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

DL/T 1766.2-2019

**Guide for the inspection of hydro-hydrogen-hydrogenated
steam turbine generators - Part 2:
(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".

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the Electric Power Industry Standardization Technical Committee (DL/T C09).

Drafting organizations of this standard. Datang Thermal Power Technology Research Institute, Datang International Power Co., Ltd. Douhe Power Plant, Shanghai Electric Power

Station Equipment Co., Ltd., Harbin Electric Machinery Co., Ltd., Dongfang Electric Co., Ltd., North China Electric Power Research Institute Co., Ltd., Inner Mongolia Datang Tuoketuo Power Generation Co., Ltd., Datang East China Electric Power Test Research Institute.

1 Scope

This standard specifies the technical requirements for the overhaul of the stator part of the water-hydrogen-hydrogen cooled turbo generator.

This standard applies to the overhaul of the stator of water-hydrogen-hydrogen-cooled turbo-generators of 200MW and above. Other capacity water-hydrogen hydrogen-cooled steam turbines for power generation the machine can be implemented by reference.

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

DL/T 298 Guidelines for Detection and Evaluation of Corona at the End of Generator Stator Winding
DL/T 607 Water and hydrogen leakage inspection of steam turbine generator
DL/T 970 Guidelines for abnormal and special operation and maintenance of large steam turbine generators
DL/T 1766.1-2017 Water-hydrogen-hydrogen-cooled turbo-generator overhaul guidelines Part 1: General
DL/T 1768 Preventive test procedures for rotating electrical machines
JB/T 6227 Hydrogen-cooled motor air tightness inspection method and evaluation

3 Term

The following terms and definitions apply to this document.

Water-hydrogen-hydrogen cooled turbo generator the stator winding adopts water internal cooling, the rotor winding adopts hydrogen internal cooling, and the stator core adopts a hydrogen-cooled turbo generator.

Troubleshooting run till failure; RTF Unplanned maintenance when the generator fails or fails.

[DL/T 1766.1-2017, definition 3.6] 3.3 A class maintenance Carry out a comprehensive inspection, diagnosis and repair of the generator stator, rotor and its auxiliary systems to maintain and restore the performance of the equipment and improve the reliability of the equipment.

[DL/T 1766.1-2017, definition 3.8] 3.4 B class maintenance refer to the A-level overhaul scope to check, diagnose and repair the components for the problems of the generator and

its auxiliary systems.

[DL/T 1766.1-2017, definition 3.9] 3.5 C class maintenance Generally, the generator and its auxiliary systems are inspected, diagnosed, and repaired with emphasis on the state of not pumping the rotor.

[DL/T 1766.1-2017, definition 3.10] 3.6 D class maintenance Eliminate deficiencies in generators and their auxiliary systems.

[DL/T 1766.1-2017, definition 3.11]

4 General

Before maintenance, technical data such as drawings, operation records, previous maintenance records and spare parts list of the generator should be prepared.

The evaluation of the stator condition before maintenance should include the following.

- a) Generator vibration assessment;
- b) Failure impact assessment;
- c) Impact assessment of abnormal operation;
- d) Evaluation of the temperature rise of each part of the generator stator;
- e) Hydrogen leakage from the generator (refer to DL/T 607 for calculation method);
- f) Hydrogen purity, frequency of hydrogen discharge and supplementation, and pollution discharge;
- g) Evaluation of accuracy of temperature measuring components;
- h) Trend analysis of hydrogen content in the fixed cold water tank;
- i) Data and alarm records of the online monitoring device;
- j) Conversion of operating hours of gas-fired units (refer to Appendix B in DL/T 1766.1-2017).

For generator base and/or bearing housing vibration exceeding the alarm value, the following principles should be followed.

- a) For generators with large vibrations in the frame and bearing housing, check the basic secondary grouting conditions based on the vibration data measured during operation.

Condition, seat plate vibration, end wear and core vibration isolation;

- b) For generators with large bearing seat vibration, the bearing shell and related installation dimensions, bearing seat and end cover, bearing shell and bearing seat ball Check the surface contact situation;

c) For generators with large stator frame vibration caused by rotor vibration, if the stator frame vibration is related to the load, it should be checked. Check the air gap between the rotor and the stator. If there is a correlation between rotor vibration and reactive load, the rotor should be strengthened. Check the winding circuit and short circuit between turns.

For generators that have experienced near-area short-circuits, lightning impulses, and single-phase grounding of the sending line, the following parts should be checked in the latest maintenance based on the evaluation results. Bit key check.

- a) The tightening of the end windings;
- b) The insulation integrity of the notch at the end;
- c) Inspection of insulated water pipes and catchment rings.

For generators operating under abnormal conditions, the maintenance of key components should be strengthened according to the evaluation results and the requirements in DL/T 970.

- a) For generators that frequently run in phases, the inspection of side cores, pressure fingers and pressure rings should be strengthened;
- b) For generators that have experienced severe out-of-step and de-excitation asynchronous operation, the inspection of the fastening of the stator winding ends should be strengthened. Focus Check looseness, wear, and changes in the dynamic characteristics of the end;
- c) For generators with frequent peak shaving operation, the tightening of the end windings, the tightening of the winding slots and the inspection of the iron core should be strengthened.

For units that have undergone capacity-increasing modification, the natural frequency at the end of the generator stator is within the range of the noticeable frequency value or the online monitoring of the vibration amplitude is large, the inspection of end fastening and wear should be strengthened.

The maintenance items corresponding to all levels of maintenance are shown in Appendix A, and maintenance items can be added when necessary.

When troubleshooting, based on the evaluation results, a comprehensive analysis of factors such as the scope of the fault, the maintenance time, and the importance of the equipment in the system should be determined to determine the Repair the project.

During the maintenance process, the records, identifications and numbers of the disassembled parts should be kept, and the newly replaced spare parts should be inspected and tested.

When entering the generator stator inspection and repair control area, the following