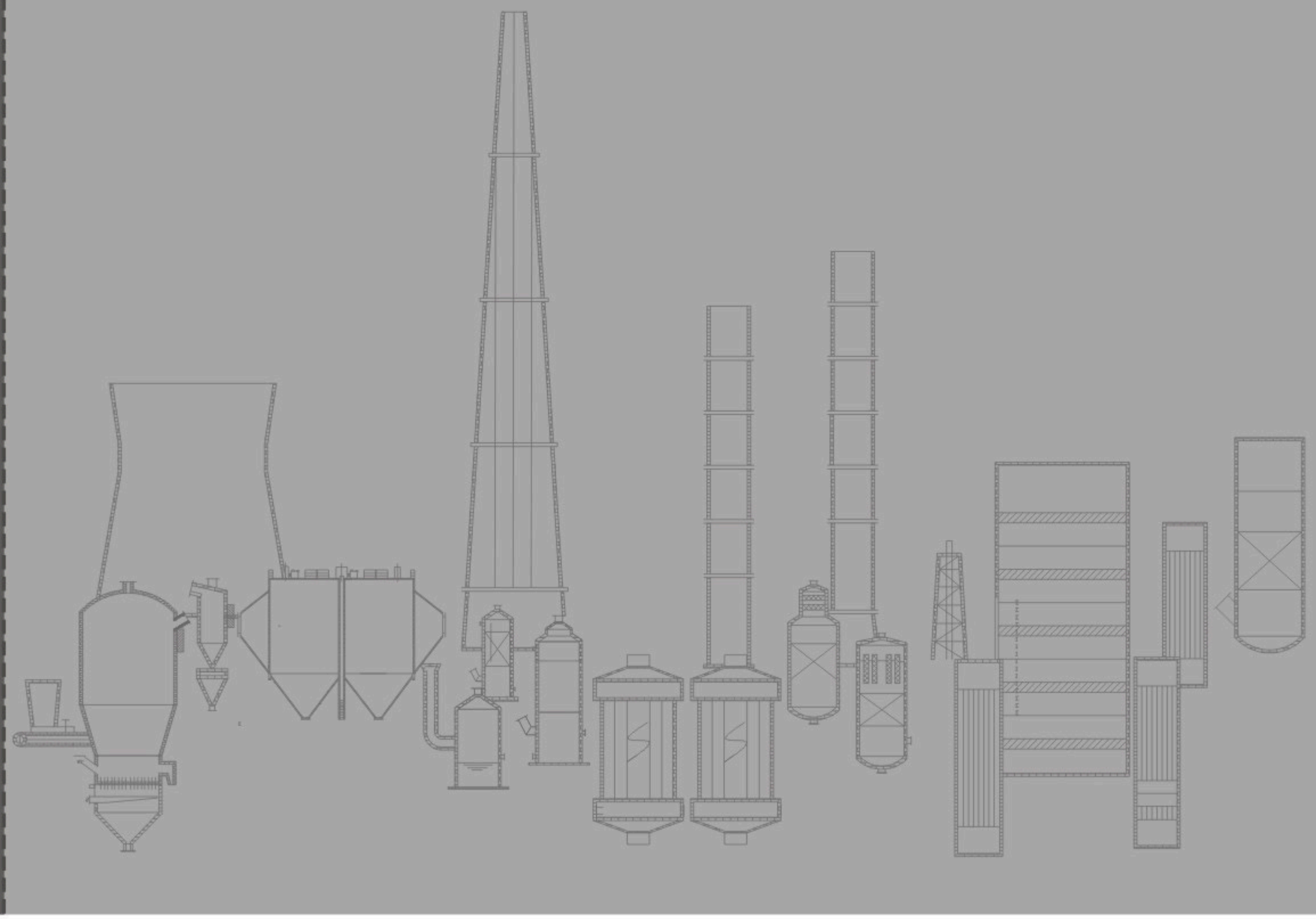
青岛哈纳斯环保设备有限公司

QINGDAO HANASI ENVIRONMENT EQUIPMENT CO.，LTD

HANASI™

工业烟气处理

Industrial flue gas treatment



设计助你成功

Designing your success

Company Profile

Qingdao Hanasi Environment Equipment Co., Ltd., founded in 2002, is a collection of environmental protection equipment research and development, design, manufacturing, maintenance, sales, as one of the science and technology modern production enterprises, to provide enterprises with professional engineering consulting, program design, equipment manufacturing, equipment maintenance and transformation and other precision services. The company has always adhered to the enterprise research and development as the center, strengthened close cooperation with research institutes and colleges and universities, and actively carried out industry-university-research, and has obtained a number of national authorized patents. In October 2013, we obtained the project certificate issued by the Technology Innovation Fund Management Center for Small and Medium-sized Enterprises of the Ministry of Science and Technology of the People's Republic of China. On December 12, 2013, we obtained the high-tech enterprise certificate jointly issued by Qingdao Science and Technology Bureau, Qingdao Finance Bureau, Shandong Provincial State Taxation Bureau and Qingdao Local Taxation Bureau. According to the national "Twelfth Five-Year Plan" policy requirements, the company independently developed and designed a wet fast-flow electrostatic precipitator, which realizes the effective treatment of PM2.5, aerosols and gas transparency in the atmospheric volume and low-concentration flue gas exhaust of large enterprises, and can fully meet the environmental protection standards required by the national Twelfth Five-Year Plan. The company has always followed the guidance of "science and technology is the primary productive force", in line with the practical and diligent professionalism, integrity and honesty of the business philosophy, and strive to build a science and technology research and development first, equipment manufacturing and maintenance, efficient and accurate pre-sales and after-sales service based on the modern production enterprises of science and technology.

Table of Contents

Company Honors


正本

中国硫酸、磷肥行业设备服务网

资质证书

证书编号：磷硫设资证第095号

青岛哈纳斯环保设备有限公司：

经考核，你单位具备中国硫酸、磷肥行业设备制造、施工安装、专业产品供应资格。

特此发证。

中国硫酸工业协会 中国磷肥工业协会

二〇一四年五月

注：1.此证一式六份，一正本、五副本，复印无效。
2.有效期：二〇一四年五月至二〇一七年五月


高新技术企业

证书

企业名称：青岛哈纳斯环保设备有限公司　　证书编号：GR201637100251

发证时间：2016年12月2日　　有效期：三年

批准机关：


CHEMCHINA
中国化工集团公司

供应商证书

Supplier Certificate

青岛哈纳斯环保设备有限公司

Hereby we certify that the company mentioned above is
兹认定贵单位进入中国化工集团
qualified and listed in ChemChina Project Management
公司供应商管理库，可为我下属企业
Information System (PMIS), which can supply registered
提供核准产品。
products to our subsidiaries.

颁发机关：
Authorized by:

有效期：2009年8月至2010年9月
Valid date: From 2009.8 to 2010.9


会员证　中国硫酸协证字第 558号

青岛哈纳斯环保设备有限公司：

经审核批准你单位为中国硫酸工业协会会员

特发此证

中国硫酸工业协会

二〇一三年六月


实用新型专利证书

局长 田力普


实用新型专利证书

局长 田力普


实用新型专利证书

局长 田力普


实用新型专利证书

局长 田力普

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认证证书

青岛哈纳斯环保设备有限公司

根据贵组织的申请，经本中心依据《质量管理体系 要求》（GB/T19001-2008 idt ISO9001:2008）规定实施认证审核，经评定，建立的质量管理体系符合标准要求。

通过认证的范围为：

脱硫装置、硫酸生产设备（净化装置、尾气处理装置）、用气设备的生产。

北京恩格威认证中心

CNAS

IAF

科技型中小企业技术创新基金

立项证书

承担单位：青岛哈纳斯环保设备有限公司

项目名称：湿式速流型电除雾器装置的研制及产业化

项目类别：技术创新项目

立项代码：13C26213713629

批准文号：国科发计〔2013〕583号

执行期限：2013年10月—2015年9月

INNOFUND 创新基金支持项目

二〇一三年十月

BLUESTAR

指定供应商

青岛哈纳斯环保设备有限公司

为中国蓝星(集团)总公司指定供应商

核准为中国蓝星及下属企业提供核准产品

有效期截止：2008年7月至2009年9月

中国蓝星(集团)总公司 颁

青岛市环境保护产业协会

会员证书

编号：QHCY—0097

青岛哈纳斯环保设备有限公司 为青岛市环境保护产业协会 会员 单位，特发此证。

有效期：自2009年4月1日起

至2013年3月31日止

二〇〇九年四月一日

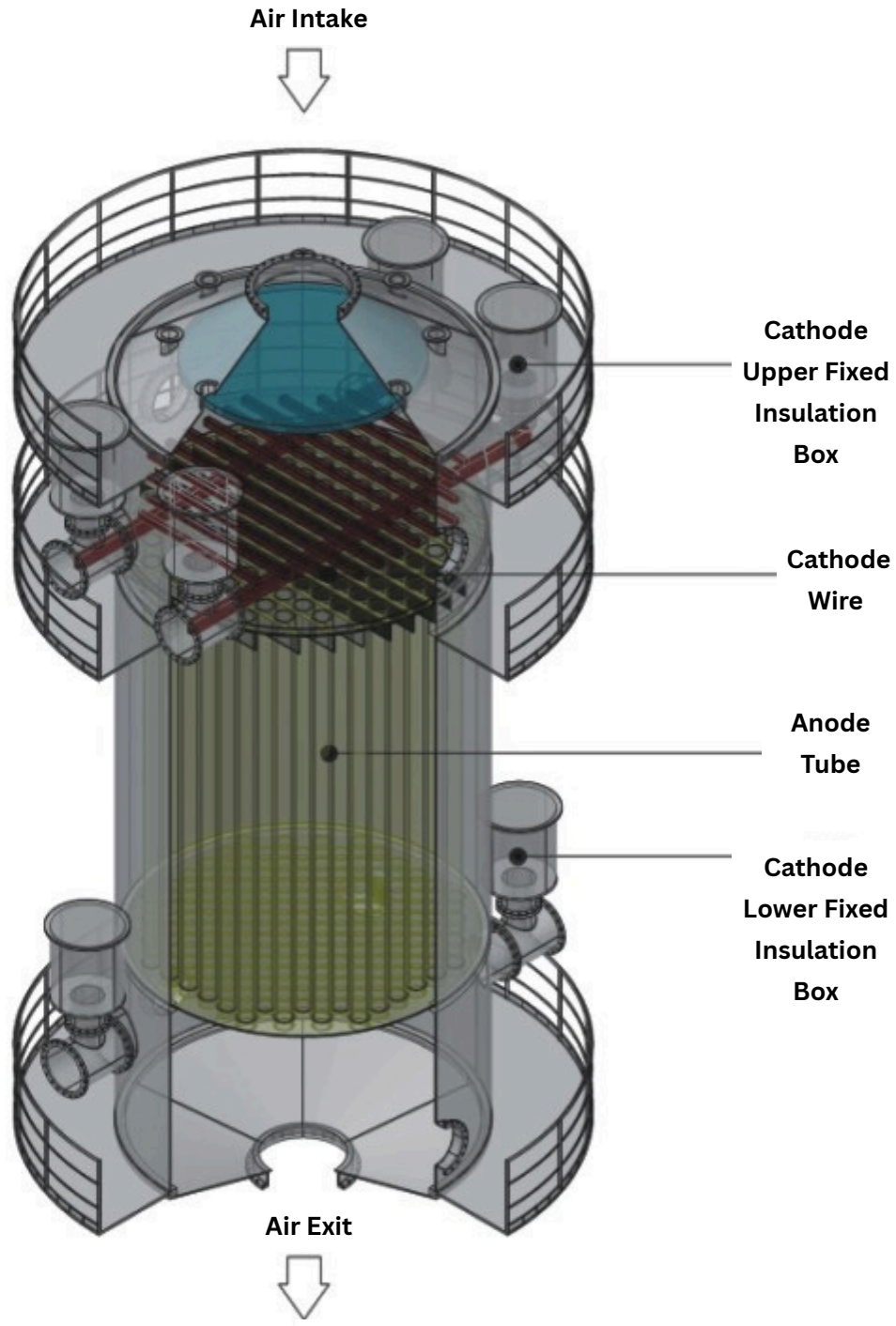
实用新型专利证书

实用新型专利证书

实用新型专利证书

实用新型专利证书

Wet Fast-flow Type Electrostatic Precipitator (WFEP)



Wet fast-flow electrostatic Precipitator is one of our company's patented products, which is to improve the operating gas speed, improve the processing capacity and reduce the investment cost under the premise of ensuring the defogging efficiency of the electrostatic precipitator. At present, wet fast-flow electrostatic precipitator are widely used in cogeneration, waste incineration boilers, sintering machines, coke ovens, petroleum catalytic cracking units, glass production lines, printing, printing and dyeing, hazardous waste incineration, refinery waste fuel boilers, monosodium glutamate production, organic smoke treatment in the electronics industry, flue gas treatment in electroplating industry workshops and other industries.

Technical Performance Parameters of Wet Fast-flow Electrostatic Precipitator

N。	Specifications	Parameters
1	Processed Gas Volume	30000Nm³/h ~1000000Nm³/h
2	Operating Pressure	≤-12KPa
4	Operating Gas Speed	2~4m/s
5	Capture Efficiency	Acid Mist 、PM2.5、 Average Capture Efficiency of aerosols > 90%.
6	Rinse Water Pressure	0.2~0.5MPa
7	Rinse Water Volume	50Nm³/h~200Nm³/h

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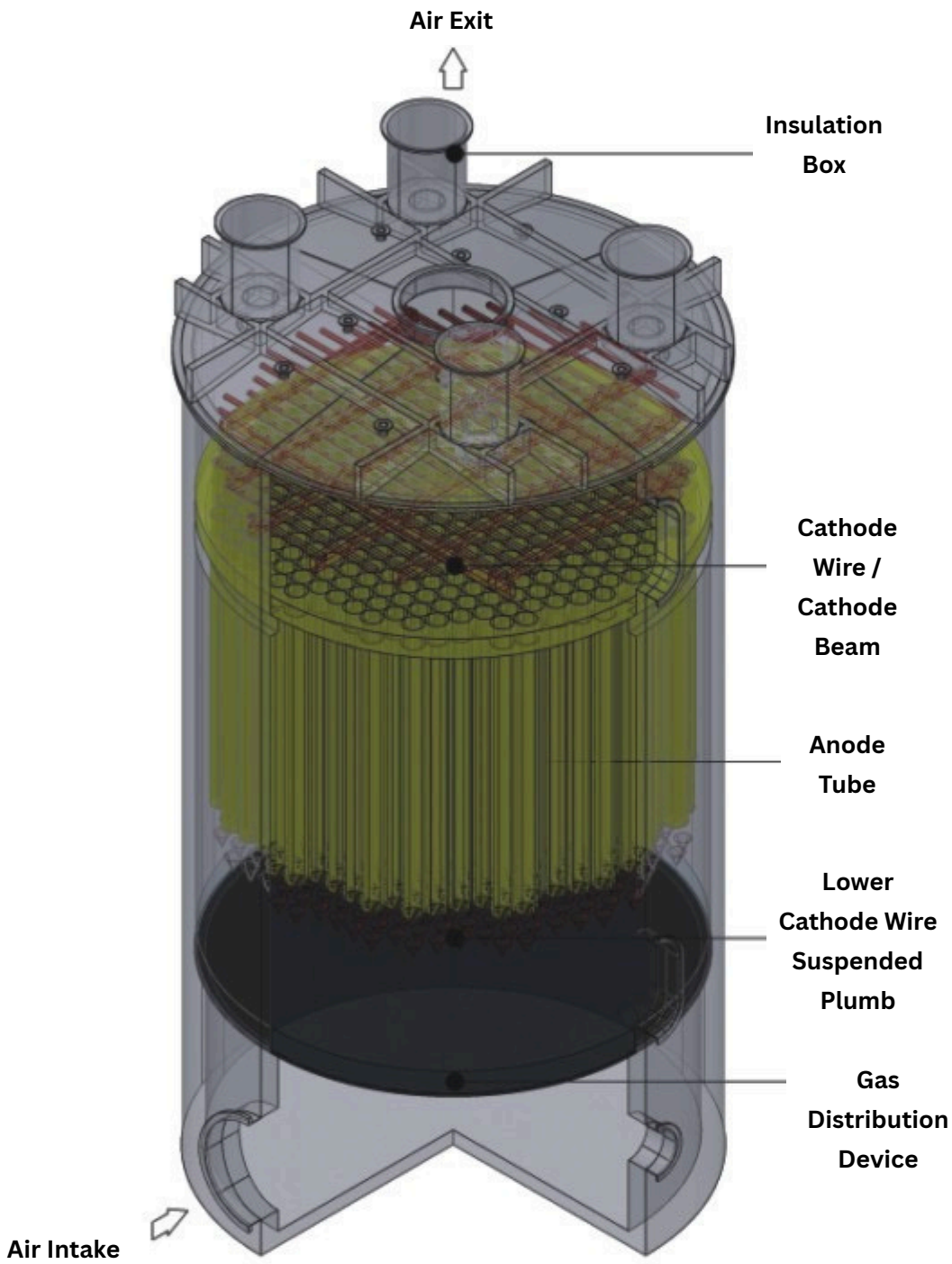
Wet Electrostatic Precipitator (WEP)



We provide various sizes of electrostatic precipitator designs, manufactures and installations of WEP.

1. **Plastic electrostatic precipitator 37 tubes ~ 342 tubes**
2. **Lead electrostatic precipitator 78 tubes ~ 330 tubes**
3. **FRP electrostatic precipitator 37 tubes ~ 342 tubes**

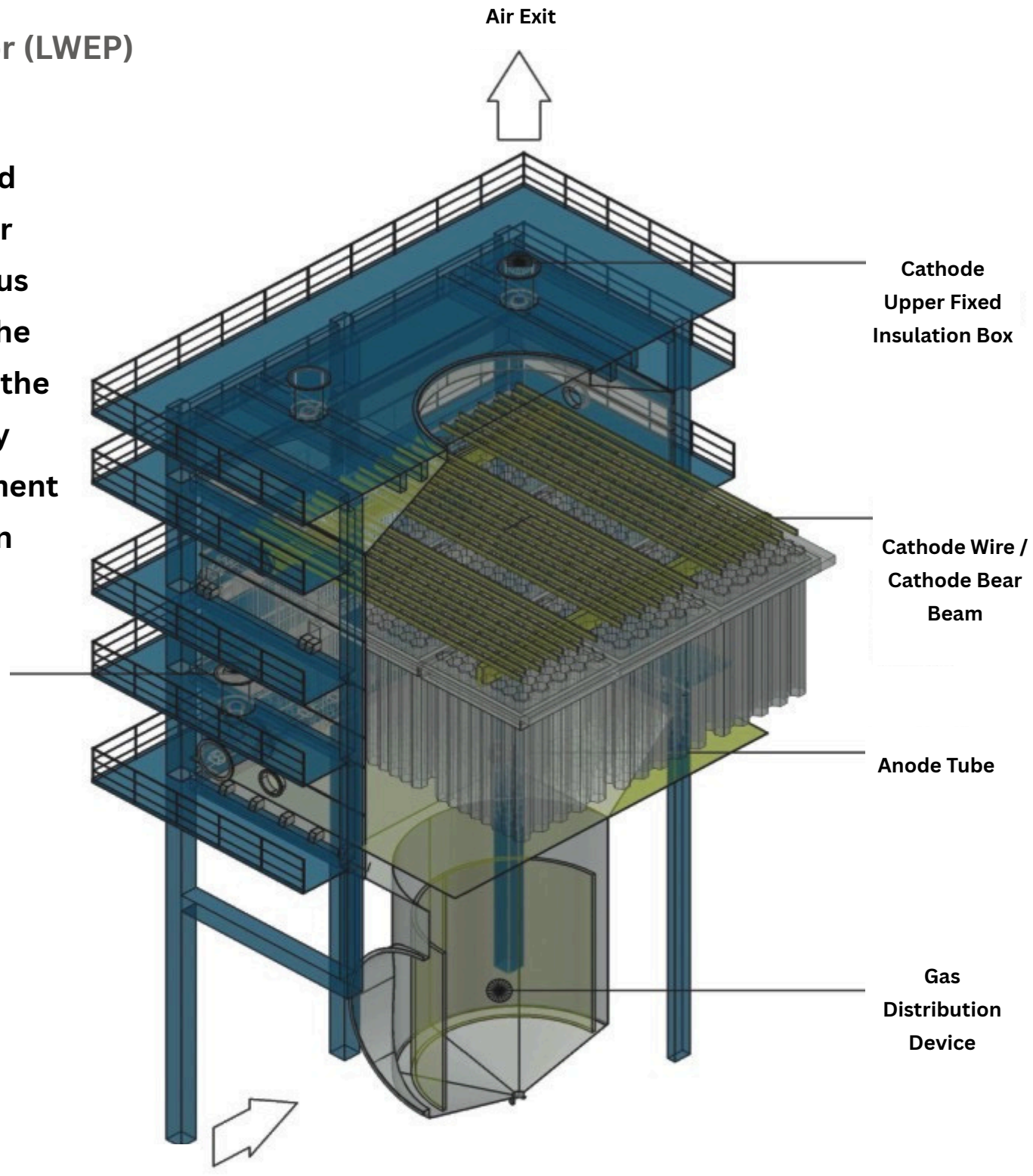
Our company can provide you with the optimal design program according to the standard gas volume, local air pressure and other conditions to ensure that the economy is reasonable.

Technical Performance Parameters of Electrostatic Precipitator

Name of Device	Work Pressure	Gas Concentration	Work Temperature
PVC Tube WEP	-8KPa	5~10%SO^2	≤40℃
Lead Tube WEP	-8KPa	5~10%SO^2	≤110℃
FRP Tube WEP	-8KPa	5~10%SO^2	≤80℃

Large Wet Electrostatic Precipitator (LWEP)

Large wet electrostatic precipitator is applied in coal-fired power plants, steel mills and other large coal-fired boilers, phosphorus ammonium tail gas treatment in the special electrostatic precipitator, the tube bundle up to a number of dry branches. Advantage is the treatment of large gas volume, widely used in modern industry.



Technical Performance Parameters of Large Electrostatic Precipitator

N。	Specifications	Parameters
1	Processed Gas Volume	100,000Nm³h ~ 1,000,000Nm³/h
2	Operating Pressure	≤10000Pa
4	Operating Gas Speed	2~4m/s
5	Capture Efficiency	Capture efficiency up to 80%~90%
6	Rinse Water Pressure	0.2~0.5MPa
7	Rinse Water Volume	≤70℃

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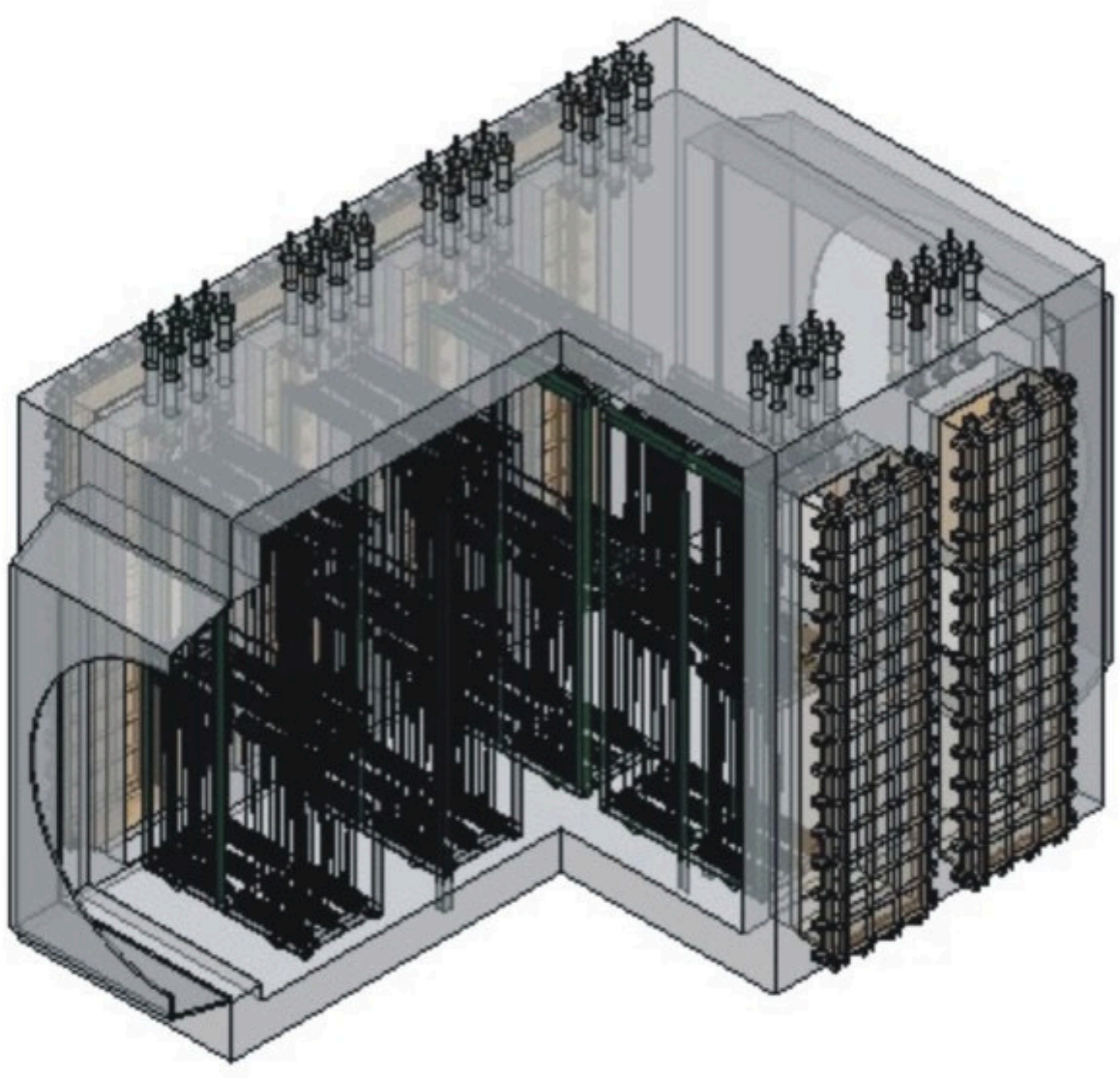
Conversion Heating Electric Furnace

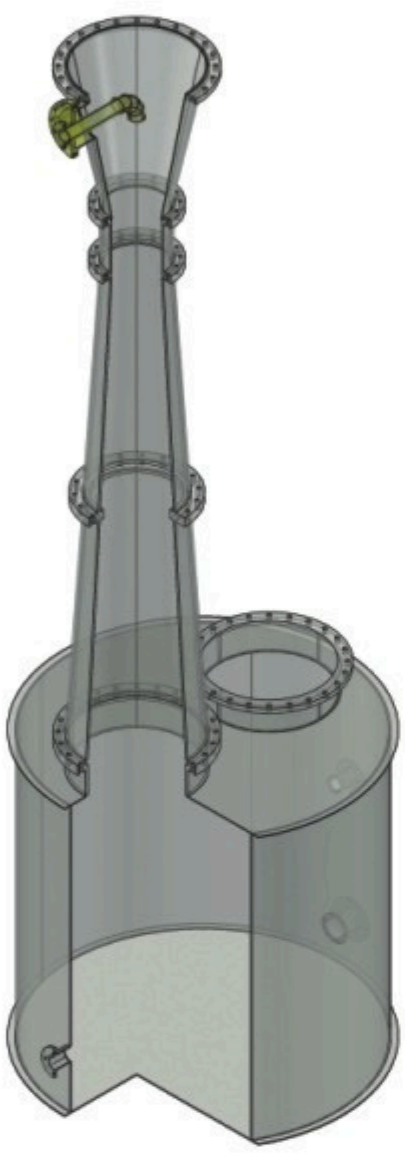


Conversion heating electric furnaces are used in the conversion section of the sulfuric acid industry at to heat the furnace gas to the catalytic conversion temperature.

Technical Performance Parameters of Conversion Heating Electric Furnace

No.	Specifications	Parameters
1	Voltage	380V
2	Connection Method	Y-joint Method / Triangle Connection Method
3	Device Power	On Customer's Requirements
4	RTD Material	0Cr25Al5
5	Heating Medium	Dry Air / SO2 Gas
6	Inlet Air Temperature	Normal Temperature to 400 °C
7	Outlet Air Temperature	≤600℃
8	Temperature Regulation	Change in the number of thermoelectric furnace groups / Change in Supply Voltage

Venturi

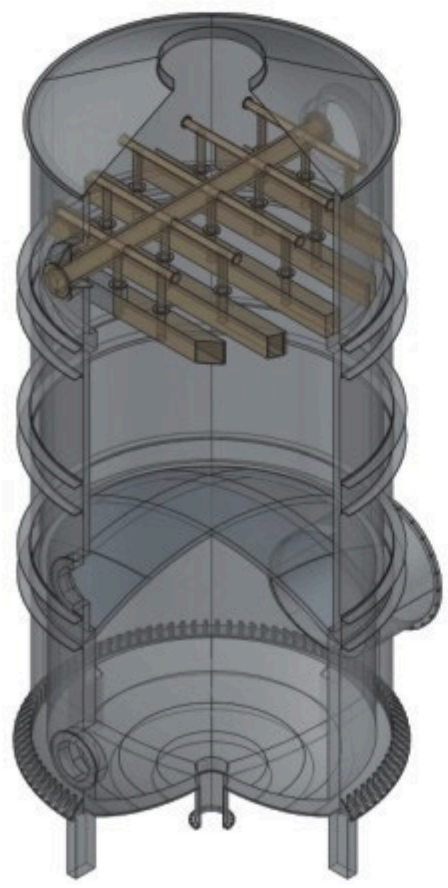


The venturi is widely used in gold treatment, chemical industry, mainly has a very good cooling, dust removal effect. The company can design and produce different specifications of venturi according to different flue gas working conditions of clients.

Technical Performance Parameters of Venturi

Specs	Shell Path / Range	In Water-cooled Jacket
Operating Pressure	-2KPa	0.15MPa
Design Pressure	-2KPa	0.16MPa
Work Temperature	Inlet 340℃ , Outlet 70℃	20～40℃
Substance Name	SO_2、SO_3、O_2、N_2、20% H_2So_4 Solutions and various mineral dusts	Water

Drying Tower



Technical Performance Parameters of Drying Tower

N。	Specifications	Parameter Range
1	Operating Gas Volume	2500~100000 (Nm^3/h)
2	Operating Gas Speed	0.8~1.5 (m/s)
3	Flue Gas Inlet Temperature	<40 (℃)
4	Flue Gas Outlet Temperature	40~50 (℃)
5	Spray Density	15~20 ($m^3/m^2.h$)

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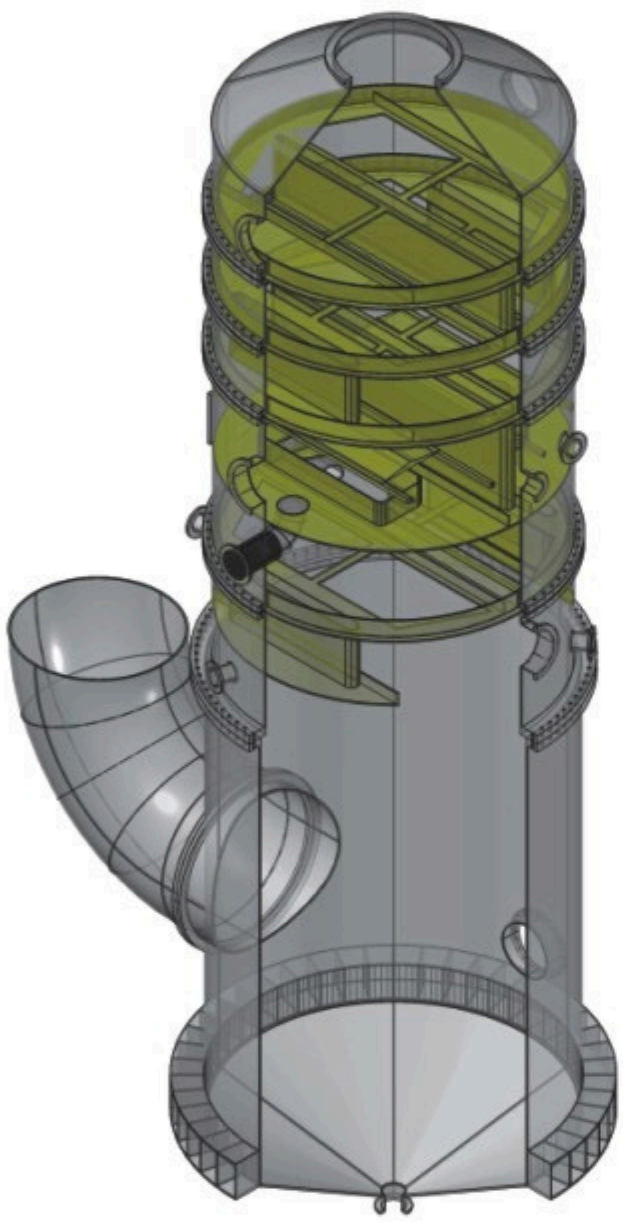
The high-efficiency integrated washing tower designed and produced by our company is equivalent to the tandem connection of empty tower and foam washing tower, with two-stage washing function. High-efficiency integrated washing tower can be single instead of two or more washing towers, in order to ensure that the dust removal efficiency is not less than 99% at the same time, not only greatly reduce the equipment footprint, but also reduce the cost of equipment production, become more and more enterprises choose.

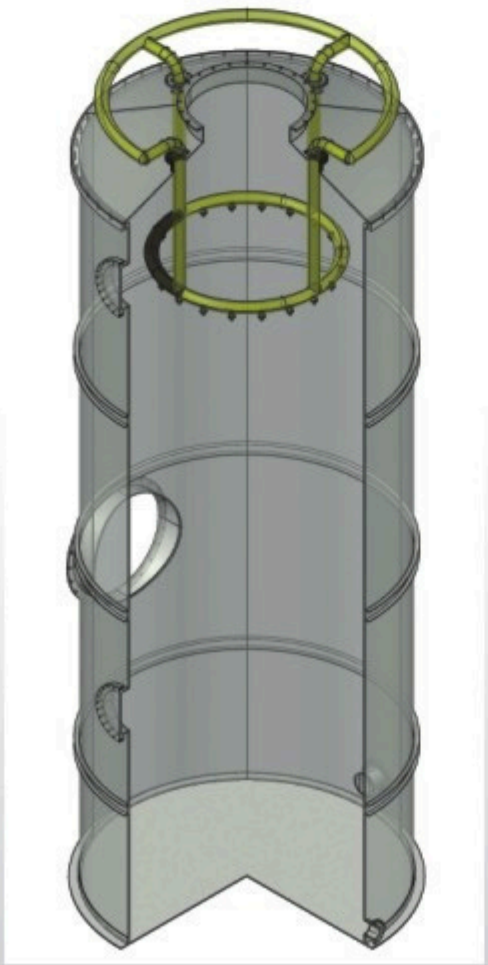
High Efficiency Integrated Washing Tower



Technical Performance Parameters of Washing Tower

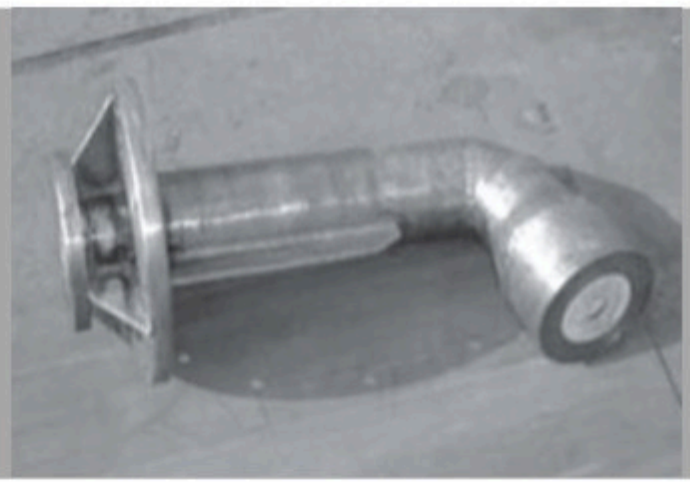
No.	Specifications	Parameters
1	Processed Gas Volume	5000~100000Nm³/h
2	Work Medium	SO_2、SO_3、H_2SO_4
3	Work Pressure	0.2~0.25KPa
4	Operating Temperatures	40~120℃
5	Inlet Flue Gas Temperature	~340℃
6	Outlet Flue Gas Temperature	~40℃

Empty Tower



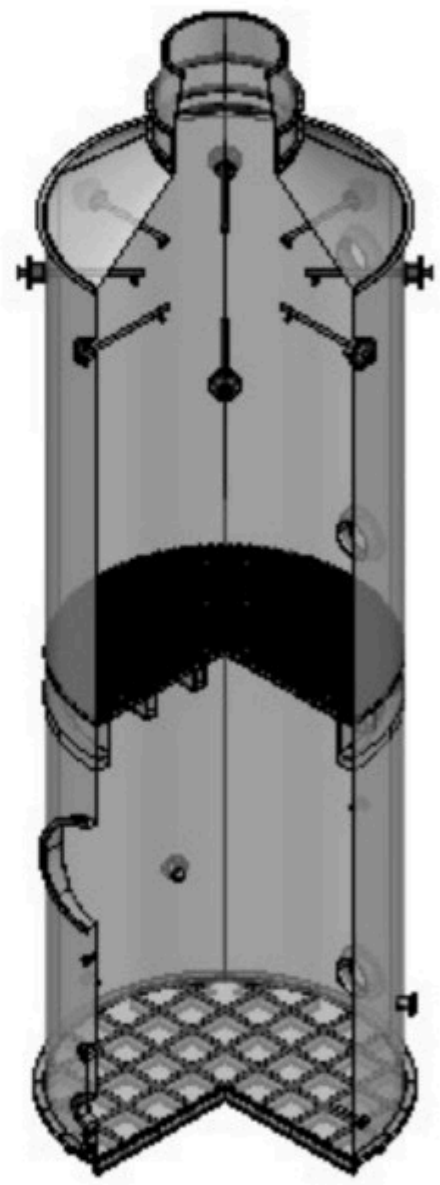
Technical Performance Parameters of Empty Tower

No.	Specifications	Parameters Range
1	Operating Gas Volume	2500~100000 (Nm³/h)
2	Operating Gas Speed	0.5~1.2 (m/s)
3	Inlet Flue Gas Temperature	360~120 (℃)
4	Outlet Flue Gas Temperature	50~80 (℃)
5	Pressure Drop	392~490 (Pa)
6	Spray Density	15~20 (m³/m².h)

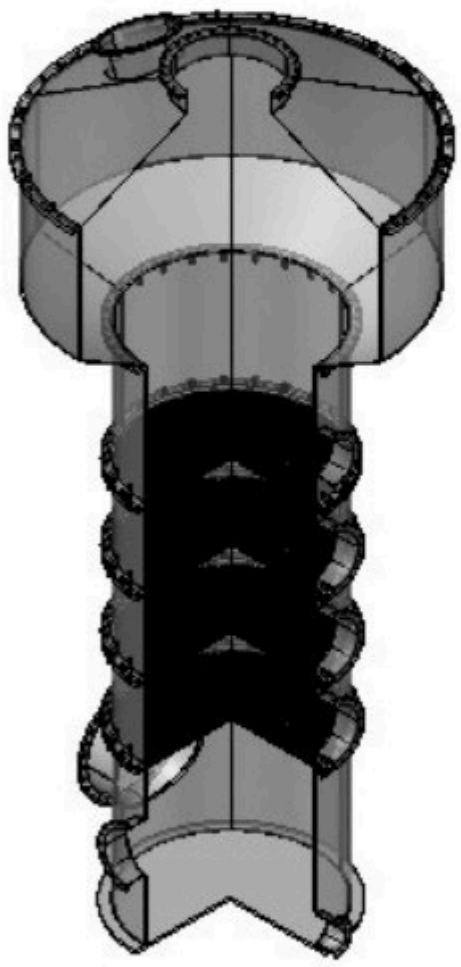


Washing Tower

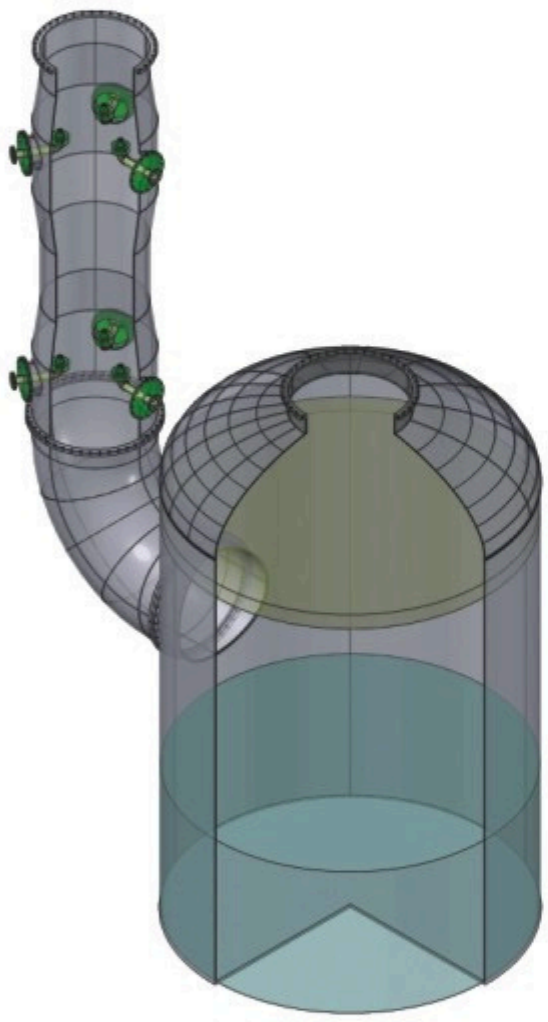
Washing towers include empty towers (first washing tower), packed towers (second washing tower) and foam washing towers. Washing tower has the advantages of simple structure, stable performance and strong adaptability, etc.



Packed Tower



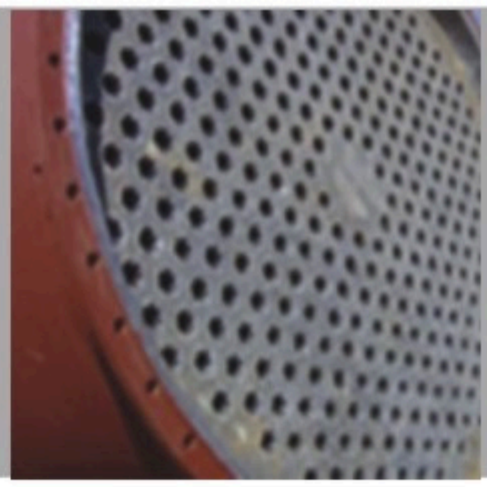
Foam Washing Tower



High Efficiency Washing Tower

Technical Performance Parameters of Washing Tower

N。	Specifications	Empty Tower	Packed Tower	Foam Washing Tower
1	Gas Inlet Temperature (°C)	~400	60~80	60~80
2	Gas Outlet Temperature (°C)	65~75	35~60	35~60
3	Removal Efficiency	60%~75%	80%	≥95%



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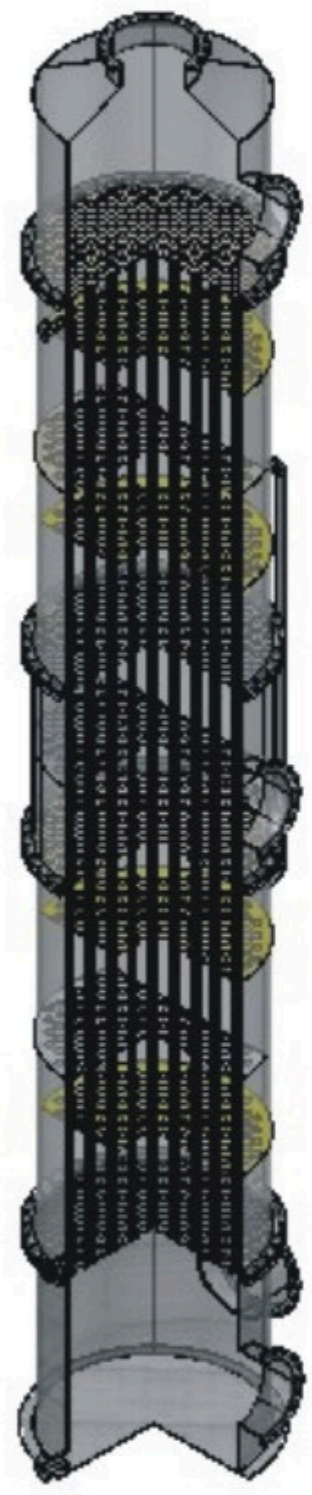
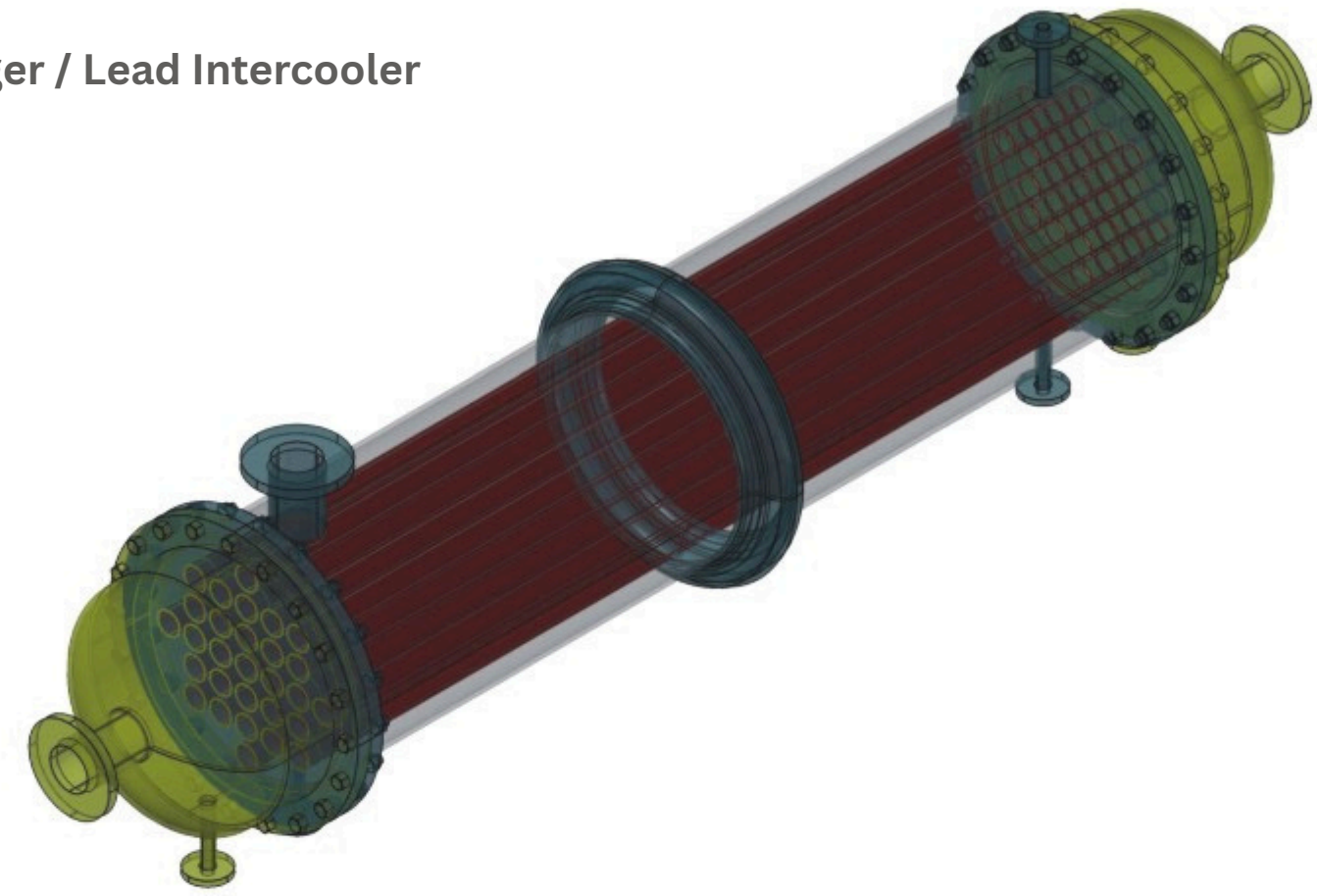
Lead-lined Heat Exchanger / Lead Intercooler





Heat exchanger that is, heat exchanger, is a hot and cold fluid between the heat transfer equipment, in recent years, in the chemical industry, petroleum, power and other industries have been widely used. Compared with the traditional heat exchanger, the lead heat exchanger made by our company has the following advantages:

1, the heat transfer coefficient value is larger, the heat transfer efficiency is high;

2, acidic gases go through the pipe course, the heat exchanger is a lead pipe, corrosion resistance is good, and the service life is high;

3, the operation is stable, the safety factor is high, and there is no leakage.

4、Resistant to high temperature

Technical Performance Parameters of Lead-Lined Heat Exchanger

N。	Specifications	Parameters
1	Gas Inlet Temperature	On Customer’s Requirements
2	Gas Outlet Temperature	≤100℃
3	Tube Pressure	≤0.5MPa
4	Shell Pressure	≤1.2MPa

Lead Coating Projects

Lead coating anti-corrosion is an excellent anti-corrosion form, which can be applied to high temperature, high pressure and negative pressure conditions. It can be applied to the anti-corrosion of various tanks, tanks and kettles such as hydrometallurgy oxygen pressure leaching reactor, acid hydrolysis tank, bromine tank electrolytic tank, etc.

Construction site of 100Kt/a electric zinc oxygen pressure leaching high-pressure reactor

Lead coating cathode beam

Electrobath

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Anti-corrosion engineering is widely used in chemical, biological, pharmaceutical, dyestuff, metallurgy, rare earth, electroplating, electric power, printing and dyeing, environmental protection and other industries such as towers, containers, reactors, pipelines, pipe fittings and other equipment.

The main products of PO anticorrosive lining are: iodine precipitation tank, empty tower, stuffing tower, pipeline.

Rubber lining products mainly include: stirring paddle, empty tower shell, reaction kettle, acid digestion tank.

Fiberglass reinforced plastic (FRP) lining products mainly include: tower tanks, tanks, steel substrate, concrete substrate, and so on.

55kt/a neutralization and oxidation tank FRP anti-corrosion stage

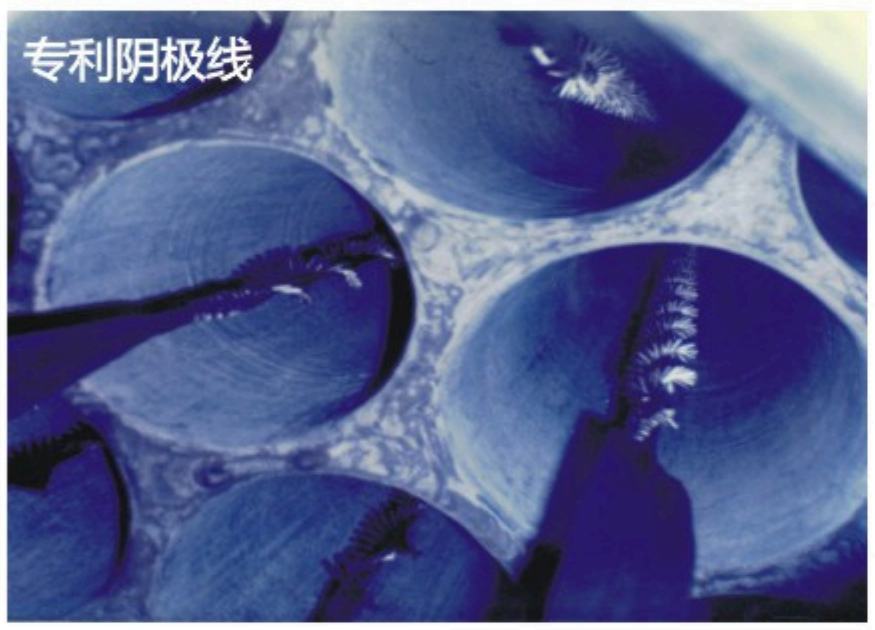
Acid-resistant brick lining products mainly include: neutralization and oxidation tank, acid digestion tank acid-resistant brick lining, acid-resistant anti-corrosion treatment of workshop flooring. As well as lining of towers, tanks and vessels.

55kt/a neutralization oxidation tank lining brick anti-corrosion stage

Our Company's Patented Products

Cathode Wire

Our patented product Arrow Dragon Z50 cathode wire, specialized in wet electrostatic precipitator, has been widely used in many large state-owned enterprises and established a good reputation.



Cathode Beam

Our company has transformed the cathode beam system of electrostatic precipitator for many enterprises, adopting the steel structure lined with PO outsourced lead plate anticorrosive, and the service life is obviously prolonged. Moreover, we adopt the split structure, if the beam needs to be repaired and replaced, it can be pumped out and replaced directly through the manhole, etc., and it is not necessary to open the top cover to lift out the whole beam frame, which is convenient and simple to operate.

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Cold air Closure

After years of research, our technicians have improved the insulation method of the insulation box of the electrostatic precipitator, i.e. the cold air closure device. It can not only achieve the insulation effect of the insulation box, but also save energy, and free of maintenance, maintenance costs, has been issued by the State Patent Office of the patent technology certificate.

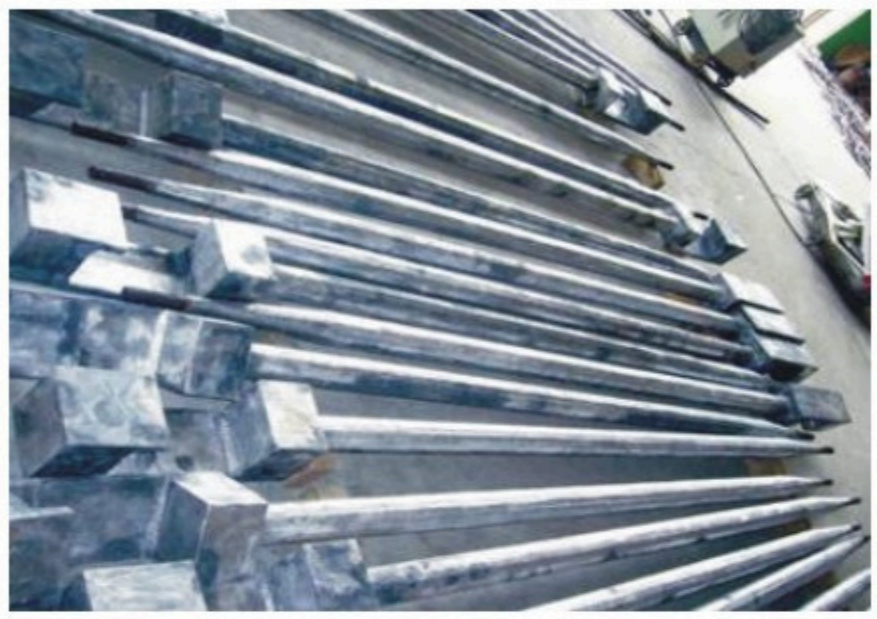
At present, the domestic use of electrostatic precipitator is the use of 3, 4 or 8 insulated box, the use of electric heating to ensure that its insulating edge. The operating cost of electricity consumption is shown in the following table: (Note: each kilowatt-hour is calculated at 0.80 CNY.)

Nb Insulation Box	Power per Box	KW / Day	KW/ Year	Annual Cost
3	4.5kw	4.5KW×24 Hour ×3 Box =324 kw	324 × 330 Day =106920 kw	106920×0.80 ¥ =85536 ¥
4	4.5 kw	4.5kw×24 Hour ×4 Box =432 kw	432×330 Day =142560 kw	142560×0.80 ¥ =114048 ¥
8	4.5 kw	4.5kw×24 Hour ×8 Box =864 kw	864×330 Day =285120kw	285120×0.80 ¥ =228096 ¥

As can be seen from the above table, the use of cold air closed device, annual savings of more than 100,000 yuan in electricity costs. Cold air closed device investment is small, fast improvement, maintenance-free, the effect is very significant. Has been in the northern copper industry, the central gold smelter, shaoguan smelter and many other large units have been successfully applied.

A Wide Range of Accessories and Services

Lead Tube

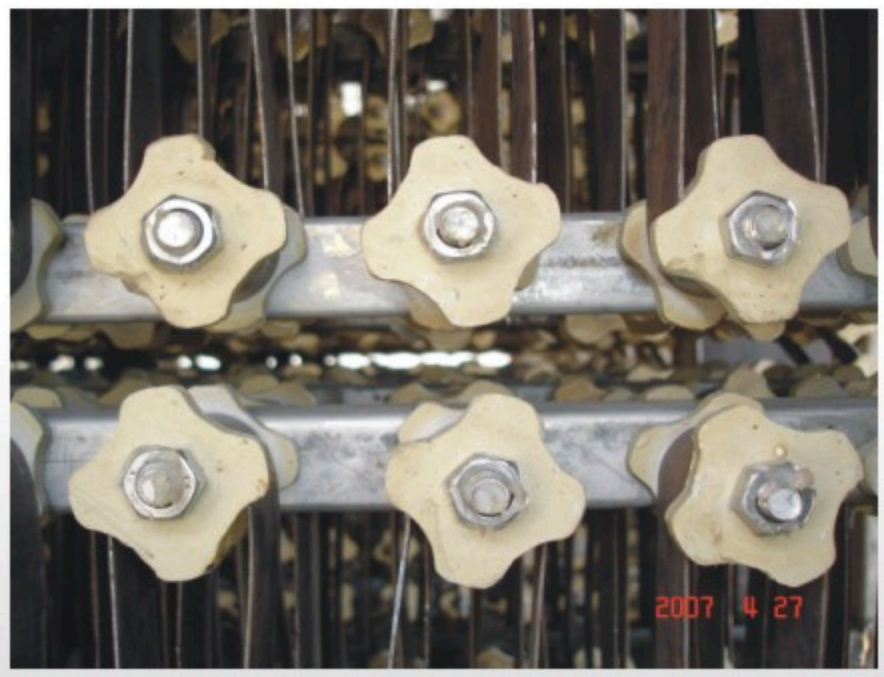


Lead-lined Boom

Spinning Spray Head

PP Spray Device

Lead Bob



Electric Stove Trolley

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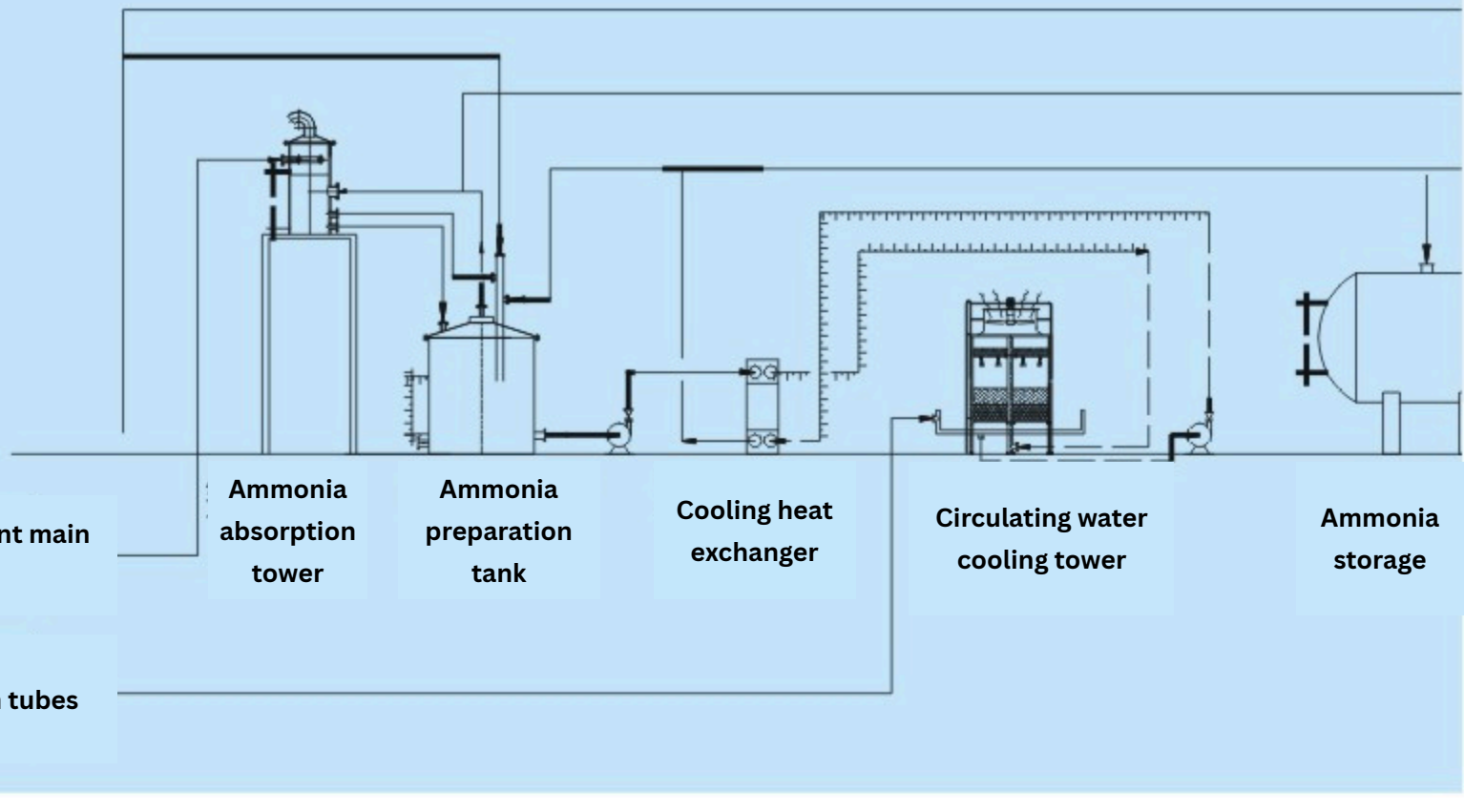
Equipment Cleaning Services

Our company utilizes high pressure cleaners to provide chemical equipment cleaning services. We can provide electrostatic precipitator cleaning, heat exchanger cleaning, intercooler cleaning, etc., with the advantages of high cleaning water pressure and thorough cleaning of dirt.

High Pressure Washer

Maintenance and Transformation of Electrostatic Precipitator



Rapid Ammonia Preparation Unit Description

Designed by Changsha Nonferrous Metallurgy Design & Research Institute Co., Ltd. and manufactured and installed by our company, the rapid ammonia water preparation unit has successfully transformed a major hazard into a general hazard.

1. Current Status and Hazards of Ammonia Storage:

Currently, ammonia storage in China mostly adopts liquid ammonia storage. For example, ammonia used in desulfurization (such as the ammonia acid method) and denitrification systems is typically stored in liquid form. According to *Identification of Major Hazard Installations for Hazardous Chemicals* (GB18218-2009), liquid ammonia storage tanks exceeding 10 tons are classified as major hazard sources. The primary hazards associated with ammonia storage stations include:

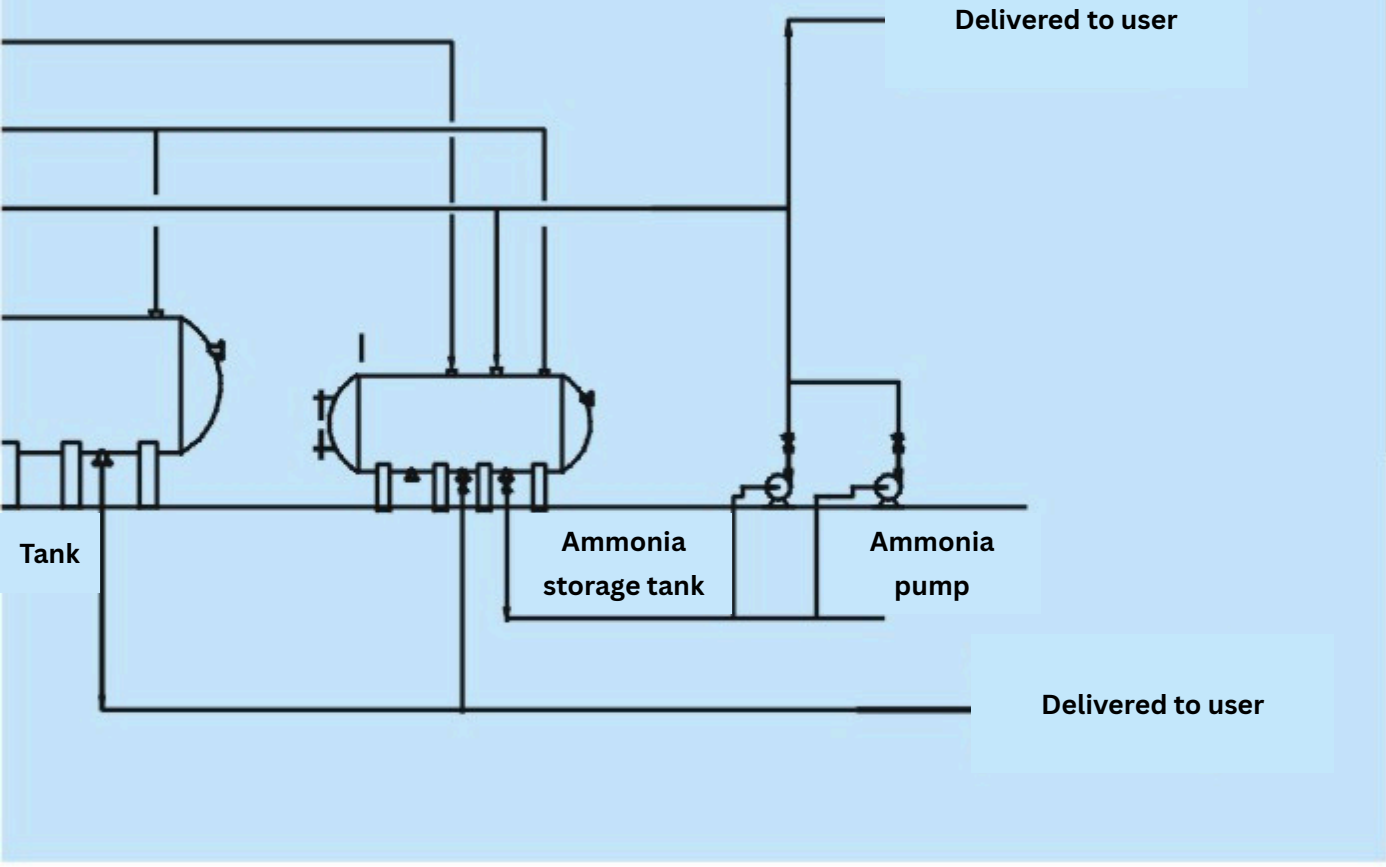
1. **Fire and explosion** (ignition sources, friction and impact, electrical sparks, electrostatic sparks, lightning); 2. **Poisoning and asphyxiation**; 3. **Chemical burns and frostbite**; 4. **Environmental hazards (pollution)**. These hazards may lead to accidents such as fires, explosions, poisoning, and environmental pollution. Each hazard can trigger corresponding injuries, with severe consequences and significant impact, making it a major hazard source. Liquid ammonia storage typically relies on ammonia compressors for on-site unloading into tanks. In addition to the risks posed by ammonia leaks, liquid ammonia storage tanks, ammonia separators, oil separators, horizontal condensers, and safety valves must be inspected every four years, making them critical and sensitive components of the entire plant. If a liquid ammonia system is not installed and instead ammonia water is transported directly to meet the plant's needs, the transportation process becomes even more hazardous than liquid ammonia transport. Moreover, ammonia water with a concentration above 20% is itself a major hazard source. This is because ammonia water at such concentrations is highly volatile, and the released ammonia gas can easily escape from the top of the tanker during transport, posing a significant accident risk. Additionally, transporting ammonia water requires 5–10 times the volume compared to liquid ammonia, making it economically impractical. Therefore, direct ammonia water transportation is less feasible and meaningful compared to liquid ammonia transport.

2. Traditional Ammonia Water Preparation Systems:

Traditional ammonia water preparation involves either introducing liquid ammonia into a water storage tank or evaporating liquid ammonia and then spraying water to mix it into ammonia water. Both processes are slow. More importantly, preparing ammonia water requires a liquid ammonia storage tank, typically with a capacity of at least 60 m^3. Thus, traditional ammonia water preparation facilities equipped with liquid ammonia storage tanks inevitably remain a major hazard within the plant.

3. Existing Ammonia Water Preparation Systems:

Based on investigations, other rapid ammonia water preparation systems use a one-time mixing process of ammonia and water inside a pressure vessel similar to a heat exchanger. Although these systems may use either liquid ammonia or ammonia gas, they all require a specialized pressure-vessel-type heat exchanger as a reactor. The main drawbacks are: 1. **Safety risks due to violent reactions**: When liquid ammonia dissolves in water, it releases heat and vaporizes. The confined reaction space inside the reactor leads to severe popping noises, indicating potential safety hazards. 2. **Non-recyclable process**: A major flaw in the preparation process is that unabsorbed ammonia gas...



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...after ammonia water enters the storage tank, it continuously increases the concentration and partial pressure of gaseous ammonia in the ammonia water tank. This causes ammonia to escape through the water seal and leak into the atmosphere, rendering the water seal ineffective.

3. Combined Heat Exchanger-Reactor Problems:

While integrating the heat exchanger and reactor into one unit may appear to save costs and space, it creates significant maintenance challenges:

If scaling or blockage occurs in the combined reactor-heat exchanger, conventional cleaning methods cannot be used. Disassembly, cleaning, and reassembly must comply with pressure vessel regulations, requiring re-inspection and recertification. Only the original manufacturer can perform maintenance, and in severe cases, the entire unit may need replacement. Users cannot address these issues independently...

4. Rapid Ammonia Water Preparation Unit

Our company's rapid ammonia water preparation unit was developed by Changsha Nonferrous Metallurgy Design & Research Institute Co., Ltd. It differs significantly from other systems in both process and equipment design, completely avoiding the three major issues mentioned above.

Key Advantages: No popping phenomenon occurs during ammonia unloading and water mixing. The recirculation system ensures stable concentration increase of ammonia water, with complete ammonia absorption and no gaseous ammonia leaks. The external plate heat exchanger (with extremely high heat transfer coefficient) allows for easy maintenance.

Working Principle: Liquid ammonia, recycled ammonia water, and makeup water are simultaneously mixed in the preparation tank. Any unabsorbed ammonia gas exits through the tank's top gas outlet and enters the ammonia absorption tower, where it is completely absorbed by sprayed makeup water.

The absorption liquid from the spray becomes the makeup water for the preparation tank, creating a single-point water supply system at the absorption tower.

System Components: Ammonia water preparation, System cooling, Fugitive ammonia absorption, Electric & automatic, control/monitoring systems

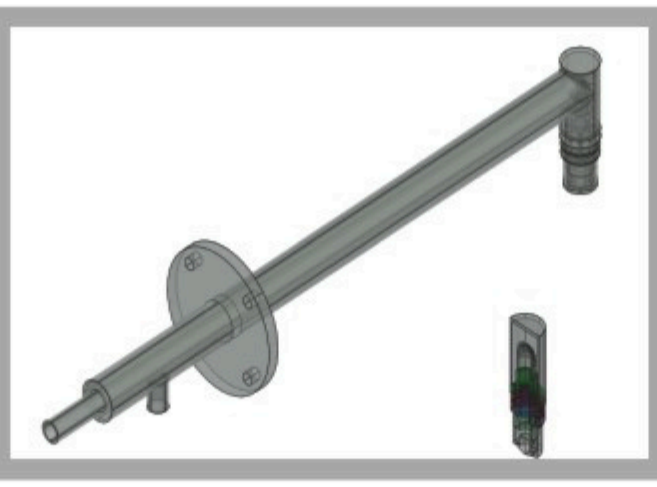
Successful Applications: This unit has been successfully implemented in: Yimen Copper Co., Ltd. ammonia station renovation project, Yunnan Copper Co., Ltd. processing plant ammonia station renovation project

Comparative Advantages: Enhanced Safety: Rapid mixing of liquid ammonia and water under atmospheric pressure ensures smooth operation with no popping phenomenon.

Easy Maintenance: Heat generated during mixing is removed by an external heat exchanger, which is simple to clean and repair. The process has low water quality requirements (no need for soft water), reducing production costs.

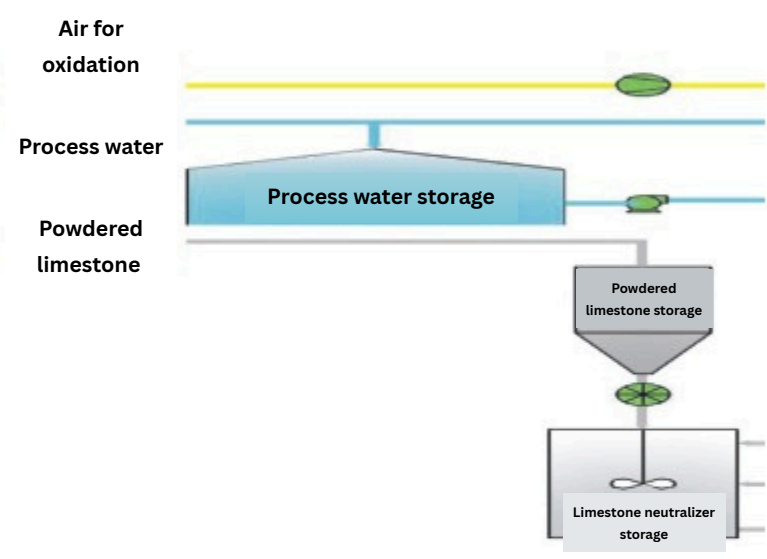
Zero Emissions: The fugitive ammonia absorption system captures all ammonia gas released during preparation and tank filling, eliminating atmospheric emissions while reducing ammonia loss and environmental impact.

Automated Operation: The automatic monitoring system allows remote control room operation, improving operator safety and working conditions while reducing physical demands.

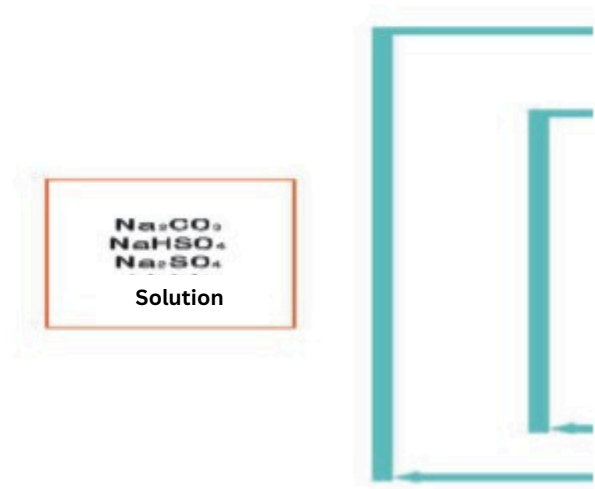


Desulfurization Unit

Gypsum method of desulfurization is part of the gypsum and industrial or agricultural potassium chloride together with ammonium carbonate solution containing crude potassium sulfate and ammonium chloride; the rest of the gypsum and 20 ~ 30% ammonium sulfate solution prepared ammonium carbonate saturated solution reaction, calcium carbonate can be returned to desulfurization for use or used in cement, metallurgy and other purposes, the ammonium sulfate solution and part or all of the crude potassium sulfate mixed with phosphoric acid or phosphate reaction to make compound fertilizer for cash crops; the ammonium chloride can also be made into elemental compound fertilizer. The ammonium sulfate solution is mixed with some or all of the crude potassium sulfate, added with phosphoric acid or phosphate reaction to make compound fertilizer for economic crops; ammonium chloride can also be made into multi-element compound fertilizer. This method is applicable to a variety of gypsum treatment and in the ammonium bicarbonate small nitrogen fertilizer plant transformation.



Double alkali method is to use sodium-based desulfurization agent for desulfurization in the tower, due to the strong alkaline sodium-based desulfurization agent, sulfur dioxide absorption reaction product solubility, will not cause oversaturated crystals, resulting in scaling and clogging problems. On the other hand, the desulfurization product is discharged into the regeneration pool with calcium hydroxide for reduction and regeneration, and the regenerated sodium-based desulfurization agent is then pumped back to the desulfurization tower for recycling. Double alkali desulfurization process reduces the investment and operating costs, more suitable for small and medium-sized boilers for desulfurization transformation.



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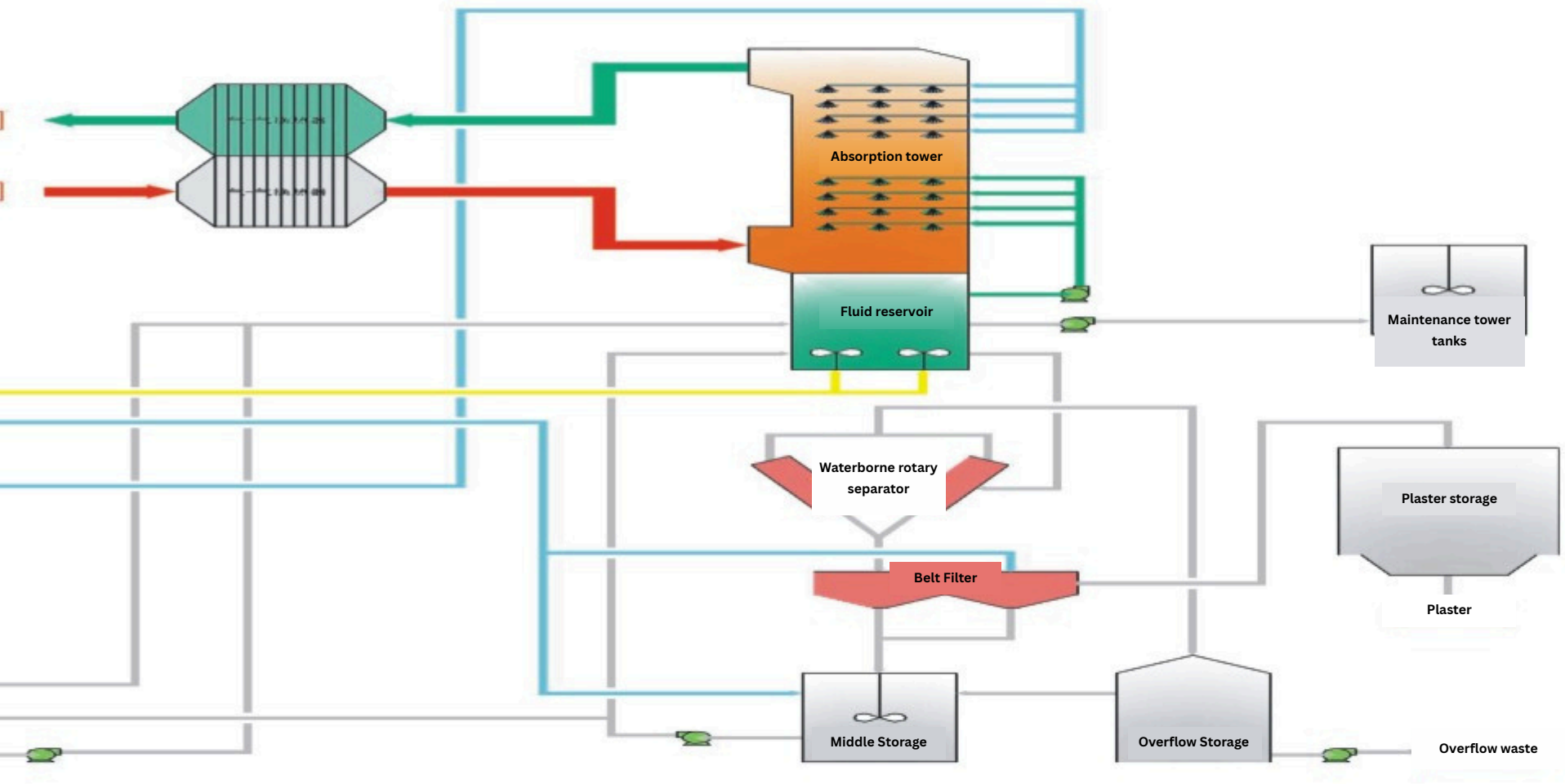
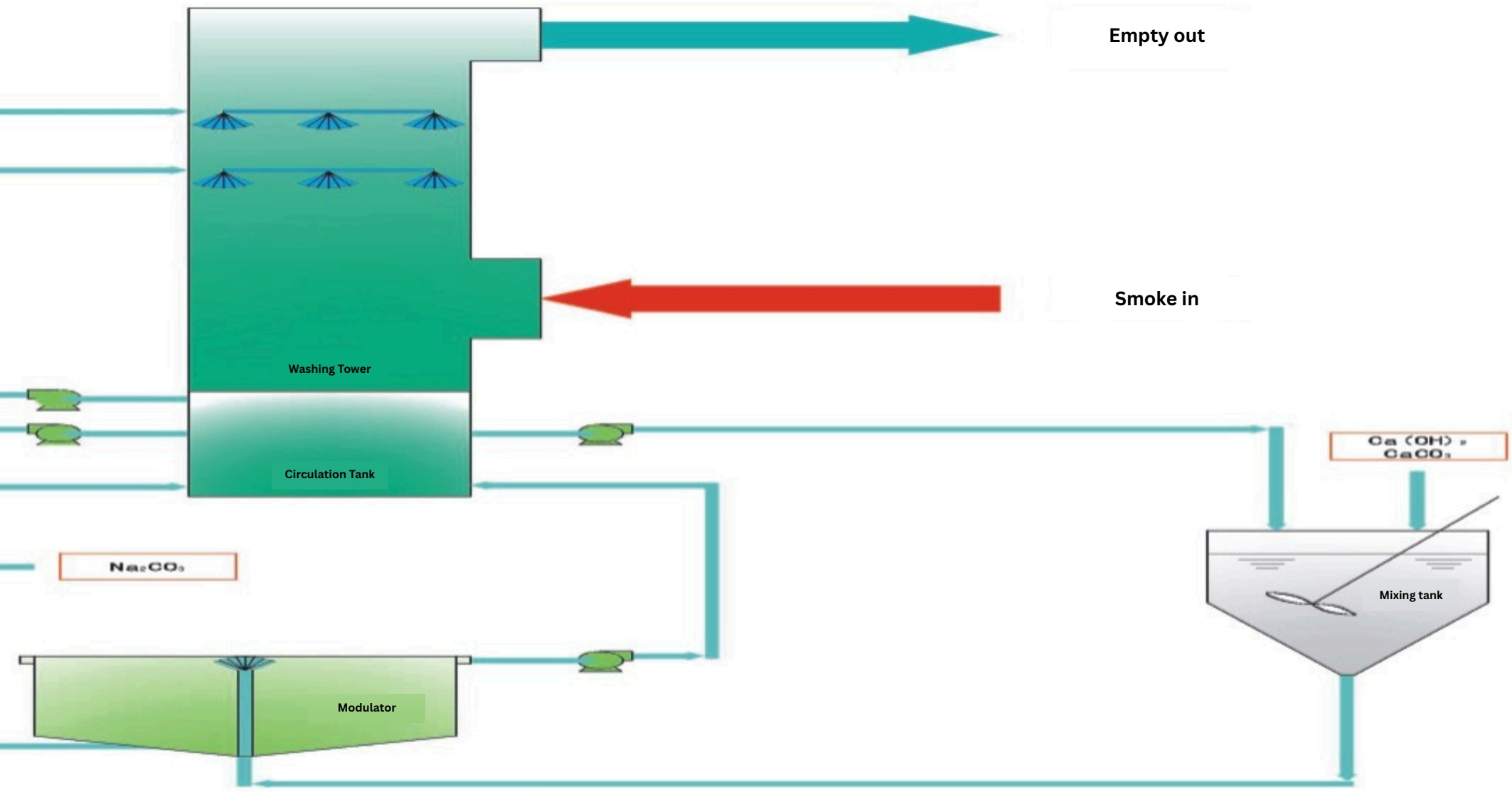


Limestone - Gypsum Desulfurization Process-Model



Bicarbonate desulfurization process-Model

Desulfurization after the addition of wet static mist eliminator, can remove the vast majority of desulfurization produced by gypsum slurry droplets, an effective solution to the problem of desulfurization gypsum rain, reduce PM10 and PM2.5 and other fine dust emissions, effective control of SO3, heavy metals (lead, mercury, arsenic, etc.) pollutant emissions, wind and smoke system resistance is small, wet static precipitator in the tailgas emissions in the application of the dust emission, but also to meet the country's ever-increasing emission standards. The application of wet static precipitator in the tail gas emission can also meet the ever-increasing national standard of soot emission and really realize the ultra-clean emission of soot. At present, the domestic desulfurization process are: limestone process, ammonia process, seawater desulfurization process, ionic liquid, organic amines, etc., a single desulfurization device has its own limitations, often forming gypsum rain, aerosols, ammonia escape, etc., and will carry a large amount of water, water condensation in high altitude after the formation of a large number of white fog, not only causing a large amount of water resources wasted and caused by the white trailing, the wet fast-flowing type of electric mist eliminator is a good solution to the problem, the wet fast-flowing type of electric mist eliminator is a good solution to the problem. Wet fast-flow electric mist eliminator is a good solution to these problems. It realizes the transparent and visualized effect of flue gas emission. In Yunnan manufacturers have been successfully used.

*The picture on the right shows the real treatment of exhaust gas treatment

Desulfurization and mist removal tower

Desulfurization and demisting integrated tower, the desulfurization and electric demisting combined into one, greatly save the operating space, improve the processing capacity and effect, greatly reduce the emission of waste, improve the cleanliness of the exhaust gas and reduce the waste of material resources. The desulfurization and denitrification of exhaust gas has made a qualitative leap, welcome your inquiry.

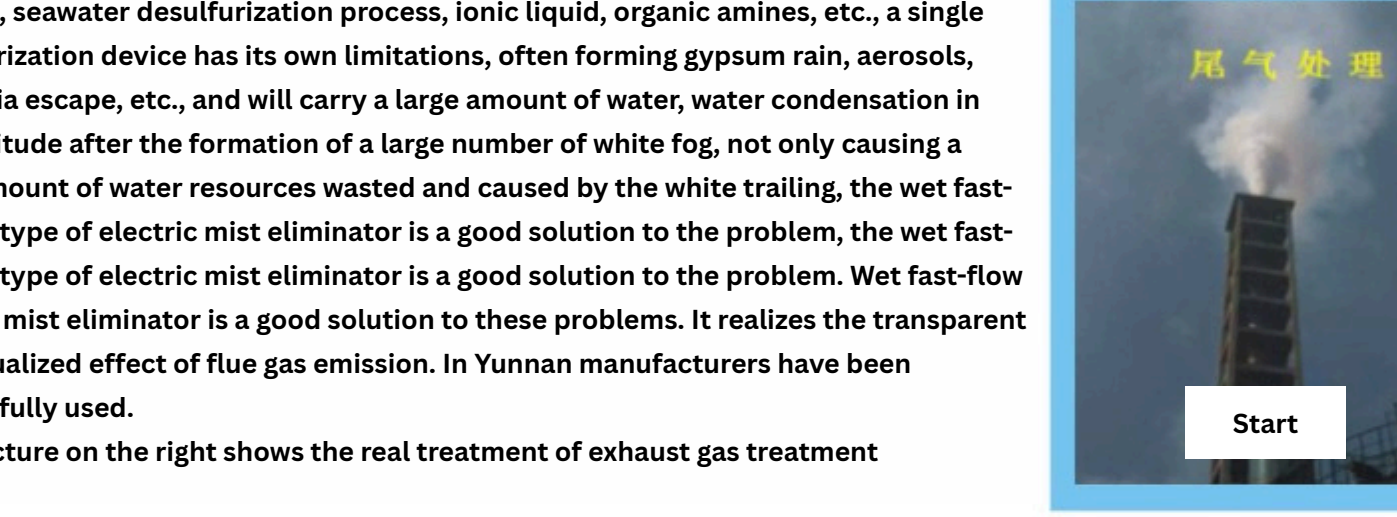
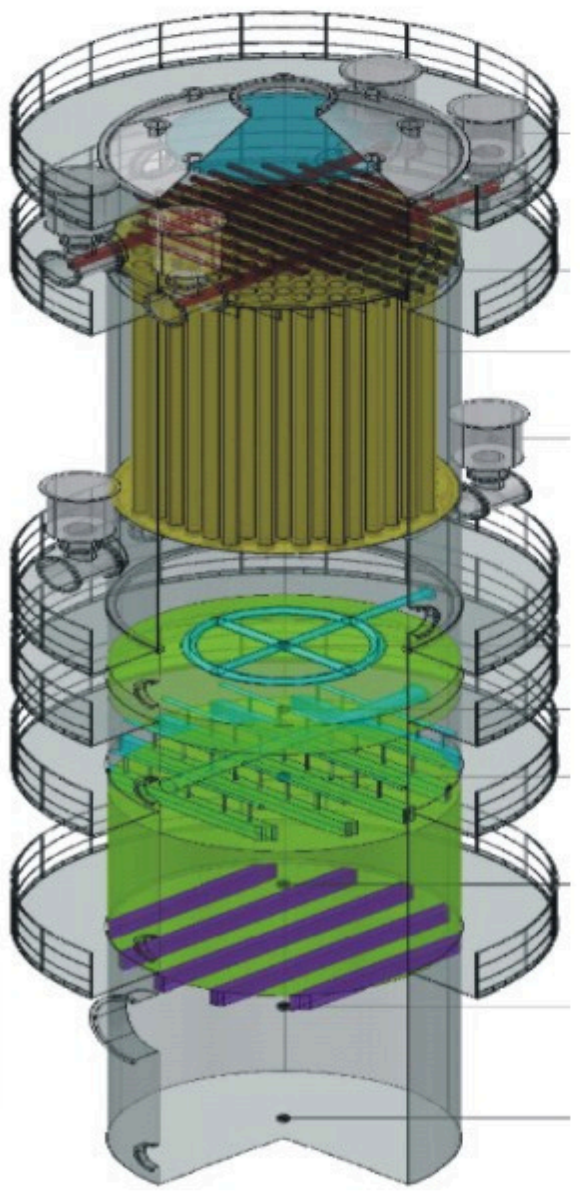


Figure for the power plant retrofitting wet electrostatic precipitator process flow



Desulfurization and mist removal tower

Wet fast-flow electrostatic precipitator in the power plant tail gas purification application

The company according to the national “Twelfth Five-Year Plan” policy requirements, design and development of wet fast-flow electrostatic precipitator, this equipment to achieve the atmospheric volume, low concentration of flue gas exhaust PM2.5, aerosols, gas transparency of the effective treatment, fully meet the national 12th Five-Year Plan required by the environmental protection standards, this product has been through the Ministry of Science and Technology appraisal, at the international leading level. This product has passed the appraisal of the Ministry of Science and Technology of the People's Republic of China and is at the international leading level. In 2013, the company was awarded the “Technology Innovation Fund Certificate for Small and Medium-sized Enterprises” issued by the Ministry of Science and Technology of the People's Republic of China, and is a national “High-tech Enterprise”. 2013 was named the “Shou contract and trustworthy” enterprise (No.). In 2013, we were honored as “Contract and Credit Keeping Enterprise” (No. 3702042013452).

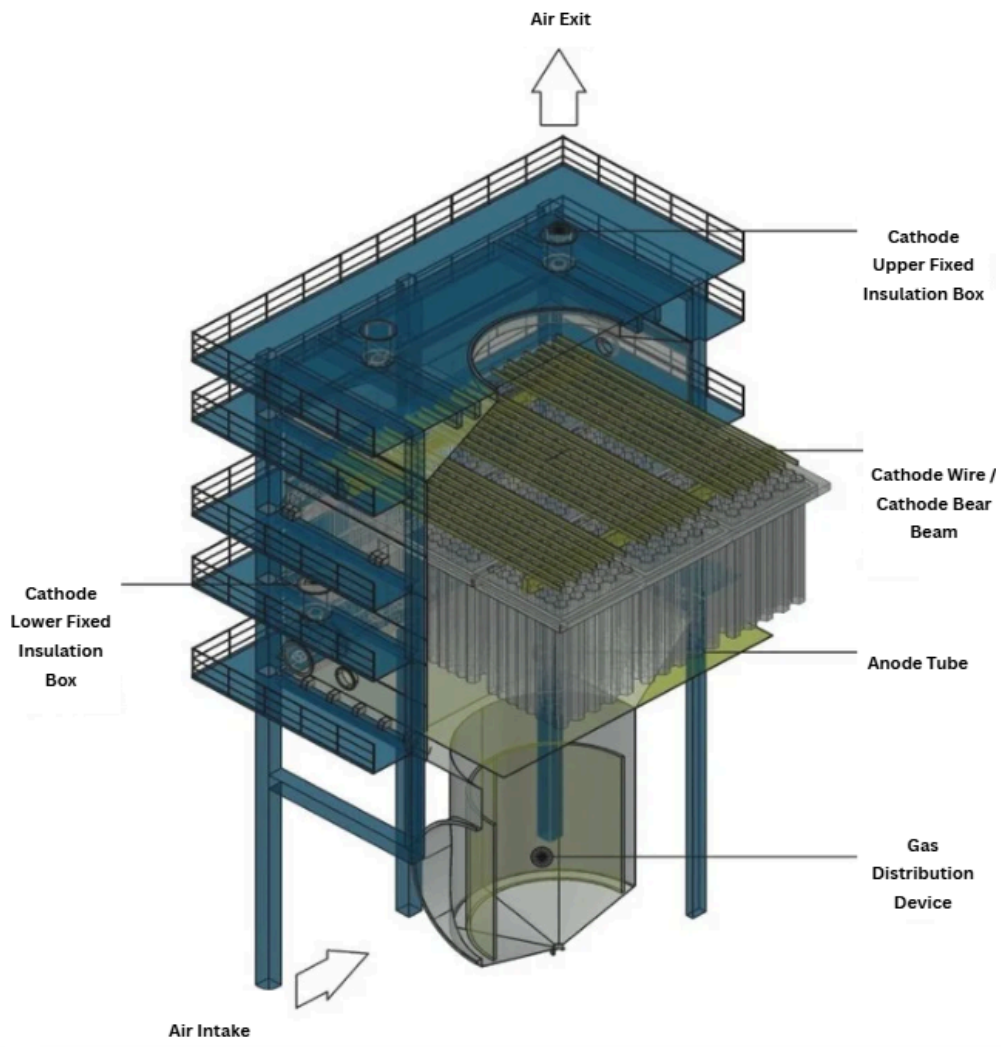
Wet Electrostatic Precipitator (WEP)

Wet Fast Flow Electrostatic Precipitator (WFEP)

Our company has been with the French Air?Liqvidi Group for many years to maintain close cooperation, wet fast-flowing electrostatic precipitator after many technical exchanges between the two sides, absorbed, digested, improved, and with the existing technology, and many years of practical experience combined with developed air pollution control devices. The device not only adopts a number of patents researched and developed by our company, but also adopts the advanced anode device of Swiss GF Group, which has overcome the shortcomings of traditional electrostatic mist eliminators such as low gas speed, large volume, high cost and unstable voltage, etc. Wet fast-flow electrostatic precipitator has been exported to Switzerland, France, Italy and other countries?

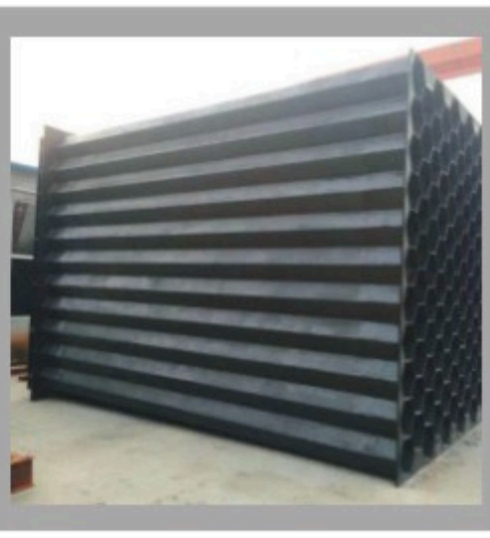
Wet fast-flow electrostatic precipitator in the power plant applications

Single 600M unit, the total flue gas volume of about 2.4 million m3/h, wet fast-flowing electrostatic precipitator device operation technology can reach 2.66m/s (the technology for the national patent technology, and by the Ministry of Science and Technology of the State project), in the premise of guaranteeing the processing effect , the volume of the equipment is reduced by at least 50%, the use of stainless steel Arrow Dragon Z50-type patented cathodic line, the equipment pressure drop of 300Pa on the entire set of almost no effect, fine dust, acid mist, gypsum rain capture rate of more than 97%. There is almost no effect on the whole unit with 300Pa pressure drop, and the capture rate of fine dust, acid mist and gypsum rain reaches more than 97%.



Comparison of parameters before and after installation of electrostatic precipitator

Item	Parameters After WESP	Parameters After Desulfurization Tower
Dust/Particulates	<2 mg/m³	~17 mg/m³
PM2.5/Aerosols	<10 mg/m³	~100 mg/m³
SO3 Acid Mist	<10 mg/m³	~100 mg/m³
Smoke Plume Opacity	<5%	<5% (*same as WESP*)



Application of fast-flow electrostatic precipitator in ammonium phosphate tail gas of Wengfu phosphate fertilizer plant

The main body of Guizhou Wengfu (group) limited liability company is Wengfu phosphate fertilizer base in Guizhou province, which is one of the five major phosphorus fertilizer bases constructed during the “eighth five-year plan” and “ninth five-year plan” of the country. 2011, the company has formed the capacity of annual production of 5 million tons of phosphate rock, 1.5 million tons of phosphoric acid, 2 million tons of sulfuric acid and 3.5 million tons of phosphorus compound fertilizer. In 2011, the company has an annual production capacity of 5 million tons of phosphate rock, 1.5 million tons of phosphoric acid, 2 million tons of sulfuric acid and 3.5 million tons of phosphate fertilizer. The main products are diammonium phosphate and monoammonium phosphate.

The Ammonium Phosphate Branch of Urfu Phosphate Fertilizer Plant produces ammonium dihydrogen phosphate (ADHP), which generates a large amount of exhaust gas. The tail gas mainly comes from the reaction section, drying section and dust collection points in the production plant of Ammonium Dihydrogen Phosphate. In the reaction section, there is a large amount of ammonia volatilization and other production waste gas; drying section of the waste gas source is mainly generated in the drying process of a large number of dust; at the same time in the dust collection point using the suction hood to collect the dust; these exhaust gases are combined together into a , through the Venturi scrubber, the two-stage empty tower scrubber into the chimney through the gravity of the separation of entrained droplets, water droplets, and separated out. Ammonium phosphate tail gas after the above treatment there are still very fine particles of small size with the tail gas through the smoke chimneys discharged into the atmosphere, the formation of gel, with the diffusion of the atmosphere drifting down in the around the production, living, office, greening and other areas of the plant.

Our company cooperated with Wengfu phosphate fertilizer factory ammonium phosphate branch plant in 2014, to add wet fast-flow type electrostatic precipitator after its ammonium sulfur tail gas.

The amount of sulfur and ammonia tail gas is 150,000m3h, the matching wet electrostatic precipitator is 342 tubes, the anode tube is FRP bee nest tube with inner diameter 300mm, and the stainless steel arrow dragon “Z50 type” cathode line. After the operation of the system, greatly reduces the aerosol, dust and water content in the flue gas, and improves the transparency and cleanliness of the flue gas. The removal efficiency of particles is as high as 95%, which not only meets the emission standard of environmental protection flue gas, but also removes the dust from , which can be used as raw material of chemical fertilizer.

This time, after Wengfu group put into use the electrostatic precipitator, under normal operation each cubic meter of flue gas can remove 1,000mg of fertilizer raw materials, processing sulfur and ammonia tail gas amount of 150,000m3/h, that is, the fertilizer raw materials removed per hour 150kg. The total amount of raw materials saved in a year: 150x24x365=1314,000kg, about 1,300 tons. And when the operation is abnormal when the dust (fertilizer raw material) content in the flue gas will reach 9000mg, the amount removed by the electric remover will be even larger, which greatly improves the recycling rate of raw materials.

According to the market price of phosphate fertilizer 2700 CNY / ton, the utilization rate of raw materials for 90%, then one year cost savings: 2700x1300x90% = 3159000 CNY, about 3.16 million.

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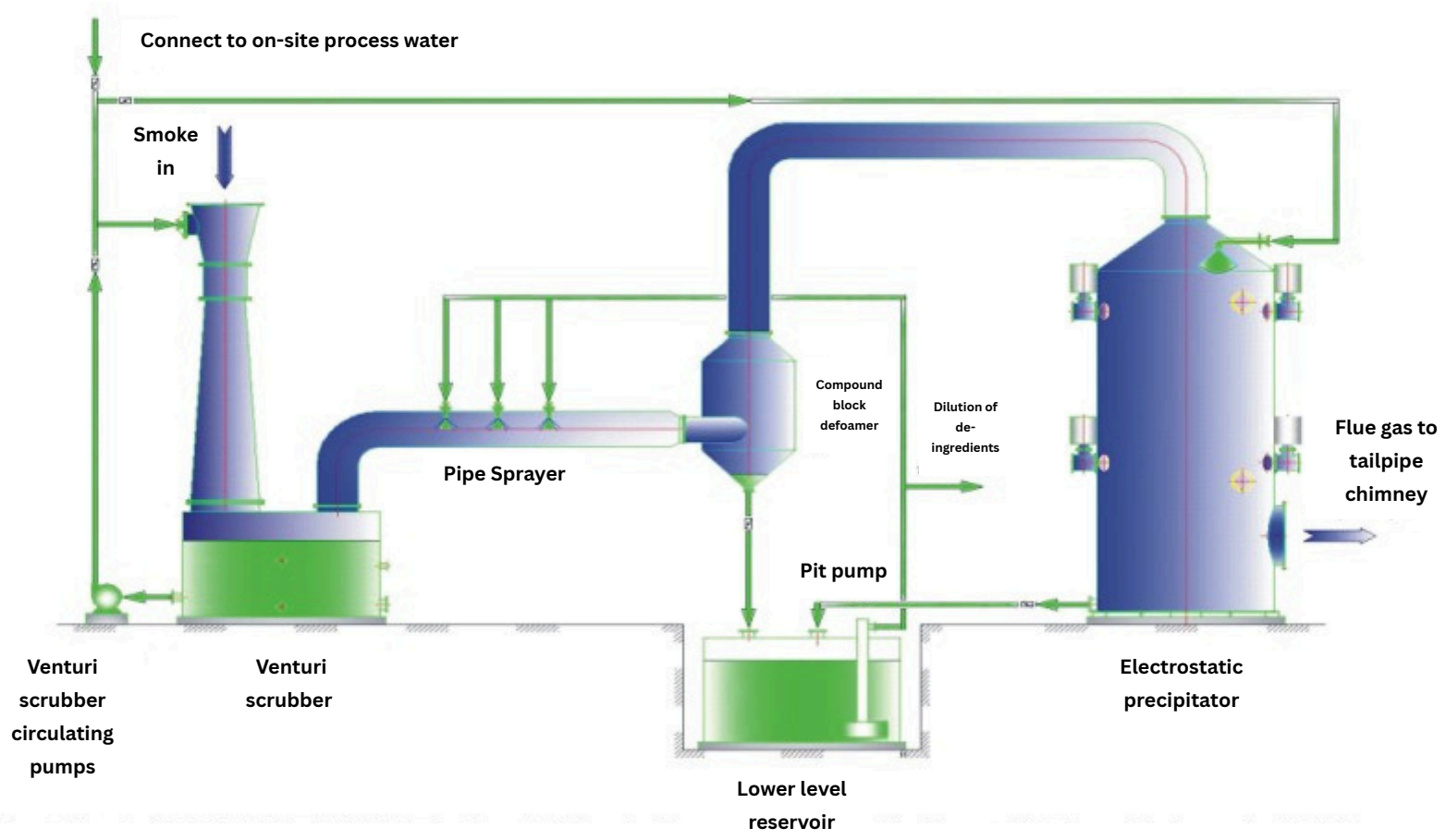
The ammonium sulphate off-gas from the previous process enters the venturi scrubber where it is cooled down and part of the dust is removed. From the venturi scrubber out of the sulfur and ammonia tail gas, through the flue gas pipeline to add a set of pipeline sprayer to make the flue gas further cooling and humidification, and then sulfur and ammonia tail gas into the compound blocking defoamer to remove large particles of water droplets droplets, and then into the high-voltage electrostatic precipitator for further depth of dust removal, mist elimination, and from the high-voltage electrostatic precipitator device out of the flue gas in the particulate matter to meet the standards of the chimney exhaust. Venturi scrubber using a circulating pump closed loop spray, scrubbing liquid from the plant when the shortage of process water system to replenish, at the same time, the plant process water and Venturi scrubber system scrubbing liquid into the high-voltage electrostatic mist eliminator spray system, regular rinsing of the electrostatic precipitator. The dust, mist droplets and washing water captured by the electrostatic precipitator are discharged into the underground tank together with the liquid collected by the compound blocking defoamer. The liquid in the underground tank is pumped by pit pumps partly into the pipeline spraying system for spraying, partly into the recirculation tank of the venturi scrubber, and the remaining part into the raw material dilution system. The following diagram shows the process flow:



Deep purification process after the mist elimination by the electric mist eliminator, the SO2, NOx, acid mist, dust, aerosol, PM2.5 and other environmental pollutants in the tail gas can be controlled extremely well, and the cleanliness of the treated flue gas is much higher than the current environmental protection standard. Moreover, the recovered particles are returned to the system for recycling and utilization, and a small portion of the water in the gas can also be recycled and utilized. However, due to the high temperature of the flue gas, saturated high-temperature gas into the lower temperature of the atmosphere , the water in the gas phase will be supersaturated precipitation droplets, resulting in white smoke phenomenon, the next step can be considered for the cooling of the flue gas, to achieve transparent emissions. Later work we can consider increasing the use of hot flue gas waste heat to reduce the amount of supplementary water in the system, increase the cooling measures, so that the ammonium phosphate tail gas cooling temperature, and then into the electric mist eliminator for dust removal, mist removal. Cooling cooling and then into the electric mist eliminator, flue gas cooling has the following advantages:

(1) Through the cooling, so that the water in the flue gas from the gaseous state into a liquid form of droplets, these droplets through the relative movement of the flue gas in the fine dust particles, impurities wrapped up in the formation of a relatively large particle size particles to facilitate the follow-up of the electrostatic precipitator equipment in addition to the dust, in addition to the fog, dust removal and removal of fog can further increase the efficiency.

(2) High-voltage electrostatic field can capture particulate matter, it is difficult to capture the gaseous form. After the flue gas cooling, moisture in the flue gas from the gaseous state into a liquid state of the droplets, after the high-voltage electric field, the water in the form of droplets captured down to improve the recovery rate of water.

At the same time, the preheat recovery device is also added in the former process, which can not only reduce the temperature of the exhaust gas, but also recover the residual heat, so as to further deepen the work of energy saving and emission reduction.

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