

ICS 27.100
CCS F 23

DL

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

DL/T 2028-2019

**Directive for chemical cleaning of membrane equipment for
water treatment in power plant**

发电厂水处理用膜设备化学清洗导则

(English Translation)

Issued on: June 4, 2019

Implemented on: October 1, 2019

Issued by: National Energy Administration

Table of Contents

Foreword
1 Scope
2 Normative references
3 General
4 Technical requirements
5 Determination of chemical cleaning process conditions
6 Chemical cleaning process
7 Chemical cleaning quality indicators
8 Chemical Supervision in Chemical Cleaning
Appendix A
Appendix B

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 Power Plant Chemical Standardization Technical Committee (DL/T C13).

Drafting organizations of this standard. State Grid Hunan Electric Power Co., Ltd. Electric Power Research Institute, Datang Huayin Electric Power Co., Ltd., China University Tang Group Science and Technology Research Institute Co., Ltd. Northwest Electric Power Research Institute, State Grid Zhejiang Electric Power Co., Ltd. Electric Power Research Institute, Hunan Provincial Xiangdian Research Institute Co., Ltd.

1 Scope

This standard specifies the technical requirements, quality indicators and test methods for the chemical cleaning of ultrafiltration and reverse osmosis membrane equipment for water treatment in power plants.

This standard applies to the chemical cleaning of hollow fiber ultrafiltration membranes and roll-type reverse osmosis composite membranes for water treatment in power plants.

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 6904 Determination of pH in industrial circulating cooling water and boiler water GB 8978 Integrated Wastewater Discharge Standard GB/T 12151 Boiler water and cooling water analysis method turbidity determination (formazin turbidity)

3 General

3.1

The chemical cleaning of membrane equipment for water treatment in power plants should develop a cleaning plan, which should include safety, environmental, and occupational health protection measures.

And there are complete review and approval procedures; quality supervision should be carried out during the cleaning process; after the cleaning, the cleaning quality should be checked and accepted.

3.2

The cleaning unit shall provide technical and safety information and training for the personnel participating in the cleaning.

3.3

During the chemical cleaning process, the safety work regulations shall be followed, and environmental and occupational health and safety protection measures shall be implemented.

3.4

When the abnormal operation of membrane equipment leads to a decrease in water production, deterioration of effluent water quality or an increase in operating pressure difference, the reasons should be analyzed to determine whether to proceed Chemical cleaning.

3.5

Chemical cleaning should not cause irreparable damage such as oxidation, corrosion, mechanical scratches, etc. to membrane elements and auxiliary equipment.

3.6

When the membrane treatment equipment is out of service for a long time, it should be chemically cleaned before using the protective liquid for protection.

4.1 Chemical cleaning conditions of ultrafiltration membrane equipment

4.1.1

After standardization of the operating data, the water production volume will be reduced by 15% or more from the initial operating water production volume.

4.1.2

After standardization of the operating data, the transmembrane pressure difference will increase by 0.05 MPa from the initial operating transmembrane pressure difference or reach the value specified by the membrane manufacturer.

4.2 Chemical cleaning conditions of reverse osmosis membrane equipment

4.2.1

After the standardization of the operating data, the water production volume decreased by 10% or more from the initial operating water production volume.

4.2.2

After standardization of the operating data, the pressure difference between the sections will increase by 15% or more than the initial operating section pressure difference or reach the value specified by the membrane manufacturer.

4.2.3

After the operation data is standardized, the desalination rate will be reduced by 10% or more from the initial operation desalination rate.

4.3 Before chemical cleaning, a chemical cleaning plan should be prepared according to the fouling, and related test results of the membrane equipment. Chemical cleaning party the case shall comply with relevant standards and technical conditions of the membrane manufacturer.

4.4 Before chemical cleaning, the cleaning equipment should be isolated from other irrelevant equipment.

4.5 The preparation of cleaning agents should use the water produced by the equipment to be cleaned or demineralized water. The cleaning agent should be fully dissolved and mixed before entering the membrane module.

4.6 The chemical cleaning of membrane equipment should adopt a combination of multiple cleaning agents or alternate cleaning, and after cleaning each agent, the cleaning agent

should be drained, and then the cleaning agent should be used.

The washing equipment produces water or demineralizes water to flush the system clean.

4.7 After the chemical cleaning, the residual liquid and residue in the equipment should be removed, and the pipes such as the connecting pipes of thermal instruments and sampling pipes should be rinsed dry.

net.

4.8 Waste liquid from chemical cleaning should be treated and discharged in accordance with GB 8978 and local environmental protection requirements.

5 Determination of chemical cleaning process conditions

5.1

The reference formula of the cleaning medium is shown in Table 1 and Table 2. Special cleaning agents recommended by the membrane manufacturer can also be used.

5.2 Cleaning parameters

5.2.1

The pH value, temperature, pressure and flow rate of the cleaning fluid should meet the technical regulations of the membrane manufacturer.

5.2.2

The pH value should be controlled within 2~3 during pickling and 10~12 during alkaline washing. It can be adjusted with ammonia, sodium hydroxide or hydrochloric acid.

The pH of the lotion is within the specified range.

5.2.3

The temperature of the cleaning solution should be controlled at 30°C~35°C.

5.2.4

The cleaning pressure of ultrafiltration membrane equipment should be less than 0.3MPa; the cleaning pressure of reverse osmosis membrane equipment should be less than 0.4MPa.

5.3 The chemical cleaning of reverse osmosis membrane equipment can be divided into online chemical cleaning and offline chemical cleaning. On-line chemical cleaning should adopt segmented cleaning.

When the membrane element is seriously blocked and its performance cannot be restored by the online chemical cleaning, the membrane element should be removed for offline chemical cleaning.