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

DL/T 932-2019

**Guide of operation and maintenance of the condenser and
vacuum system**

凝汽器与真空系统运行维护导则

(English Translation)

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Table of Contents

Foreword
1 Scope
2 Normative references
3 General
4 Operation and maintenance requirements
5 Operational monitoring and testing
6 Optimization of Cold End System Operation
7 Vacuum system failures and causes
8 Inspection and maintenance
Appendix A (Normative Appendix) Water quality requirements for condenser cooling pipes of different materials
Appendix B (informative appendix) Condenser operating characteristic supervision curve
Appendix C (informative appendix) Calculation of overall condenser heat transfer coefficient

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 932-2005 "Guidelines for Operation and Maintenance of Condenser and Vacuum System". Compared with DL/T 932-2005, except for editorial the main technical changes are as follows.

- Increase the operation and maintenance requirements of the vacuum pump;
- Added the main failure reasons of the vacuum pump;
- Increased the operation and maintenance requirements of the dual back pressure condenser.

This standard was proposed by the China Electricity Council.

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

Drafting organizations of this standard. Xi'an Thermal Power Research Institute Co., Ltd.,

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1 Scope

This standard specifies the general principles and requirements for the operation and maintenance of surface water condensers and vacuum systems for steam turbine generator sets in power plants.

This standard applies to water-condensing steam turbine generator sets.

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/T 5248 Copper and copper alloy seamless pipe eddy current testing method GB/T 7735 Steel pipe eddy current inspection method GB/T 12969.2 Eddy current inspection method for titanium and titanium alloy pipes DL/T 561 Water and Vapor Chemical Supervision Guidelines for Thermal Power Plants DL/T 581 Condenser rubber ball cleaning device and circulating water secondary filtration device DL/T 712 Guide for Selection of Materials for Condenser and Auxiliary Equipment Cooler Tubes in Power Plants DL/T 794 Guidelines for chemical cleaning of boilers in thermal power plants DL/T 1078 Operational performance test procedure for surface condenser

3 General

3.1

The design, manufacturing and installation units shall create conditions for the implementation of this standard, and create opportunities for the reliable and economic operation of condensers and vacuum systems.

Favorable conditions.

3.2

When the power plant compiles the operation regulations, the following technical data should be attached.

- a) The influence curve of unit back pressure on steam turbine heat rate;
- b) Curve of influence of unit back pressure on power generation;
- c) Condenser characteristic curve under off-condition;
- d) Operating characteristic curve of circulating water pump;

- e) The change curve of the performance of the pumping equipment and the cooling water temperature or working steam parameters;
- f) Water quality index requirements such as the oxygen content of condensate.

4.1 Condenser

4.1.1

The tightness of the vacuum system is qualified.

4.1.2

The condenser is clean in good condition.

4.1.3

The cooling water flow meets the design requirements.

4.1.4

The steam pressure of the shaft seal is normal.

4.1.5

The condensate subcooling is qualified.

4.1.6

The heat transfer end difference of the condenser is within the design range.

4.1.7

The condensate water quality is qualified.

4.1.8

The water level of the hot well is normal.

4.1.9

The pressure of the condenser is measured with an absolute pressure gauge, and there is no problem of water accumulation in the pressure measuring tube of the condenser.

4.1.10

After the unit is overhauled, the condenser and vacuum system should be filled with water for leak detection.

4.1.11

All welds on the condenser body are tight and leak-free.

4.1.12

The compensator connecting the condenser throat and the low pressure cylinder is tight and leak-free. When the rubber belt compensator is equipped with a water seal, the water

seal is intact.

4.1.13

All pipe welds connected to the condenser body shall be tight and leak-free.

4.1.14

The steam side drain valve of the condenser is tight and leak-free.

4.1.15

The cooling pipe has no perforation leakage.

4.1.16

The expansion joints and welds of the cooling pipe and the tube sheet of the water chamber shall be tight and leak-free.

4.1.17

The connection between the condenser water level gauge and the water level transmitter is tight and leak-free to ensure normal water level control and water level indication.

4.1.18

The action of the condenser water level switch is reliable.

4.1.19

The condenser water level should be within the normal working range.

4.1.20

The vacuum interlock protection is normal.

4.1.21

Appropriate anti-corrosion measures shall be taken for the condenser water chamber and tube sheet.

4.1.22

The water quality requirements for circulating cooling water should meet the relevant regulations in DL/T 561, and the cooling pipe flow rate requirements should meet the relevant regulations in Appendix A.

Regulations.

4.1.23

When the unit is out of operation for more than 3 days, the cooling water in the condenser water chamber and the condensed water in the hot well shall be drained in time after the unit is shut down.