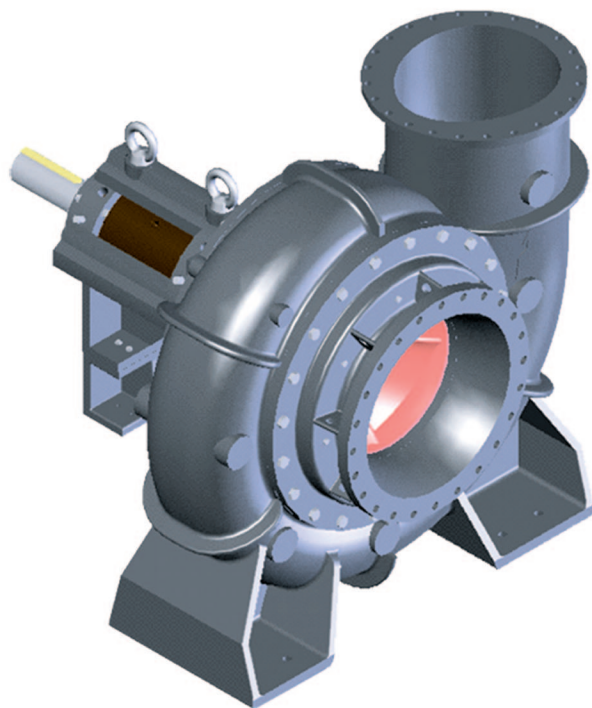


GSD INDUSTRIAL CO., LTD.

DS

系列脱硫循环泵



川源股份有限公司

用途

DS系列脱硫循环泵主要应用于火力发电厂的烟气脱硫系统，是世界目前应用最为广泛的FGD湿法脱硫工艺中石灰石-石膏法的吸收塔浆液洗涤循环泵。

电厂脱硫工艺简介

电厂燃烧后脱硫(FGD)占脱硫总量的98%以上，而石灰石-石膏工艺脱硫效率高，技术成熟，应用最广，约占85%左右。火力发电站的烟气脱硫系统的脱硫过程，首先从锅炉流出的原烟气温度较高(150~180℃)，经过气-气换热装置(GGH)进行降温，通过增压风机输送到吸收塔，原烟气在吸收塔内自下而上的流动与从吸收塔上部喷射的石灰石-石膏浆液混合液液滴进行大面积比的逆流接触反应，完成对SO₂的洗涤吸收。经过吸收后的净烟气，再经过除雾器、气-气换热装置(GGH)升温(80℃左右)，从烟囱排出到大气中。具体的流程见下图。

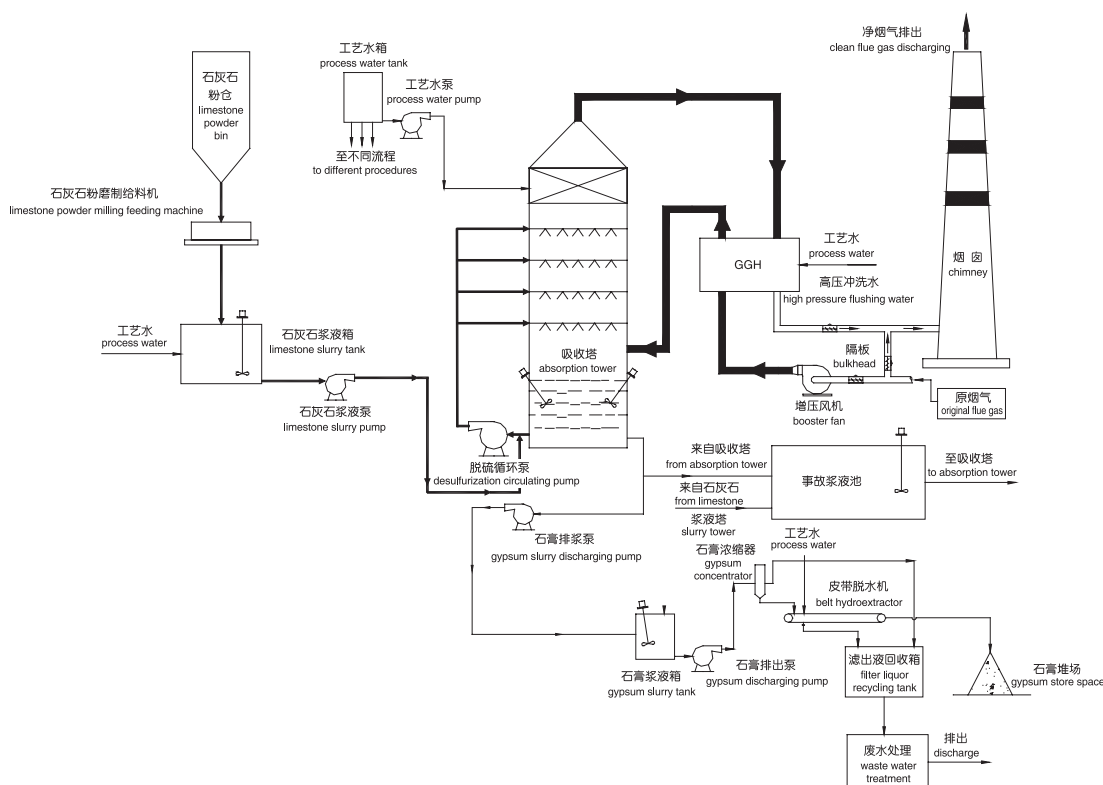
APPLICATION

The DS series desulfurization circulating pump is mainly applied to the flue gas desulfurization system in steam power plant, which is the slurry washing circulating pump of absorption tower of the most widely used limestone-gypsum method of FGD wet desulfurization process currently in the world.

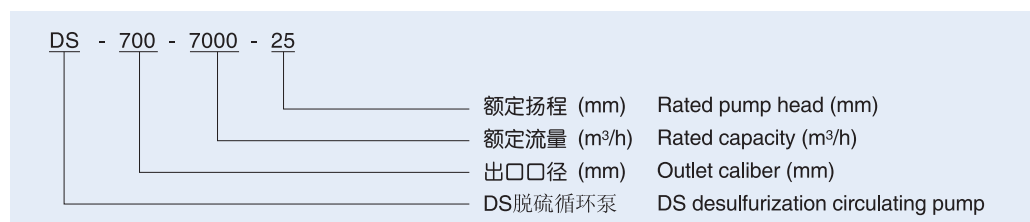
BRIEF INTRODUCTION OF DESULFURIZATION PROCESS IN POWER PLANT

The flue gas desulfurization (FGD) after combustion in power plant accounts for more than 98% of the total quantity, while that of the limestone-gypsum desulfurization process is about 85%, which is of high efficiency and most wide application. The temperature of original flue gas from the boiler during desulfurization process of the flue gas desulfurization system in steam power plant is higher (150~180℃), which is lowered by the gas-gas heat exchanger (GGH). The original flue gas then shall be transported to the absorption tower, which shall flow from upper to down to carry out the counter-flow contact reaction with the limestone-gypsum mixed slurry jetted from the upper party of the absorption tower to accomplish the absorption of SO₂. The clean flue gas after absorption shall be heated up by through the demister and gas-gas heat exchanger (GGH), which then shall be discharged to atmosphere from chimney. Detailed procedures refer to the following diagram.

石灰石-石膏湿法烟气脱硫工艺流程图
Flow Diagram of Limestone-gypsum Wet Flue Gas Desulfurization Process



型号说明 TYPE DESCRIPTION



结构特点

1. DS脱硫泵的水力设计采用两相流动理论，应用CFD流体模拟分析技术，使其设计符合流动规律，运行可靠、使用寿命长、运转效率高。
2. 为了增加泵体的承压能力，在泵体的外围增加了宽大的加强筋板。
3. 泵体支脚采用大支脚支撑，对于大型泵的蜗壳不对称问题，采用了偏心设计支撑面，保证泵的平稳、可靠、安全支撑。
4. 泵为单级、端吸、切向吐出蜗壳式离心泵；适合输送耐磨、耐蚀性浆体，高效区宽，该结构形式泵在实际应用已经证明是非常适用FGD吸收塔脱硫浆液循环使用。
5. 机械密封腔设计为锥形结构，内设置旋流分离槽，能够有效防止介质沉淀，加速介质的流动，有效散失机械密封产生的热量，改善机封的工作环境，延长机械密封使用寿命。
6. 悬架支架采用短结构，增加支架的支撑刚性，保证泵的平稳可靠运行。
7. “后拉式”悬架结构且采用加长膜片联轴器，拆卸、维护方便，特别对更换机械密封等易损件不用拆卸管路与电机即可以完成。同时膜片联轴器轴向调节余量大，动平衡性能好，抗冲击能力强，传递扭矩大，泵运转平稳、安全。
8. 轴承部件采用轴承体和轴承架配合，可以进行轴向调节，可以保证叶轮端面磨损后，调节叶轮端面间隙，始终保持泵在高效区运行。
9. 轴承采用高承载能力轴承组合，稀油润滑，大油池设计，可以保证轴承的长使用寿命。为了保证油品消耗后得到及时补偿，在轴承体上设计了在线补偿润滑油的恒位油杯，可以对润滑油的损耗进行及时自动补充。
10. 轴承温升，采用铂热电阻进行温度测定，在线检测轴承温度，实现远程监控。
11. 叶轮、护板采用经济密封倾角，增强密封效果，减小冲刷磨损，延长转子轴向调整周期。
12. 叶轮、前后护板采用高耐蚀、耐磨双相组织的高铬材料Cr30，同时为提高其性能加入相应稀有金属和稳定元素，亦经过循环热处理，以保证其在该系统工况下的长寿命；泵体、吸入盖材料为耐磨、耐腐蚀超低碳含氮双相不锈钢

STRUCTURE FEATURES

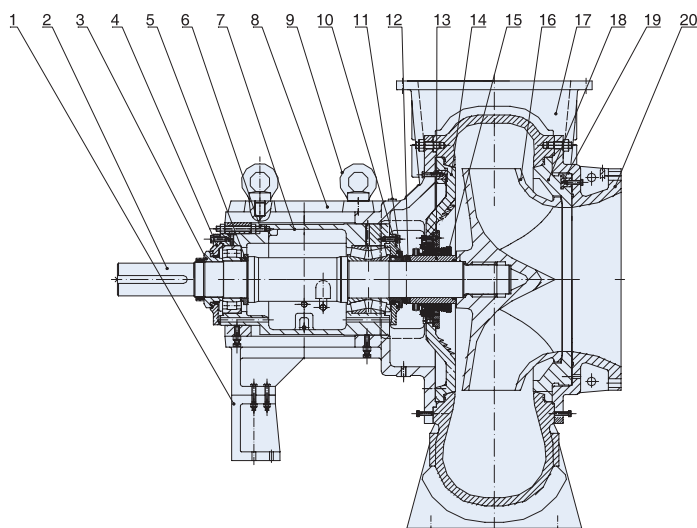
1. The two-phase flow theory and CFD fluid simulation analysis technique are applied for the design of hydraulic power of DS desulfurization pump, which make the design conforming to the flow rules and enable stable operation, long service life and high rotation efficiency.
2. The large stiffening plate shall be set up in the periphery of pump body to strengthen the bearing capacity of pump body.
3. Large bracket bearings shall be applied for the bracket bearings of pump body. And the eccentric supporting surface shall be applied to deal with the problem of asymmetrical spiral casing of large-scale pump to insure the stability, reliability and safe supporting of pump.
4. The pump is a single-stage, end suction, tangential discharge volute centrifugal pump, which is applicable for conveying wear-proof and corrosion proof slurry with wide area of high efficiency. It has been proved in practical application that the pump of this structure is very suitable for FGD absorption tower desulfurization slurry circulating.
5. The mechanic seal cavity is designed to be conical structure, inside which the cyclone separating groove is set up, which shall effectively avoid medium precipitation, speed up medium flow, effectively disperse the heat generated by mechanic seal, improve working environment of mechanic seal and prolong the service life of mechanic seal.
6. The short structure is applied for suspension bearing to increase the supporting rigidity and insure stable and reliable run of pump.
7. The diaphragm coupling is applied for the "pull-back-type" suspension structure, which is easy to remove and maintained. The pipe circuits and motor are unnecessary to be removed when replacing quick-wear parts, such as mechanic seal etc. At the same time, the adjusting space of shaft direction of diaphragm coupling is large. It is of good dynamic balance, strong resistance to shock and stable and safe pump operation.
8. The coordination of bearing body and bearing pedestal is adopted for the bearing part, by which can adjust the shaft direction and adjust end clearance of impeller after wear-out to keep the pump operating in the high-efficient region all the time.
9. The bearing group with high bearing capacity is adopted by the bearing, which is of oil lubrication and for which the large oil pool is designed, which can insure long service life of bearing. In order to insure timely refill of oil after consumption, the constant level oil cup for on-line refilling lubricating oil is designed from the bearing body, by which the automatic refilling shall be carried out for consumption of lubricating oil.
10. The temperature rise of bearing shall be measured by the platinum thermal resistance. And the bearing temperature shall be inspected on-line that the remote supervision is realized.
11. The economic sealing angle of inclination is applied for the impeller and guard board to strengthen the sealing effect, reduce abrasion caused by flushing and extend adjusting period of shaft direction of rotor.
12. The impeller and front and back guard board are made of high corrosion proof and wear proof duplex structure high chromium Cr30. At the same time, the rare metal and stable elements are added in order to heighten its performance and it has received

- CD4MCu，经过严格多循环热处理，其组织细密，性能优异。适用于氯离子浓度最高可达80000ppm，温度可为70℃以下的腐蚀性和磨蚀性的石灰—石膏混合浆溶液。
13. 泵配有单端面、静止型、无冲洗（或间断性冲洗）密封，使用寿命在8000h以上。
 14. 转子为刚性轴系，轴径充裕，低的悬臂比，运转可靠、稳定。

the thermal circulating treatment to insure long service life under this working condition. The material of pump body and suction cover is the wear proof and corrosion proof super low carbon nitric duplex stainless steel CD4MCu and it has received multiple circulating heating treatment that it is of fine structure and excellent performance. It is applicable for the wear proof and corrosion proof limestone- gypsum mixed slurry solution with the concentration of chloride ion of at most 80000ppm under the temperature of lower than 70℃.

13. The pump is equipped with a single-end, static and non-flushing seal, the service life of which shall be longer than 8000h.
14. The rotor is of rigid shafting. The shaft diameter is sufficient. The low cantilever rate enables reliable and stable operation.

结构简图及材质 CONSTRUCTION AND MATERIAL



No.	名称 Name	材质 Material
1	支架 Support	QT500-7
2	轴 Shaft	45
3	后迷宫套 Back labyrinth seal	QT500-7
4	后端盖 Back end cover	QT500-7
5	拆卸垫圈 Removing gasket	45
6	调节螺栓 Adjusting bolt	
7	轴承体 Bearing body	QT500-7
8	轴承架 Bearing pedestal	QT500-7
9	吊环螺钉 Ring screw	
10	前端盖 Front end cover	QT500-7
11	前迷宫套 Front labyrinth seal	QT500-7
12	拆卸环 Removing ring	
13	轴套 Shaft sleeve	45
14	后护板 Back guard board	Cr30
15	机械密封 Mechanic seal	SiC
16	叶轮 Impeller	Cr30
17	泵体 Pump body	CD4MCu
18	前护板 Front guard board	Cr30
19	预制件 Prefabricated part	CD4MCu
20	吸入盖 Suction cover	CD4MCu

三维结构图 THREE-DIMENSIONAL STRUCTURE DIAGRAM

