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**Code for design of recirculating cooling water system in
chemical plant**

化学工业循环冷却水系统设计规范

(English Translation)

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1 General

1.0.1

In order to make the design of the circulating cooling water system in the chemical industry comply with national guidelines, policies, laws and regulations, unify the technical requirements for system design, achieve safety, reliability, advanced technology, reasonable economy, convenient management, and maintenance, and meet water-saving requirements, energy saving and environmental protection, labor safety and sanitation protection and other requirements, formulate this specification.

1.0.2

This code is applicable to the design of circulating cooling water system engineering of new construction, expansion and reconstruction of chemical engineering projects.

1.0.3

The design of the circulating cooling water system in the chemical industry should actively and steadily adopt effective new processes, new technologies, new equipment and new materials on the basis of continuously absorbing domestic and foreign advanced technologies, summarizing production practice experience and scientific experiments.

1.0.4

The design of the chemical industry circulating cooling water system project shall not only implement this specification, but also comply with the current relevant national standards.

2.0.1 Recirculating cooling water system

A water supply system that uses water as the cooling medium and circulates, consisting of heat exchange equipment, cooling facilities (equipment), treatment facilities, water pumps, pipelines and other related facilities.

2.0.2 indirect open recirculating cooling water system indirect open recirculating cooling water system A circulating cooling water system in which the circulating cooling water and the cooled medium indirectly transfer heat and the circulating cooling water directly contacts the atmosphere to dissipate heat.

2.0.3 Indirect closed recirculating cooling water system indirect closed recirculating cooling water system Circulating cooling water and cooling medium indirect heat transfer and circulating cooling water and cooling medium are also indirect heat transfer circulating cooling water system.

2.0.4 Direct open recirculating cooling water system

The circulating cooling water system is a 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.

2.0.5 Secondary water secondary water

After the first use, the water quality can meet the water reuse without treatment.

2.0.6 Wet cooling tower wet cooling tower

A cooling tower in which water and air are in direct contact, and heat and mass exchange are performed simultaneously to lower the water temperature.

2.0.7 Dry-wet cooling tower

A cooling tower that combines the functions of air cooling and wet cooling towers.

2.0.8 Natural draft cooling tower natural draft cooling tower

The cooling tower that provides the air flow power in the tower by the draft force formed by the difference in air density inside and outside the tower.

2.0.9 Mechanical ventilation cooling tower

The power of the air flow in the tower is the cooling tower provided by the ventilation machinery (fan).

2.0.10 Counter-flow cooling tower

The air enters the tower from the air inlet at the lower part of the tower, and exchanges heat with the water flowing from the upper part of the tower to reduce the water temperature.

2.0.11 Cross-flow cooling tower cross-flow cooling tower

The air enters the tower horizontally from the air inlet of the tower, and passes through the packing perpendicular to the water flow direction to reduce the water temperature of the cooling tower.

2.0.12 Water spray packing

It is installed in the cooling tower, so that there is sufficient contact time and area between water and air, which is conducive to the filling material of heat and mass exchange.

2.0.13 Net area of water drenching

The cross-sectional area of the beam and column area deducted from the top of the cooling tower spray fill.

2.0.14 Water eliminator drift eliminator

It is a device installed in the cooling tower to recover the liquid water (water droplets, water mist) entrained in the tower airflow.

3.1 General provisions

3.1.1

The design of the circulating cooling water system shall include the division of the system and the layout of the circulating cooling water device area, the design of the circulating water cooling facilities, the design of the circulating cooling water water quality treatment,

the design of the circulating cooling water pumping station, the design of the water transmission and distribution pipe network and the design of supporting facilities.

3.1.2

The design of the circulating cooling water system should be based on the water balance plan of the whole plant, making full use of reclaimed water and reducing the consumption of water resources.

3.1.3

The design of circulating cooling water system shall meet the following requirements.

- 1 It shall meet the requirements of the heat exchange working condition of the production device;
- 2 For process heat exchange equipment with large differences in water temperature, water quality or water pressure requirements, circulating cooling water systems should be installed separately; for individual heat exchange equipment with high water pressure requirements, local pressure boosting measures should be adopted;
- 3 The production process requires that the devices or units that cannot interrupt the circulating cooling water supply shall have safe water supply guarantee measures.

3.1.4

The design water volume of the circulating cooling water system shall be calculated according to the normal hourly water consumption of process production equipment and auxiliary production equipment, and shall be checked by the maximum hourly water consumption.

3.1.5

The design water supply temperature of the indirect cooling open type and direct cooling open type circulating cooling water system shall be determined by thermodynamic calculation according to the water supply temperature allowed by the production process and combined with the meteorological conditions of the plant construction area.

3.1.6

The water supply temperature of the intercooled closed circulation cooling water shall be determined according to the requirements of the production process and combined with the temperature of the cooling medium.

3.1.7

The expansion tank of the intercooled closed system shall have functions such as nitrogen automatic pressure regulation, water level detection, automatic water replenishment and discharge, and prevention of air entering the system.