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PEOPLE'S REPUBLIC OF CHINA**

DL/T 951-2019

**Guideline for the acceptance of reverse osmosis equipment for
water treatment in power plant
(English Translation)**

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A.1 Calculation of desalination rate

A.2 Calculation of recovery rate

Foreword

This standard is compiled in accordance with the requirements of GB/T 1.1-2009 "Guidelines for Standardization Part 1: Standard Structure and Compilation".

This standard replaces DL/T 951-2005 "Guidelines for Acceptance of Reverse Osmosis Water Treatment Equipment in Thermal Power Plants", and compared with DL/T 951-2005, except for the main technical changes besides the editorial modification are as follows.

- Modified the scope of application of the standard (see 1, 2005 version 1);
- Modified the normative reference documents (see 2, 2005 edition 2);
- Modified terms and definitions (see 3, 2005 edition of 3);
- Modified the requirements for the water production and desalination rate configuration of membrane elements (see 4.1.3, 4.3.2 of the 2005 edition);
- Deleted the provisions on the maximum inlet pressure requirements for the initial operation of reverse osmosis (see 4.3.3 in the 2005 edition);
- Modified the provisions of the security filter configuration requirements (see 4.1.4, see 4.4 in the 2005 edition);
- Added the requirements for the configuration of safety nets for reverse osmosis pressure vessels (see 4.1.6);
- Modified the low-pressure flushing requirements when reverse osmosis is shut down (see 4.1.7, see 4.6 of the 2005 edition);

- Modified the provisions of the configuration requirements for reverse osmosis pipelines (see 4.1.10, see 4.9 in the 2005 edition);
- Deleted the provisions on the configuration requirements of reverse osmosis dosing facilities (see 4.11 in the 2005 edition);
- Revised the requirements for materials for reverse osmosis pipelines and valves (see 4.2.3, see 5.3 in the 2005 edition);
- Increase the anti-corrosion requirements of reverse osmosis composite racks (see 4.2.5);
- Modified the requirements for hydraulic test, flushing and loading and unloading space (see 4.4.1, see 7.3.1 and 7.3.3 of the 2005 edition);
- Deleted the requirements of pipe connection and arrangement (see 7.3.5 of the 2005 edition);
- Added electrical safety assurance requirements (see 4.4.2);
- Increase the requirements of instrument range and accuracy (see 4.4.3);
- Deleted the definition of delivery acceptance (see 10.1 of the 2005 edition);
- Modified the performance parameters in Table 1 (see Table 1, see Table 1 in the 2005 edition);
- Added the performance requirements of energy recovery device (see 5.5.4);
- Added transport requirements for reverse osmosis water treatment equipment (see 6.3);
- Modified the requirements for storage of reverse osmosis water treatment devices and membrane elements (see 6.4, see 14.1 in the 2005 edition).

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction and interpretation of the Power Plant Chemical Standardization Technical Committee.

This standard was drafted. Xi'an Thermal Power Research Institute Co., Ltd. Shanghai Electric Power Institute State Grid Hunan Electric Power Co., Ltd. Electric Power Research Datang Huayin Power Co., Ltd.

1 Scope

This standard specifies the technical conditions and methods for acceptance of reverse osmosis water treatment devices in thermal power plants.

This standard applies to the acceptance of reverse osmosis water treatment equipment used in thermal power plants. Refer to this standard for reverse osmosis water treatment

devices for other purposes Quasi-acceptance.

2 Normative references

The clauses in the following documents become clauses of this standard after being quoted in this standard. All dated reference documents, only dated the version applies to this document. For undated references, the latest version (including all amendments) applies to this document.

GB 191 Packaging, Storage and Transportation Graphic Mark GB/T 5656 Technical Conditions of Centrifugal Pump (Class II) GB 6388 Transport packaging receipt and delivery mark GB 12348 Environmental Noise Emission Standard at the Boundary of Industrial Enterprises GB/T 13306 signs GB/T.20103 Membrane separation technical terms GB 50171 Specification for construction and acceptance of panel, cabinet and secondary circuit connection of electrical installation engineering GB 50235 Construction Code for Industrial Metal Pipeline Engineering DL/T 543 Guidelines for quality acceptance of water treatment equipment for power plants DL 5068 Code for chemical design of power plants

3 Term

The following terms and definitions defined in GB/T.20103 apply to this standard.

Spiral wound reverse osmosis membrane module One or several roll-type reverse osmosis membrane elements are connected in series according to certain technical requirements and assembled with a single reverse osmosis membrane shell.

Disk tube reverse osmosis membrane module it is composed of a disc tube diaphragm, a hydraulic deflector, an O-shaped rubber ring, a lip seal ring, a center rod and a pressure sleeve, which is used to handle high Membrane modules containing salt water.

Security filter cartridge filter the precision filtration equipment installed before the reverse osmosis body is used to filter the solid particles leaked by the pretreatment system to ensure the reverse osmosis membrane Security.

The common practice reverse osmosis equipment A reverse osmosis water treatment device using low-pressure reverse osmosis membranes, brackish water reverse osmosis membranes (including anti-fouling membranes) and other membrane elements.

The high pressure reverse osmosis equipment A reverse osmosis water treatment device using membrane elements such as seawater reverse osmosis membranes and dish-tube reverse osmosis membranes.

4.1 Configuration requirements

4.1.1

The reverse osmosis water treatment device includes a complete set from the inlet flange of the security filter to the reverse osmosis fresh water outlet flange.

Unit equipment. In addition, there is a reverse osmosis membrane chemical cleaning device and a reverse osmosis auxiliary dosing device.

4.1.2

The selection of reverse osmosis membrane elements should fully consider the water quality characteristics of the inlet water. When used in wastewater treatment, anti-pollution membranes should be used.

4.1.3

The selection of the type and quantity of reverse osmosis membrane elements should fully consider the influence of water temperature and the attenuation of membrane flux during use to ensure that the During use, it will not cause insufficient water production due to equipment design defects.

- a) The design value of the flux of the reverse osmosis membrane should not exceed the range of the flux of the corresponding model specified by the membrane manufacturer.
- b) The number of membrane elements should be able to ensure that the water production reaches the design value when running at the lowest design water temperature. When running at the highest design water temperature, the desalination rate reaches the design value.

4.1.4

The filtration accuracy of the security filter before the roll-type reverse osmosis membrane device is generally not less than 5 μ m.

The filter accuracy of the safety filter is generally not less than 10 μ m, the pressure difference should not be higher than 0.05MPa, and the filter element replacement cycle should not be less than 3 months.

4.1.5

The inlet high-pressure protection interlock of the reverse osmosis body and the inlet low-pressure protection interlock of the high-pressure pump should be equipped, and there should be a place to prevent reverse osmosis water.

A facility that forms an instant high-pressure impact on the reverse osmosis membrane when the treatment device is started.