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Code for design of industrial recirculating cooling water treatment

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1 General

1.0.1 In order to implement the national principles and policies of saving water resources, saving energy and protecting the environment, and make the design of industrial circulating cooling water treatment be technologically advanced, economical, practical, safe and reliable, this specification is formulated.

1.0.2 This specification is applicable to the design of industrial circulating cooling water treatment for new construction, expansion and reconstruction projects that use surface water, groundwater and recycled water as supplementary water.

1.0.3 The design of industrial circulating cooling water treatment should absorb advanced production practice experience and scientific research achievements at home and abroad, meet the requirements of safe production, environmental protection, energy saving and water saving, and facilitate construction, maintenance and operation management.

1.0.4 The design of industrial circulating cooling water treatment shall not only comply with this specification, but also comply with the current relevant national standards.

2.1.1 recirculating cooling water system

A water supply system that uses water as the cooling medium and runs in circulation, consisting of heat exchange equipment, cooling equipment, treatment facilities, water

pumps, pipelines and other related facilities.

2.1.2 surface water surface water

Refers to the water existing on the land surface exposed to the atmosphere, such as rivers, lakes, glaciers and swamps, excluding sea water.

2.1.3 open system open system

A general term for indirect cooling open and direct cooling systems.

2.1.4 indirect open recirculating cooling water system indirect open recirculating cooling water system

The circulating cooling water system with indirect heat transfer between the circulating cooling water and the cooled medium and the direct contact between the circulating cooling water and the atmosphere for heat dissipation is referred to as the indirect cooling open system.

2.1.5 direct open recirculating cooling water system

The circulating cooling water system in which the circulating cooling water is in direct contact with the cooled medium to exchange heat and the circulating cooling water is in direct contact with the atmosphere to dissipate heat is referred to as the direct cooling system.

2.1.6 Indirect closed recirculating cooling water system indirect closed recirculating cooling water system

The circulating cooling water system in which the circulating cooling water and the cooled medium indirectly transfer heat and the circulating cooling water does not come into contact with the atmosphere is referred to as a closed system.

2.1.7 Pharmacy chemicals

Various chemicals used in circulating cooling water treatment.

2.1.8 Total count of aerobic heterotrophic bacteria

The number of heterotrophic colonies per milliliter of water was counted by the bacterial plate count method, and the unit was CFU/mL.

2.1.9 Biological slime slime

A viscous substance in which microorganisms and their secreted mucus are mixed with other organic and inorganic impurities.

2.1.10 Biological slime amount slime content

The volume of biological slime contained in the circulating cooling water measured by the biological filter method, the unit is mL/m3.

2.1.11 fouling resistance

The numerical value of the decrease in heat transfer efficiency due to deposits on the heat transfer surface of the heat exchange equipment, in m2.K/W.

2.1.12 corrosion rate corrosion rate

The annual average corrosion depth calculated from metal corrosion weight loss, in mm/a.

2.1.13 Adhesion rate

The amount of dirt growth per month on the unit heat transfer surface of the heat exchanger, in mg/(cm2.month).

2.1.14 system water volume system capacity volume

The sum of all water volumes in the circulating cooling water system, in m3.

2.1.15 cycle of concentration

Ratio of circulating cooling water to make-up water salinity.

2.1.16 monitoring test coupon

Standard metal test strips placed in monitoring heat exchange equipment, test tubes or tower pools for monitoring corrosion.

2.1.17 prefilming

The process of circulating the pre-film liquid through the heat exchange equipment to form a uniform and dense protective film on the metal surface.

2.1.18 side stream

The part of water that is diverted from the circulating cooling water system and treated before returning to the system.

2.1.19 Permitted retention time of chemicals

The effective time of the agent in the circulating cooling water system.

2.1.20 amount of makeup water

It refers to the amount of water lost during the operation of the supplementary circulating cooling water system, and the unit is m3/h.

2.1.21 amount of blowdown

Under the condition of determined concentration multiple, the amount of water that needs to be discharged from the circulating cooling water system, the unit is m3/h.

2.1.22 Reclaimed water reclaimed water

After the sewage is treated, the water quality meets the water utilization requirements.

2.1.23 stability index stability index

Refers to the difference between twice the saturated pH of the water and the actual pH of the water. This is used to determine the corrosion or scaling tendency of the water.

2.1.24 scaling inhibition

Inhibit or delay the formation and growth of scale in the circulating cooling water system.

2.1.25 corrosion inhibition

Inhibit or delay the process of metal corrosion in the circulating cooling water system.

2.2 Symbols

A--cooling tower air flow rate (m3/h);

Ac--dosing amount of sulfuric acid (kg/h);

C--air dust content (g/m3);

Cmi--the content of a certain component in supplementary water (mg/L);

Cms--supplemented water suspended solids content (mg/L);

Crs - suspended solids content in circulating cooling water (mg/L);

Cri--the content of a certain component in circulating cooling water (mg/L);

Csi--the content of a certain component in the water after side stream treatment (mg/L);

Css--Suspended solids content in filtered water (mg/L);

Gf--dosing amount for the first time (kg);

Go-dosage of oxidizing biocide (kg/h);