulation test when the unit is static;
- f) Added a new frequency modulation test;

g) Added the actual measurement and modeling test of the adjustment system parameters.

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the Power Plant Steam Turbine Standardization Technical Committee.

The revision unit of this standard. Xi'an Thermal Power Research Institute Co., Ltd.

The main revision of this standard. Zhang Yafu, Chen Kun and Wang Tao.

The time when this standard was first issued..1999.This standard is the first revision. This standard replaces DL/T 711-1999 from the date of implementation.

The opinions or suggestions during the implementation of this standard are fed back to the Standardization Management Center of China Electricity Council (No. 2 Baiguang Road, Beijing) no. 1, 100761).

Test Guidelines for Steam Turbine Regulating and Security System

1 Scope

This standard specifies the performance standards and test methods that should be met by the steam turbine regulating and security system.

This standard is applicable to the acceptance test of the electro-hydraulic regulating system of steam turbines driving generators in thermal power plants. For electro-hydraulic control system the related parts can be used as reference after transformation and industrial steam turbine.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB 2900.46 Electrical Terms Steam Turbine and Auxiliary Equipment GB/T 7596 Mineral turbine oil quality in power plant operation GB/T 22198 Steam Turbine Speed Control System Acceptance Test GB/T 30370 Primary Frequency Modulation Test and Performance Acceptance Guide for Thermal Power Generating Set DL/T 701 Terminology of Thermal Power Plant Automation DL/T 824 Guidelines for Performance Acceptance of Steam Turbine Electro-hydraulic Control System DL/T 892 Technical conditions of power station steam turbine DL/T 1235 Synchronous generator prime mover and its regulation system parameter measurement and modeling guide DL/T 1270 Unit load rejection test guidelines for thermal power generation construction projects DL 5190.3 Technical Specification for

Power Construction Construction Part 3: Steam Turbine Generator Set

3 Terms, definitions and symbols

3.1

The terms not listed in this standard shall meet the requirements of the national standard GB/T 2900.46.

3.2

The definitions of some professional terms in this standard refer to the provisions of DL/T 701 and DL/T 892.

3.3

The basic names, symbols and units are listed in Table 1.

3.4

The professional names and definitions are listed in Table 2.

5 Temporary speed rise

4.5 Maximum instantaneous speed $n_{\max}$ After the load rejection of the steam turbine generator set, the maximum instantaneous speed $n_{\max}$ of the steam turbine under the control of the regulating system shall not cause the emergency protector to operate.

4.6 Critical overspeed maximum speed $n_{w,\max}$ After the steam turbine loses load under the condition of uncontrollable regulation system, its critical overspeed maximum speed $n_{w,\max}$ shall not be greater than the rated speed 18%. The steam turbine rotor should be subjected to overspeed test in the manufacturer. The test speed should exceed 2% of the maximum calculated speed for critical overspeed.

When only limited by the emergency interrupting device, the maximum test speed shall not exceed 20% of the rated speed.

4.7 Overspeed protection system

4.7.1 When the overspeed protection control (OPC) is activated, the regulating steam valve is quickly closed, the unit does not trip, and its operating speed is generally the rated speed 103%.

4.7.2 When the electric overspeed protection is activated, the unit trips, and the electric overspeed action speed is generally 110% of the rated speed. Electric overspeed generally set DEH Electric overspeed, TSI electric overspeed or tachometer card electric overspeed have the same action value, and each channel should be tested separately.

4.7.3 When the mechanical overspeed protection is activated, the fly hammer or flying ring is hit, the unit trips, and the mechanical overspeed action speed is generally the rated

speed $110\% \pm 1\%$. The reset speed should be higher than the rated speed.

4.7.4 When the additional overspeed protection action unit trips, the action speed should be 1% to 2% higher than the emergency protector action speed, and the maximum should not be greater than the rated speed.

114% of the speed..

4.8 Steam valve closing time the recommended value of the total closing time t of the main steam valve, the regulating steam valve and the auxiliary steam valve is shown in Table 6 (the closing time of the auxiliary steam valve and the closing time of the regulating steam valve are required Seek agreement).

4.2.8 Closing time of the extraction check valve the total closing time of the extraction check valve directly connected to the steam turbine cylinder should be less than 1s.

5 Test preparation

5.1 Drawing up a test plan and organizing division of labor

5.1.1

Draw up a test plan and write a test outline, which includes. test purpose, test items, test methods, test procedures, test Conditions, precautions, safety measures and schedule.

5.1.2

Establish a test leading group, the test process is directed by one person, unified actions, clear division of labor, specific tasks, and strict positions Bright.

5.1.3

All parties participating in the assessment and acceptance test shall reach an agreement on the test methods, standards and accuracy of instruments and meters. For imported units Test methods and standards other than this method can also be used.

5.1.4

All parties participating in the test should clarify their responsibilities and jointly formulate the test program and test report.

5.2 Instruments and meters

5.2.1

The accuracy, frequency response and recording speed of recording (automatic recording) instruments and meters used in the test should meet the requirements of the measured object Requirements. It is best to use special instruments and meters.