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**Technical requirements of dry process cement production
complete equipment - Part 6: Desulphurization system**

新型干法水泥生产成套装备技术要求 第6部分：脱硫系统

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1 Scope

This document specifies the classification, composition, technical requirements, safety and environmental protection, installation acceptance and commissioning, performance testing and delivery documents of the desulphurization system of complete equipment for new dry process cement production.

This document applies to the design, manufacture, installation acceptance and performance testing of the desulphurization system within complete equipment for new dry process cement production.

3 Terms and definitions

3.1 wet desulphurization system: a system that achieves desulphurization by a process in which the absorbent enters the desulphurization system in solid form and the desulphurization by-product returns to the production system in a dry state.

3.2 compound desulphurization system: a system that achieves desulphurization by a process in which the absorbent enters the desulphurization system in a combination of solid and liquid form and the desulphurization by-product returns to the production system in a dry state.

3.3 dry desulphurization system: a system that achieves desulphurization by a process in which the absorbent enters in a dry state and reacts with SO₂, the desulphurization by-product being in a dry state.

4 Classification and composition

4.1 Desulphurization systems are divided into wet desulphurization systems, compound desulphurization systems and dry desulphurization systems.

4.2.1 A wet desulphurization system consists of desulphurizing agent preparation equipment, desulphurization equipment, water supply equipment, by-product treatment equipment, slurry discharge and recovery equipment, and waste water treatment equipment.

4.2.2 A compound desulphurization system consists of a desulphurizing agent silo and a feeding device.

4.2.3 A dry desulphurization system consists of a desulphurizing agent silo and a conveying device.

5 Technical requirements

5.1.1 The wet desulphurization system shall comply with GB 51284 and HJ 179.

5.1.2 Equipment in the wet desulphurization system that comes into contact with slurry shall have a corrosion protection function.

5.1.3 Equipment in the compound desulphurization system that holds corrosive liquid shall have a corrosion protection function.

5.1.4 The dry desulphurization system shall comply with GB/T 19229.2.

5.1.5 Steel structures shall comply with GB 50205. Steel ladders, platforms and guardrails shall comply with GB 4053.1, GB 4053.2 and GB 4053.3. Welded parts shall comply with JC/T 532. Machine painting and rust prevention shall comply with JC/T 402. The packaging, transport and storage of the equipment and its parts shall comply with JC/T 406.

5.1.10 Centrifugal pumps used in the desulphurization system should be provided in two sets, one in service and the other on standby.

5.2.1 The performance requirements of the desulphurization system shall comply with Table 1. Table 1 sets, for each of the three types, the flue gas handling capacity in units of ten thousand cubic metres per hour, which runs from 10 to 150 for the wet single-tower, the compound and the dry system alike; the SO₂ concentration before desulphurization, referred to the standard state, dry basis and 10 percent oxygen, which is not greater than 5 000 for the wet system, not greater than 2 000 for the compound system and not greater than 600 for the dry system; the SO₂ concentration after desulphurization on the same basis, in milligrams per cubic metre, which is 0 to 35 for the wet and the compound systems and 5 to 100 for the dry system; the water consumption in tonnes per hour, 5 to 35 for the wet system and 0.4 to 2.5 for the compound system, water consumption not being a requirement for the dry system; the electricity consumption in kilowatt hours per tonne, 0.5 to 50 for the wet system and 0.05 to 0.1 for the compound and dry systems; and the calcium to sulfur molar ratio, 1.02 to 1.05 for the wet system and less than 10 for the dry system, this ratio not being a requirement for the compound system. A continuation row of Table 1 fixes the mass ratio between desulphurizing agent consumed and SO₂ removed, separately for the solid agent and for the liquid agent; the OCR of that row does not allow each figure to be attached to its column with certainty, so the figures are not reproduced here. A note states that a dash marks an item that is not a requirement.

5.2.2 The desulphurization efficiency of the system shall satisfy what the contract provides.

5.3.1 Desulphurizing agent preparation equipment consists of a reclaiming device or silo, a slurry preparation tank and centrifugal pumps. Preparation shall comply with JB/T 14499, the silo with NB/T 47003.2 and the centrifugal pumps with GB/T 5656. The slurry preparation tank shall be fitted with an agitator complying with HG/T 20569.

5.3.2.1 The desulphurization equipment consists of the desulphurization tower, circulating pumps, oxidation air blowers, a sump and return equipment.

5.3.2.2 The desulphurization tower shall comply with JB/T 12537 and NB/T 47003.1.

5.3.2.3 Within 2 m of the inlet, the tower flue duct should be faced with stainless steel plate whose material properties shall not be lower than those of 022Cr23Ni5Mo3N (S22053) in

GB/T 4237-2015.

5.3.2.4 The tower inlet flue duct shall be fitted with an emergency water spray cooling device. The tower outlet flue duct shall be fitted with a drainage device. The flue damper of the tower shall comply with JB/T 10992.

5.3.2.7 The mist eliminator of the tower shall comply with JB/T 10989, the spray pipes with JB/T 10991 and the nozzles with JB/T 10964. The tower should use a side-entry agitator complying with JB/T 10983, slurry circulating pumps should be slurry centrifugal pumps complying with JB/T 11834, oxidation air blowers should be Roots blowers complying with JB/T 8941.1, and the oxidation air ducts shall comply with JB/T 11264.

5.3.2.17 Slurry piping of the wet desulphurization system should be rubber-lined carbon steel, glass fibre reinforced plastic or duplex stainless steel; rubber-lined carbon steel piping shall comply with HG 21501, glass fibre reinforced plastic piping with HG/T 21633, and duplex stainless steel piping with GB/T 21833.2.

5.3.3.3 The capacity of the water supply tank shall be not less than one hour of system water consumption.

5.3.4.1 By-product treatment equipment consists of centrifugal pumps, hydrocyclones and a vacuum belt dewatering machine; the hydrocyclones shall comply with JB/T 10984 and the vacuum belt dewatering machine with JB/T 10982.

5.3.5.2 The desulphurization system shall be provided with one emergency slurry tank.

5.3.6.2 Desulphurization waste water treatment equipment shall comply with JB/T 11392; the settling tank and the water tank should be of steel construction.

5.4 The compound desulphurizing agent consists of a solid agent and a liquid agent. The solid agent silo should be a steel silo complying with NB/T 47003.2, with a bag filter complying with JB/T 11642 on top and a screw feeder complying with JB/T 11933 as the feeding device. The liquid agent silo should be an atmospheric vessel complying with NB/T 47003.1, fed by a centrifugal pump complying with GB/T 5656.

5.5 In the dry desulphurization system the agent silo should be a steel silo complying with NB/T 47003.2, with a bag filter complying with JB/T 11642 on top and a screw feeder complying with JB/T 11933 as the conveying device. Equipment insulation shall comply with GB 50264.

5.6.4 The energy efficiency class of the motors shall meet class 2 of Table 1 of GB 18613-2020.

5.6.8 The desulphurization system shall use a distributed control system, whose network security shall comply with GB/T 33009.1.

5.6.9 The control parameters of the wet system shall include the inlet and outlet temperature, the level, the pH and the mist eliminator differential pressure of the tower, the