



Sinoma Technology & Equipment Group Co., Ltd.

Sinoma  
Technology  
Equipment

[www.sinoma-tec.com.cn](http://www.sinoma-tec.com.cn)



# COMPANY PROFILE

- 2015 First DeSOx project for thermal power plant
- 2014 First SCR project for chemical plant
- 2013 First bag filter of inner-outside bag for slag grinding mill
- 2012 First SNCR project for cement plant
- 2010 First joint bag filter for heavy dust-laden gas from cement kiln, raw mill and cooler
- 2007 First ETB (Conversion of ESP to bag filter) for heavy dust-laden gas from cement kiln and raw mill
- 2006 First bag filter for biomass energy power generation boiler in China
- 2003 First pulse jet bag filter for cement kiln in China
- 2002 First ESP for heavy dust-laden gas from cement kiln and raw mill in China
- 1996 First high-temperature reverse-air bag filter for cement kiln in China
- 1994 First 240m<sup>2</sup>ESP for iron blast furnace casting house in China
- 1983 First 85 m<sup>2</sup> ESP (electrostatic precipitator) for cement kiln in China

**With world-leading  
environmental protection technology**

## Sinoma Technology & Equipment Group Co., Ltd.

Sinoma Technology & Equipment Group Co., Ltd. (abbr. Sinoma-Tec), with 23 subsidiary firms & manufacturing factories all around China and more than 4,800 employees, is a leading supplier of equipment and services to the world cement, mineral and environmental protection industries. Sinoma-Tec is a high-tech enterprise in the equipment industry under Sinoma International Engineering Co., Ltd. belonging to China National Materials Group Corporation Ltd. (SINOMA) with all its equipment resources.



Sinoma-Tec is a systematic service provider of engineering, research & development, technical service, EPC project, spare parts and international trade. It possesses key technique portfolio and patents and innovation systematical service. Beside of maintaining the predominance and market shares in the field of cement engineering technology and equipment, its products has been successfully applied in metallurgy, mineral, power plant, coal, energy and recycling industries.

In environmental protection section, Sinoma-Tec has one Dedusting Technology Institute (R&D) and three manufacturing bases (Sinoma(henan) Environmental Protection Co., Ltd., Sinoma (Changshu) Environmental Protection & Conveyance Machinery Co.,Ltd. and Sinoma(TianJin) Heavy Machinery Co., Ltd.)

Sinoma-Tec has been engaged in R&D on environmental protection equipment for over 70 years; It possesses many key technical patents and know-how for dust collecting, which is keeping step with world advanced level. Seven series over 60 varieties of Sionma-tec equipment, including ESPs, bag filters, cyclones & separators, gas conditioning towers, constant-temperature controlled water spraying system, air-air heat exchangers, denitration (De-NOx) and desulfurization (De-SOx) technology have been successfully applied in cement, metallurgy, power plant, mineral industry and etc.

Up to today, Sinoma-Tec has supplied over 2000sets of dust collectors for cement production lines of all sizes. The cross-section area of the largest kiln ESP supplied is 330m<sup>2</sup>, the filter area of one single bag filter is up to 28,000m<sup>2</sup>. These products have been supplied to many large groups, such as Lafarge Cement, Heidelberg Cement, Italcementi Group, CRH, Lhoist, Vietnam Song Thao, ONODA, Hume, BOSWA, CONCH and etc., with production lines from 2000t/d to 10000t/d. All the dust collectors supplied have passed the environmental protection acceptance and the lowest dust emission value is only 3mg/Nm<sup>3</sup>.

With the increasing requirements of dust emission for environmental protection standards in recent years, Sinoma-Tec has completed conversion of more than 150ESPs to bag filters, ensuring or even increasing original kiln production output, meeting the new local or national environmental protection standards, and meanwhile reducing energy consumption. It is our know-how and technology that helps our customers gain huge economic and social benefits.

Sinoma-Tec possesses many advanced and reliable technology for harmful gas treatment in denitration and desulfurization industry, and has completed over 100cases. In all the cases, the gas quantity of single equipment can reach 3,400,000 Am<sup>3</sup>/h (NOx emission < 50mg/Nm<sup>3</sup>, SO<sub>2</sub> emission < 35mg/Nm<sup>3</sup>, dust emission < 5mg/Nm<sup>3</sup>), which meets the requirement for ultra-low emission.

Today, Sinoma-Tec, as the leading company of equipment and service supplier in China, became one large scale and high-end equipment manufacturing enterprise group with independent intellectual property and international competitive ability. Sinoma-Tec is dedicated to construct complete industrial chain, occupying key resources, improving service systems, offering value added service, accelerating business transformation, making the most of advantages of talented people, technology, brand, reputation, etc. and offering technical equipment, solutions and all-around full process added service for customers. Sinoma-Tec insists on focusing on the requirements of customers, building professional brand, wishing to build a better future together with new and old friends at home and abroad.





### Administrative policy

- ◆ Quality-rooted, advanced, top-grade, create world-class brand.
- ◆ Environment-based, environmental protection, energy saving, build green homes.
- ◆ Employees-oriented, healthy, harmonious, share joyful work.



### Quality control target

1. Offer technology and service (including consultation, design and project contracting service.)  
—100% up to requirement of laws, regulations, environmental protection, hygiene and safety standard  
—100% up to requirement of contract
2. Offer 100% up-to-standard contract project with excellent product rate not less than 95%.
3. Offer satisfactory product and service, with customer satisfaction more than 99%.
4. Persist in continuous quality improvement, 100% complete improvement measures in management review.



### Integrated quality control, pursue zero-fault

Strictly conform to GB/T 19001-2011, ISO9001:2011, and put emphasis on integrated quality control and pursue zero-fault. Our company has professional quality assurance department in charge of detecting with advanced detection device, and ensuring a matured, reliable and customized high-end product provided to the customers.





## Manufacturing bases and advanced manufacturing facilities

Sinoma-Tec has three professional manufacturing bases, which are Sinoma(henan) Environmental Protection Co., Ltd., Sinoma (Changshu) Environmental Protection & Conveyance Machinery Co.,Ltd. and Sinoma(TianJin) Heavy Machinery Co., Ltd.). These bases are equipped with 300 units of manufacturing facilities including large CNC vertical lathes, CNC horizontal lathes, CNC milling machines, deep hole drilling machines, CNC laser cutting machines, large-scale lifting equipment etc., ensuring the stability of product quality. They are also the manufacturing bases and centers of high-end equipment for cement and environmental engineering in North, Central and Eastern China.



Sinoma (Changshu) Environmental Protection & Conveyance Machinery Co.,Ltd.



Sinoma(TianJin) Heavy Machinery Co., Ltd.

CNC laser cutting machine



Modern processing and manufacturing workshop



CNC plasma cutting machine



Large-scale bending machine

Large-scale shearing machine



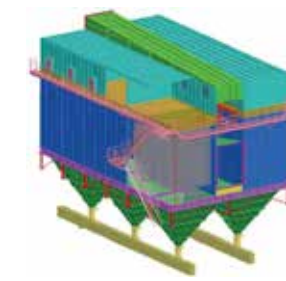
Steel structure pretreatment equipment



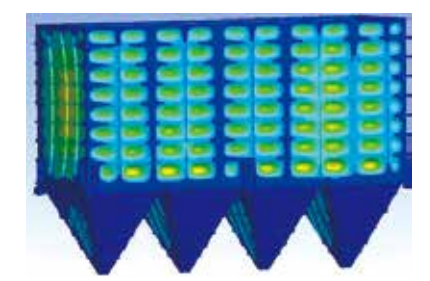
## RESEARCH SYSTEM



Design software with independent intellectual property rights



Integral sectional view



Integral structural analysis



Laboratory for bag filter

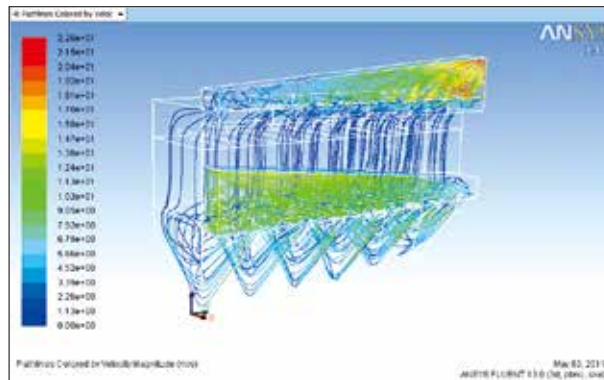


Pulse jet test device

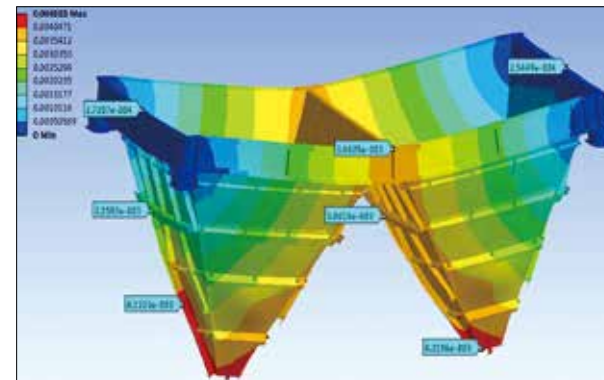


Pulse jet unit under inspection in the factory

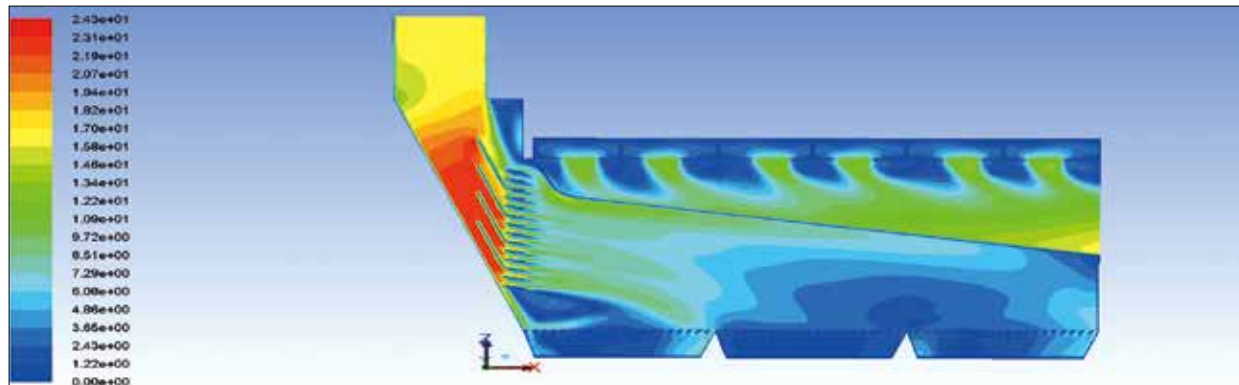




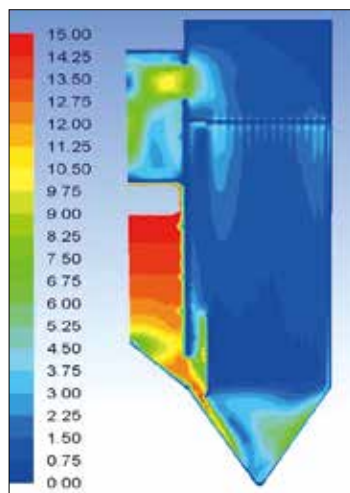
Numerical simulation and performance analysis of bag filter by CFD



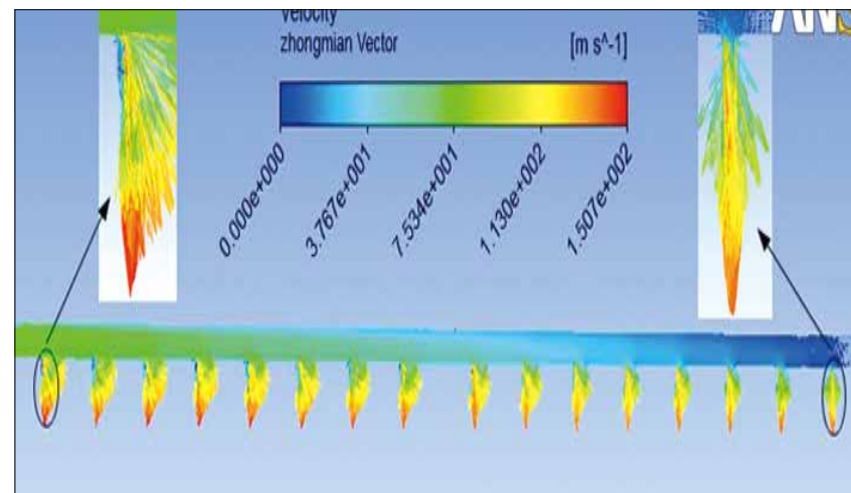
Stress analysis for hopper



Flow field analysis for inlet duct



Flow field analysis of one section



Numerical simulation research on the dust cleaning technology by CFD

## TDM large-scale process bag filter

### Application

This kind of bag filters are used for removing and collecting solid particles in the gas, and applied mainly for exhaust gas treatment of kiln & cooler, bypass and dust treatment of dryer, grinding system (cement mill, slag mill) etc. in cement industry. It is also applied for exhaust gas treatment in metallurgy, electrical power, chemical industry, ceramic, nonmetallic mine, heavy metal smelting, etc. industry.



### Advantages

- ◆ High dust-collection efficiency.
- ◆ Low differential pressure between inlet and outlet, low power consumption.
- ◆ Stable and reliable operation, 100% synchronized operation with main equipment, low maintenance cost, special anti-corrosive measures ensuring longer service life.
- ◆ Integration in R&D, manufacturing, installation and service; professional system solution for customers.
- ◆ Single jetting & double jetting both available, which are applicable for a wide range of gas flow volume.
- ◆ Long service life of filter bag ensuring lower operation cost.

### Features

- ◆ Design of equipment structure with ANSYS software, ensuring safety and economy of equipment.
- ◆ Design of reasonable gas-distribution device and low CAN gas flow structure with CFD, ensuring high-efficient and safe operation.
- ◆ Walk-in clean air plenum with double layer access door, ensuring air leakage rate less than 3%.
- ◆ Standard modular structure, making site installation convenient and effective seal welding.
- ◆ Key structure-pulse jet device and dedusting control device gained many state patents for invention and utility model.
- ◆ Multiple intelligent operation monitoring system, overall real-time monitoring gas temperature, gas pressure, differential pressure between chambers, air distribution and broken bags. Feedback the dedusting control and abnormal alarming in time, ensuring quick and accurate monitoring for broken bags in operation.
- ◆ Perfect dedusting control system with Siemens PLC, including "time set", "pressure set", "on-line" and "off-line" dedusting programs available for owner's option.
- ◆ Touch screen and human-computer interface facilitating to adjust the dedusting program, including intervals and pressure.

### Specification and performance table:

Developed process bag filter series									
Type	Filter area of one chamber(m <sup>2</sup> )	Qty. of chambers		Capacity(m <sup>3</sup> /h)		Inlet dust concentration (g/Nm <sup>3</sup> )	Outlet dust emission (mg/Nm <sup>3</sup> )	Filter resistance (Pa)	
		MIN	MAX	MIN	MAX				
TDM-	176	619	6	20	222937	743125	<1000	<10	<1200
TDM-	192	676	6	20	243205	810682	<1000	<10	<1200
TDM-	216	760	6	20	273605	912017	<1000	<10	<1200
TDM-	224	788	6	20	283739	945795	<1000	<10	<1200
TDM-	324	1140	6	20	410408	1368025	<1000	<10	<1200
TDM-	384	1351	6	20	486409	1621363	<1000	<10	<1200
TDM-	512	1802	6	20	648545	2161818	<1000	<10	<1200

Note: the table above takes length of filter bag (Ø160×7000mm) as standard.

Sinoma-Tec supplies bag filters with capacity of 3,000-2,000,000 m<sup>3</sup>/h, dust emission < 10 mg/Nm<sup>3</sup> (2 mg/Nm<sup>3</sup> for special design), negative pressure < 15,000 Pa, differential pressure between inlet and outlet < 1,200 Pa. Additionally, we can design bag filters according to special requirement for customer.

Sinoma-Tec supplies whole set of products focusing on process system and requirement of customers. Based on powerful R&D ability, we are leading environmental protection industry by optimized production flow and high-efficiency execution, and can offer whole set of products for customers.



## TDM Bag Filter Special for Coal Mill

### Application

This kind of bag filters are used for removing and collecting combustible particles in the gas, and applied mainly for dust treatment of coal powder preparation system. It is also applied for metallurgy, carbon black, electrical power, sludge drying, etc. industry.



### Advantages

- ◆ Three measures including static prevention, dust accumulation prevention and spark prevention, ensuring safe and stable operation.
- ◆ Multiple operation monitoring system feedback abnormal alarm in time.
- ◆ Multiple explosion venting measures, ensuring resolving rapidly after accident.
- ◆ Higher dedusting strength, longer bag and smaller footprint compared to plenum pulse coal mill bag filter. It is applicable for large gas capacity system of coal vertical mill.
- ◆ On-line dedusting modes(recommend), saving bags at the same of gas capacity.

### Features

- ◆ Anti-static bag & cage and reliable grounding equipment, preventing static accumulation effectively.
- ◆ Large-angle pyramid hopper with side wall vibrator and heater (applied in extreme-cold areas or for high humidity process), preventing dust accumulation in the hopper.
- ◆ Anti-accumulation discharger, preventing coal powder accumulation in the hopper.
- ◆ Equipped with explosion venting valve and CO<sub>2</sub> extinguishing system.
- ◆ Multiple operation monitoring measures including hopper temperature, compressed air pressure, bag broken(optional) and CO outlet concentration.
- ◆ Low resistance of equipment reduces energy consumption of fan.  
More reasonable dedusting cycle and pressure reduces compressed air consumption and extends life of bags, ensuring lower operation cost.

#### Developed coal mill bag filter series

Developed process bag filter series									
Type	Filter area of one chamber(m <sup>2</sup> )	Qty. of chambers		Capacity(m <sup>3</sup> /h)		Inlet dust concentration (g/Nm <sup>3</sup> )	Outlet dust emission (mg/Nm <sup>3</sup> )	Filter resistance (Pa)	
		MIN	MAX	MIN	MAX				
TDM-96	176	4	20	42240	211200	<1000	<10	<1200	
TDM-126	231	4	20	55440	277200	<1000	<10	<1200	
TDM-144	265	4	20	63600	318000	<1000	<10	<1200	

Note: the table above takes length of filter bag (Ø130×4500 mm) as standard.

Customized design for special requirement and industry.

## TDM Standard Bag Filter

### Application

This kind of bag filters are mainly used for Ventilation and dust collection in crushing plant, transfer point, bulk loading point and bin & silo. It is also applied for dust collection in metallurgy, electrical power, chemical industry, ceramic, nonmetallic mine, heavy metal smelting, etc industry.



### Advantages

On-line dust cleaning method without poppet valve and cylinder at outlet ensuring high operation reliability.  
Less bag with bag length up to 3500mm ensuring small footprint and simple process layout.

### Features

- ◆ Pulse jet technology, ensuring complete dedusting and low operating resistance.
- ◆ Long bag, compact structure and small footprint, making easy for process layout.
- ◆ Multiple inlet & outlet modes and ladder position, making easy for client to arrange.
- ◆ Integral transportation with small volume, ensuring manufacturing quality.
- ◆ Side exchanging bag at special position such as bottom of bin and silo etc., reducing the requirements of space height.
- ◆ Series standard product design, ensuring interchangeability for wear parts of bags, cages and pulse valves.
- ◆ Automatic control of dedusting program and easy maintenance.

#### Specification and performance table:

Type	Capacity	Inlet dust concentration	Outlet dust emission	Filter resistance
	m <sup>3</sup> /h	g/Nm <sup>3</sup>	mg/Nm <sup>3</sup>	Pa
TDM-3x12	≤ 3700	≤ 200	10	≤ 1200
TDM-3x16	≤ 4900	≤ 200	10	≤ 1200
TDM-4x16	≤ 6500	≤ 200	10	≤ 1200
TDM-5x14	≤ 7200	≤ 200	10	≤ 1200
TDM-5x16	≤ 8200	≤ 200	10	≤ 1200
TDM-6x16	≤ 9800	≤ 200	10	≤ 1200
TDM-9x12	≤ 11100	≤ 200	10	≤ 1200
TDM-10x12	≤ 12300	≤ 200	10	≤ 1200
TDM-11x12	≤ 13500	≤ 200	10	≤ 1200
TDM-12x12	≤ 14800	≤ 200	10	≤ 1200
TDM-13x12	≤ 16000	≤ 200	10	≤ 1200
TDM-12x14	≤ 17200	≤ 200	10	≤ 1200
TDM-13x14	≤ 18700	≤ 200	10	≤ 1200
TDM-13x16	≤ 21400	≤ 200	10	≤ 1200
TDM-14x16	≤ 23000	≤ 200	10	≤ 1200

Note: the table above takes length of filter bag (Ø130×3500 mm) as standard.

Customized design for special requirement and industry.



## Plenum Pulse Bag Filter

### Application

This kind of bag filters are mainly used for ventilation and dust collection in crushing plant, transfer point, bulk loading point, bin & silo and grinding system. It is also applied for dust collection in metallurgy, electrical power, chemical industry, ceramic, nonmetallic mine, heavy metal smelting, etc industry.



### Advantages

- ◆ Simple and practical structure, low steel consumption.
- ◆ Off-line dust cleaning method with very good result.

### Features

- ◆ Separated chambers, dedusting separately, on-line maintenance.
- ◆ Pulse valves with large volume adopted, jetting with higher air pressure and more strength and less pulse valves.
- ◆ No jetting tube in chambers, easy to replace bags.
- ◆ Embedded elastic bag mouth (called as "snap" design), ensuring low dust emission.

### Specification and performance table:

Developed process bag filter series									
Type	Filter area of one chamber(m <sup>2</sup> )	Qty. of chambers		Capacity(m <sup>3</sup> /h)		Inlet dust concentration (g/Nm <sup>3</sup> )	Outlet dust emission (mg/Nm <sup>3</sup> )	Filter resistance (Pa)	
		MIN	MAX	MIN	MAX				
LPF-	32	40	3	6	7200	14400	<1000	<10	<1200
LPF-	64	80	3	8	14400	38400	<1000	<10	<1200
LPF-	96	120	3	20	21600	144000	<1000	<10	<1200
LPF-	128	160	3	22	28800	211200	<1000	<10	<1200
LPF-	144	180	3	22	32400	237600	<1000	<10	<1200
LPF-	152	190	3	22	34200	250800	<1000	<10	<1200

Note: the table above takes length of filter bag (Ø130×3060mm) as standard.

## Electrostatic Precipitator (ESP)

### Application

ESP is widely used for removing and collecting solid particles in industrial gas, and applied mainly for exhaust gas treatment of kiln, cooler, bypass and dust treatment of dryer, grinding system (cement mill, coal mill), etc. in cement industry. It is also applied for exhaust gas treatment in metallurgy, electrical power, chemical industry, ceramic, nonmetallic mine, heavy metal smelting, etc industry.



### Advantages

- ◆ Mature and advanced ESP technology with precise manufacture and reasonable layout.
- ◆ Widely adaptive operation condition, including high temperature, heavy dust load and high negative pressure.
- ◆ Low pressure differential, high dust collecting efficiency.
- ◆ Stable and reliable operation with multi electric fields, 100% synchronized operation with cement kiln.
- ◆ Long service life and low maintenance cost.

### Features

- ◆ Standardized and computer-aided design for reasonable structure and convenient maintenance;
- ◆ Boxed roof beam, making ESP light in weight and strong.
- ◆ Discontinuous rapping, making low dust emission.
- ◆ High frequency power supply, making power saving 20~30%.
- ◆ Advanced gas distribution plates and gas guiding plates, making gas distribute more uniformly and reasonably in electrical fields.
- ◆ Advanced collecting plates (ZT24) and discharge electrodes (V0, V15, V25, V40) optimally matched high-voltage power supply, effectively increasing average voltage in electrical fields and current density on plates, resulting in more efficient dust collecting.
- ◆ Three inlet and outlet modes, which is from top, horizontal and from bottom, meeting different process layouts and simplify process flow.

### Specification and performance table:

Capacity (m <sup>3</sup> /h)	Outlet dust emission (mg/Nm <sup>3</sup> )	Pressure loss (Pa)	Specification of ESP	Inlet mode
<200000	≤50	200	18/7.5/3×8/0.4	from top, flap type
200000-300000			24/10/3×8/0.4	horizontal, X-shape
300000-400000			25/10/3×9/0.4	from top, flap type
			23/10/3×9/0.45	from top, flap type
			22/12.5/3×9/0.45	from top, flap type
			22/12.5/3×9/0.45	from top, flap type
			27/12.5/3×9/0.45	from top, flap type
			30/12.5/3×10/0.4	horizontal, X-shape
400000-500000			33/12.5/3×10/0.4	horizontal, X-shape
			31/15/3×9/0.4	horizontal, X-shape
			3×23/12.5/3×10/0.4	horizontal, X-shape
			32/12.5/3×10/0.4	from top, flap type
			33/12.5/3×10/0.4	from top, flap type
			33/12.5/3×10/0.45	from top, flap type
			34/12.5/3×9/0.4	from top, flap type
			2×31/12.5/4×8/0.4	from top, baffle type
600000-800000			2×28/15/3×10/0.4	horizontal, X-shape
			2×23/15/3×11/0.4	horizontal, X-shape
			2×31/12.5/4×9/0.4	from top, baffle type
			2×22/15/4×10/0.4	from top, flap type
	2×34/12.5/3×9/0.4	from top, flap type		
800000-1000000				
>1000000				



## AHE air air heat exchanger

### Application

This kind of equipment are used for reducing gas temperature from cooler in cement plants. It can effectively reduce the quantity of exhaust gas and protect bag filter from damage of high temperature. It is also applied for exhaust gas treatment in metallurgy, electrical power, chemical industry, etc industry.

### Advantages

- ◆ Use ambient air as cooling medium, which is not limited by environmental resource.
- ◆ Reduce temperature of gas stably and reliably.
- ◆ Operate fans in group or single flexibly according to gas temperature of inlet & outlet, achieving low power consumption.
- ◆ Apply slow-speed and large-airflow cooling fan with low noise.



### Features

- ◆ Apply crossflow in-line (or staggered) heat-exchange structure with high heat exchange efficiency.
- ◆ Apply coupled type fan with high transmission efficiency and low trouble risk.
- ◆ Protective tubes at inlet of heat-exchange tubes prolong the service life.
- ◆ Plate-type structure, tube bundles delivered as one unit make site installation easy.
- ◆ Floating inlet at the top of tube bundles, solving the problem of internal thermal expansion and sealing.
- ◆ High-temperature limit is up to 450°C, which is suitable for operation of cooler.

#### Specification and performance table:

Type		Temperature (°C)		Capacity (Nm <sup>3</sup> /h)	Tube arrangement	Pressure drop (Pa)
		Inlet	Outlet			
AHE-S-	269/2×2	250/(450)	130/(200)	105000	staggered	<500
AHE-S-	367/2×3	250/(450)	130/(200)	300000	staggered	<500
AHE-S-	399/2×2	250/(450)	130/(200)	190000	staggered	<500
AHE-S-	399/2×3	250/(450)	130/(200)	350000	staggered	<500
AHE-S-	487/2×2	250/(450)	130/(200)	240000	staggered	<500
AHE-S-	487/2×3	250/(450)	130/(200)	400000	staggered	<500
AHE-S-	487/2×4	250/(450)	130/(200)	480000	staggered	<500
AHE-L-	23×28/3	250/(450)	130/(200)	365000	in line	<300
AHE-L-	23×24/2	250/(450)	130/(200)	190000	in line	<300

## Technology of converting ESP to BF

### Application

A great number of existing electrostatic precipitators of cement production lines in China ( including ESPs for cooler, kiln, cement mill, dryer, bypass and coal mill) can no longer meet the new dust emission standards and need modification and upgrading, some of them being too small due to past low requirements of dust emission, and some of them operating poorly due to the fluctuation of dust specific resistance after addition of WHG system ( waste heat power generation). The technology of converting ESP to BF (abbr. ETB) developed by Sinoma-Tec is based on advanced low-pressure long-bag pulse jet technology and targeted at the stricter dust emission of different countries. It converts ESP to a pulse jet BF or a hybrid filter by reusing some structure of the original ESP and adding internal gas distribution devices and components of pulse jet bag filter. This technology is adaptable for conversion of leading ESP (including Lurgi, KHD, ELEX, EE and national type) to BF at home and abroad. It is also applicable for the conversion of the same kind of products in electrical power, metallurgy, chemical engineering, etc industry. It has gained a second award of science and technology progress prize awarded by China Building Materials Industry Association in 2010.



### Advantages

- ◆ Diagnosis and test for the operation of existing system before conversion engineering.
- ◆ Customize the system conversion plan based on current operating parameters and offer "turn-key" engineering service (including conversion of ID fan/ motor/VVF, air compressors, gas cooling system, dust conveyers, duct anti-abrasion treatment and corresponding civil, electrical & automation design).
- ◆ The dust emission is low (<10 mg/Nm<sup>3</sup>) after conversion; achieve on-line overhaul and synchronized operation with main equipment and non-troubling dust emission.
- ◆ Low resistance after conversion leads to low energy consumption.
- ◆ Saving steel structure, simple construction and short in time limit reduce the construction cost of conversion;
- ◆ Increase the gas capacity of bag filter.
- ◆ Suitable for collecting heavy dust laden gas for kiln.

### Features

- ◆ Analyzing the structure of reusing parts of ESP with ANSYS and based on site calibration, scientific enforcement ensuring safety and economy of equipment.
- ◆ Internal gas distribution device developed with CFD ensuring gas distribute uniformly and reasonably.
- ◆ Walk-in type clean air plenum structure with double-layer access door, ensuring air-leakage less than 3%.
- ◆ Integrate pulse jet unit and square-section blow tube, facilitating manufacture and installation of equipment and shortening installation period.
- ◆ Special anti-corrosion measures suitable for conversion of ESPs for kiln, bypass and dryer.
- ◆ Key structure—low-pressure long-bag pulse jet technology and de-dusting control device gained many state patents for invention and utility model. Lower pressure differential means lower power consumption, more reasonable dust-cleaning cycle and compressed air pressure means less compressed air consumption.
- ◆ Multiple intelligent operational monitoring system, overall real-time monitoring gas temperature, gas pressure, differential pressure between chambers, gas distribution and broken bags. Feedback the de-dusting control and abnormal alarming in time, ensuring the quick and accurate detecting of broken bags in operation.
- ◆ Perfect de-dusting control system with Siemens PLC, including "time set", "pressure set", "on-line" and "off-line" de-dusting programs available for owner' option.
- ◆ Touch screen and human-computer interface facilitating to adjust the de-dusting program, including intervals and pressure.



## Gas conditioning tower (GCT) & constant-temperature water-spraying system

### Application

These devices are mainly used for conditioning and cooling gas from kiln, cooler, bypass and grinding system. They are also applicable for exhaust gas in metallurgy, electrical power, chemical etc industry.

### Advantages

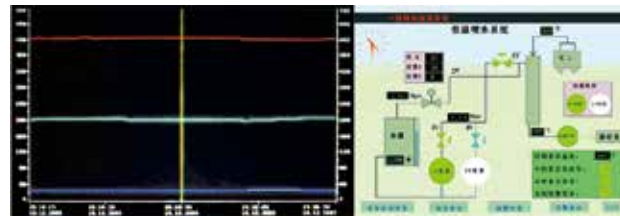
Integration of engineering, manufacture, installation and after-sale service. customized and specialized engineering and service based on concrete operation situation and requirement.  
Intelligent and easy operation, automatic regulation and real-time monitoring.  
Water-spraying system: simple structure and single cooling medium and no need for compressed air, less space and less investment.

### Features

- ◆ Simulation by computer based on academic calculation and rich site experience, applicable for different operation of cement production line. Thermocouple reacting within micro-seconds, isolators used for analog signal to isolate disturbing signals under site situation. S7 series PLC adopted in the control box can collect and treat digital and analog signals in the water spraying system quickly.
- ◆ Perfect monitoring devices: monitoring of water-level and temperature of water tank, monitoring of water pressure of feeding and returning water piping, monitoring of gas temperature.
- ◆ Keeping outlet temperature constant by combined adjustment of returning valves and quantity of working lances.
- ◆ Pump preassembled together with control valves in the manufacturing plant. Three stages of filtration for water-spraying system, lances with self-cooling and self-purging device, removing block in high temperature and heavy dust-laden gas. Nozzles with special material can withstand high temperature and be of anti-corrosion and anti-abrasion.
- ◆ GCT: Inlet from up and horizontal and outlet of horizontal and slope are available for choice and very convenient to arrange. Multi-layers gas distribution plates and multi-arrangement of different lances guarantees good performance of GCT.



Pre-assembled Combined Unit for Pumps and Control Valves



Screen Copy for Constant Temperature Water-spraying System fo Anqing Aerbo Project

### Performance and Specification:

GCT Specification		Ø6.5 × 26m	Ø7.5 × 30m	Ø8.5 × 34m	Ø9.5 × 39m	Ø10 × 42m	
Performance Data	Gas Volume *10 <sup>4</sup> Nm <sup>3</sup> /h	18	18-27	27-40	40-80	80-100	
	Max. Water Consumption (t/h) ≥ 10s			300			
	Resistance (Pa) ≤			300			
	Inlet Dust Content (g/Nm <sup>3</sup> ) ≤			200			
	Pressure (Pa) ≤			6000			
	Inlet Temperature (°C)	350 (Max450)	350 (Max450)	350 (Max450)	350 (Max450)	350 (Max450)	
Outlet Temperature (°C)	150 (Max200)	150 (Max200)	150 (Max200)	150 (Max200)	150 (Max200)		
Max Water Consumption (t/h)	18	27	40	57	68		
Structure Data	GCT Diameter (m)	6.5	7.5	8.5	9.5	10	
	GCT Height (m)	26	30	34	39	42	
	Gas Entrance		From top	From top	From top	From top	From top
	Screw Conveyor	Size	Ø500 × L	Ø500 × L	Ø500 × L	Ø500 × L	Ø500 × L
		Quantity	1	1	1	1	1
	Motorized Slide Gate	Size	Ø500	Ø500	Ø500	Ø500	Ø500
		Quantity	2	2	2	2	2
	Motorized Doubleflap Valve	Size	Ø500	Ø500	Ø500	Ø500	Ø500
		Quantity	2	2	2	2	2
	Weight						
Waterspraying System	Pressure (MPa)	2.8					
	Type	Spill-return	Spill-return	Spill-return	Spill-return	Spill-return	

## Introduction of denitration technology for thermal power plant

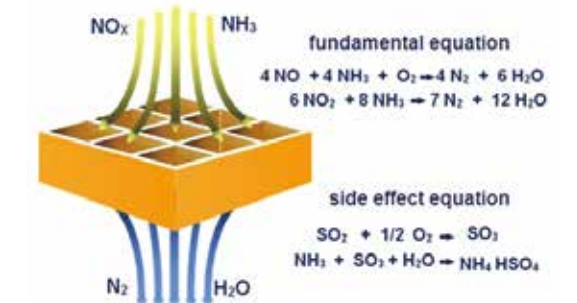
Generally speaking, denitration technology can be classified into two categories: source control and tail end flue gas treatment.

- ◆ Source control includes low NOx combustion technology and staged combustion technology.
- ◆ Tail end flue gas treatment includes SCR (Selective Catalytic Reduction) and SNCR (Selective Non-Catalytic Reduction).

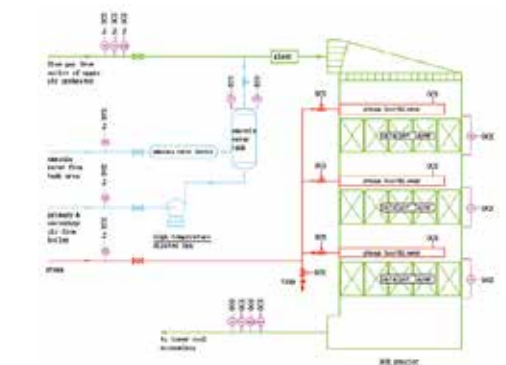
### SCR (Selective Catalytic Reduction)

- ◆ Principle: put reductant (ammonia) evenly into the flue gas at the temperature of 320~420°C. Under the effect of catalyst (rare-earth or V-Ti), the NOx in flue gas selectively reacts with ammonia to form N<sub>2</sub> and H<sub>2</sub>O and remove the NOx.

#### ◆ Main reaction equation

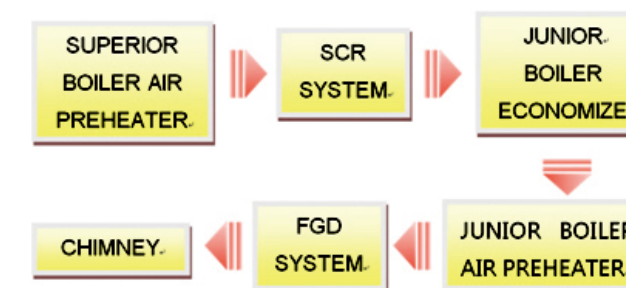


#### ◆ SCR flow sheet for boiler

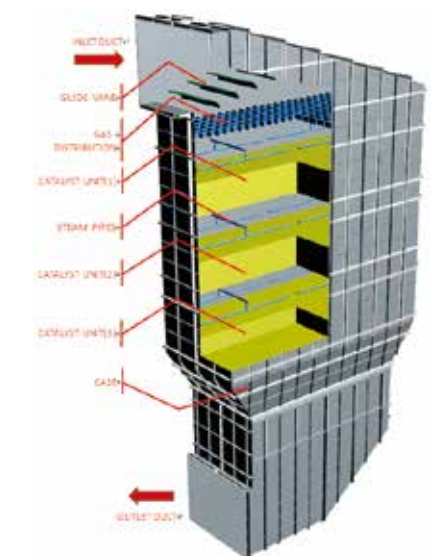
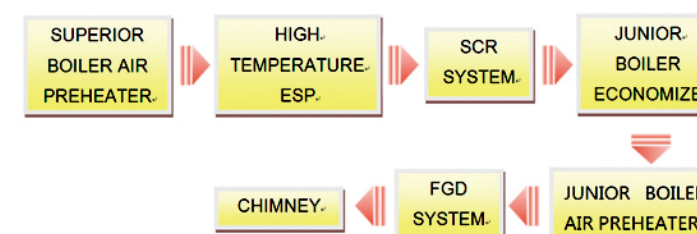


#### ◆ SCR denitration typical case

a) Layout for high dust density case (single boiler)



b) Layout for low dust density case (single boiler)



Denitration Reactor



◆ Feature of SCR system

- a) Located at the tail end, little influences on boiler;
- b) High denitration efficiency, max efficiency can reach above 93%;
- c) Low ammonia escape rate (less than 3ppm);
- d) Low ammonia consumption, low ammonia-nitrogen ratio ( normally less than 1.05);
- e) SO<sub>2</sub>/SO<sub>3</sub> conversion rate less than 1%;
- f) Most applied for high-capacity machine units.

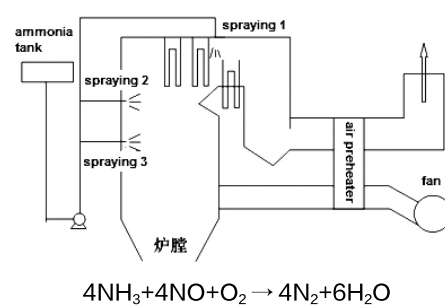
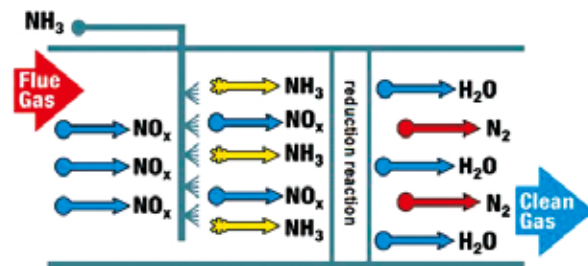
◆ Advantage of Sinoma SCR denitration system

- a) Sinoma has a long history of service in cement, thermal power, glass and relevant industries, and has formed a complete service system from design, research, manufacture, execution and installation. Sinoma can provide a integrated solution for flue gas cleaning and a full service to the client.
- b) Combining the domestic and international advanced technology, Sinoma innovates constantly and develops SCR denitration system with independent intellectual property rights suitable for different types, fuel and combustion conditions.
- c) The newly developed denitration system adopts non-toxic rare earth oxides as catalyst, which has good stability and superior performance. The catalyst reacts stably and has good ability to cope with fluctuation of furnace load.
- d) Denitration system is equipped with advanced inlet and outlet flue gas analyser and high-sensitive control system, which ensures the denitration system run steadily and reliably and the operating parameters be automatically regulated in time.
- e) For each newly-built or modified denitration system, CFD flow field is made at the beginning of the proposal to improve the uniformity and stability, which reduces the operating resistance of the denitration system in the maximum extent.

SNCR (Selective Non-Catalytic Reduction)

- ◆ Principle: put reductant (ammonia) evenly into the flue gas at the temperature of 850~1050°C. Without the effect of catalyst, the NO<sub>x</sub> in flue gas selectively reacts with ammonia to form N<sub>2</sub> and H<sub>2</sub>O and remove the NO<sub>x</sub>.
- ◆ Main reaction equation:

◆ SNCR flow sheet:



◆ Feature of SNCR:

- a) Use boiler as reactor, nonuse of catalyst;
- b) Reaction temperature at 850~1050°C ;
- c) Low denitration efficiency ( at 30~50%);
- d) No SO<sub>2</sub>/SO<sub>3</sub> conversion;
- e) Simple system, low first investment, high operating cost;
- f) Widely applied for low-capacity machine units, circulating fluidized bed boilers and cement plants.

◆ Advantage of Sinoma SNCR denitration system

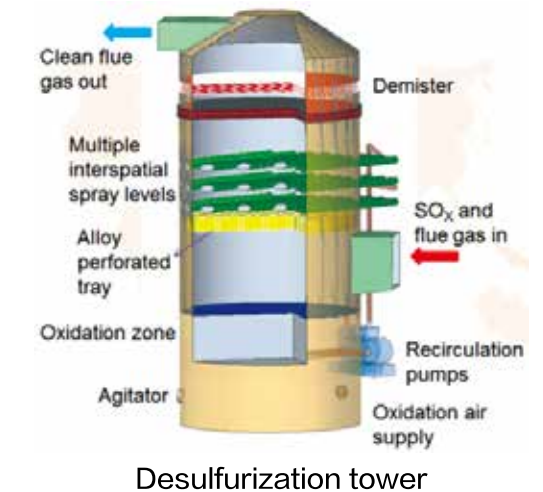
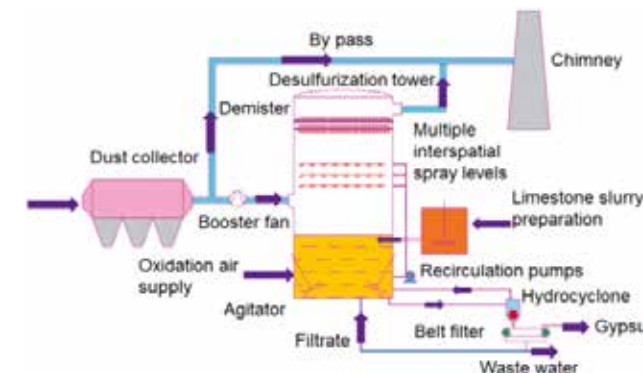
- a) Denitration system is equipped with advanced inlet and outlet flue gas analyser and high-sensitive control system, which ensures the denitration system run steadily and reliably and the operating parameters be automatically regulated in time.
- b) Sinoma's SNCR denitration system is equipped with high-efficiency atomizing nozzle, which makes the reaction more sufficient and quick. This system improves the reaction efficiency and reduces the ammonia escape quantity and mole ratio of NH<sub>3</sub>/ NO<sub>x</sub>.
- c) Sinoma's SNCR denitration system has zero influence on the original furnace combustion condition, so as not to affect the production efficiency.

Limestone-Gypsum Wet Desulfurization

Application

Limestone-Gypsum Wet Desulfurization is applicable for high and middle sulfur coal flue gas desulfurization of large and medium sized industrial furnace. This method has been applied successfully in cement, metallurgy, electric power etc. industry.

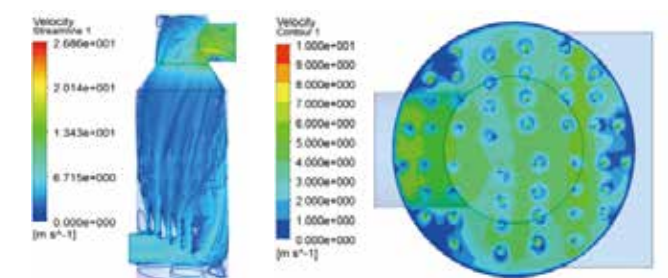
Principle and process flow



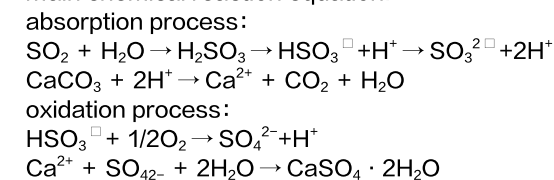
Process Features

- ◆ Abundant resources and low price due to adopting common limestone(lime) as desulfurizer. Especially for cement plant, the kiln dust can be adopted directly as desulfurizer.
- ◆ High desulfuring efficiency up to 99%;
- ◆ Mature technology, stable operation, rate of operation up to 98 or more;
- ◆ Desulfurization by-products have added value and can be recycled.
- ◆ Large capacity of flue gas and good adaptability to coal type, applicable for flue gas desulfurization with different coal sulfur contents.
- ◆ This process can also remove some of HCL, Hg, VOC etc. harmful substances. For PM, it can achieve super-clean emission.
- ◆ Limestone Slurry preparation  
Adopt limestone or lime as desulfurizing absorbent, Limestone is treated by crushing and grinding, then add water stirring into absorbent slurry. Lime powder is added water stirring into absorbent slurry.
- ◆ Absorption and reaction  
SO<sub>2</sub> in the flue gas firstly is absorbed by water of the slurry in desulfurization tower, and reacts with CaCO<sub>3</sub> to form CaSO<sub>3</sub>. CaSO<sub>3</sub> is oxidized by O<sub>2</sub> of the air blowed in, finally generating gypsum crystal CaSO<sub>4</sub> · 2H<sub>2</sub>O. The flue gas after desulfurization go through the demister to remove the small droplet, and then is emitted through the chimney.
- ◆ Gypsum dewatering  
Desulfurization gypsum slurry is recycled after dewatering treatment.

Advantages of desulfurization system developed by Sinoma



Main chemical reaction equation:





- ◆ Adopt uniform-fluid device based on CFD analysis, increasing the desulfurization efficiency. Equipped with inlet baffle device, tray device, energy saving ring etc. structure in strict accordance with CFD analysis, ensuring uniform distribution of flue gas in the tower and increasing the mass transfer efficiency.
  - 1) Inlet diversion device improves the gas distribution in desulfurization tower and then reduce the diameter or tower, which reduces investment.
  - 2) Tray device strengthens the mass transfer of SO<sub>2</sub> into slurry to form slurry foam layer which enlarges the area between gas and liquid. It can improve absorption and reduce spraying quantity of circulating slurry.
  - 3) Energy saving ring can effectively prevent flue gas escaping and scouring the wall of tower, reducing the gas-liquid ratio.
- ◆ Reasonable layout of spraying layer and nozzles, high-performance double nozzles, strengthening mass transfer effect. Adopt special program to design every spraying layer and its nozzles, ensuring high spraying coverage rate and uniformity, which increases desulfurization efficiency and reduces circle quantity of slurry. Adopt high-performance double nozzles and achieve intensive secondary atomization, which enlarges the area between gas and liquid. This nozzle has excellent wear & corrosion resistance, anti-blocking function and high reliability.



Spraying device used for absorption and reaction



- ◆ Adopt high-performance demister  
Adopt multi-layer high-performance ridge-type demister combined with uniform-flow board technology to achieve low pressure and small critical separated droplet diameter, ensuring carrying quantity of droplet no more than 20mg/Nm<sup>3</sup>. It can minimize dust quantity carried by mist and achieve super-clean emission.
- ◆ DCS intelligent control system  
DCS intelligent control system: adds inlet pressure control loop of fan; regulate the SO<sub>2</sub> outlet concentration by slurry offering; concentration control by vacuum dehydrating agent filter cake; automatic washing control of demister based on differential pressure. All the controls reduce energy consumption and ensure that emission standard is achieved.
- ◆ Innovation design of energy conservation for kiln flue gas desulfurization in cement plant  
Create a simplified limestone wet desulfurization process, aiming at the instability of sulfur content. This process takes energy conservation as a top priority under the condition of achieving emission standard, which can save energy more than 50% compared to common limestone wet desulfurization. The desulfurization cost of large cement product line can be controlled at below 2 RMB yuan per ton of clinker.

### Project parameter table

Generating unit capacity (MW)	600	300	50	25
Max continuous evaporation (t/h)	2042	1025	240	130
FGD flue gas inlet flow(wet basis) (Nm <sup>3</sup> /h)	2170000	1090000	340000	170000
FGD design gas temperature (°C)	123	134	145	140
FGD inlet SO <sub>2</sub> concentration (mg/Nm <sup>3</sup> )	4200	900	2000	3600
FGD inlet dust concentration (mg/Nm <sup>3</sup> )	30	80	30	15
Desulfurization tower size (m)	φ16.9x35	φ12.9x27	φ7.3x34	φ5.2x28
FGD outlet SO <sub>2</sub> concentration (mg/Nm <sup>3</sup> )	35	100	35	100
FGD outlet dust concentration (mg/Nm <sup>3</sup> )	5	18	5	18
Total pressure loss (Pa)	2400	1500	2300	1800

## PROJECT CASES



Bag filter for kiln of Malaysia Bahau Cement Plant (5000 t/d)



Bag filter for coal mill of Malaysia Bahau Cement Plant (5000 t/d)



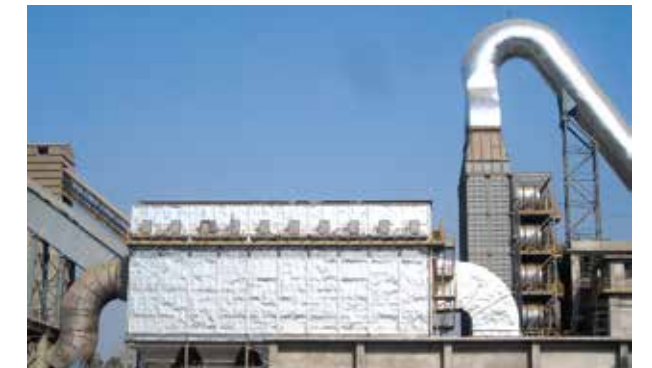
Bag filter for kiln of Malaysia Hume Line 2 Cement Plant (5000 t/d)



Bag filter for cooler of Malaysia Hume Line 2 Cement Plant (5000 t/d)



Bag filter for kiln of Lafarge India Sonadih Cement Plant ( 5000 t/d )



Bag filter for cooler of Lafarge India Sonadih Cement Plant ( 5000 t/d )





Bag filter for kiln of Lafarge Sancha Cement Plant ( 5000 t/d )



Joint bag filter for kiln and cooler of Heidelberg Russia Tula Cement Plant( 5000 t/d )



Module Bag Filter for Kiln of Caapora Cement Plant of Lafarge Brazil (4000 t/d)



Bag filter for boiler of Suqian Bio-mass Generation Project

Electrostatic precipitator for kiln of Egypt Nahada Cement Plant( 5000 t/d )



Electrostatic precipitator for cooler of Egypt Nahada Cement Plant( 5000 t/d )



Bag filter for slag grinding system of Zhangjiakou Liaoyuan Cement Co. Ltd.(0.3 Mt/a)



Bag filter for kiln of Guangdong Youkeng Building Material Co. ,Ltd. ( 5000 t/d )



Bag filter for bypass of Egypt Nahada Cement Plant( 5000 t/d )



Bag filter for coal mill of Vietnam Xining Cement Plant



Two Conversions of kiln ESP to BF (1200t/d &2500t/d) for Gansu Xiahe Ando Investment Co.,Ltd.- especially designed for high altitude area.



Conversion of cooler ESP to BF (5000t/d) for Jiaomei Group QianYe Cement Plant-The first conversion case of cooler ESP to BF in China.

Bag filter for kiln of Sinoma Hanjiang Cement Plant (2500 t/d)



Bag filter and air air heat exchanger for cooler of Sinoma Hanjiang Cement Plant( 2500t/d)



Conversion of high dust-laden kiln ESP to hybrid dust collector (5000t/d) for Tianrui Group Ruzhou Cement Plant-The first conversion case of high dust-laden kiln ESP to hybrid dust collector in China (13.5 days of kiln shutdown).



Conversion of kiln ESP to BF (2000t/d) for Halaer Mengxi Cement Plant- especially designed for extreme cold area.







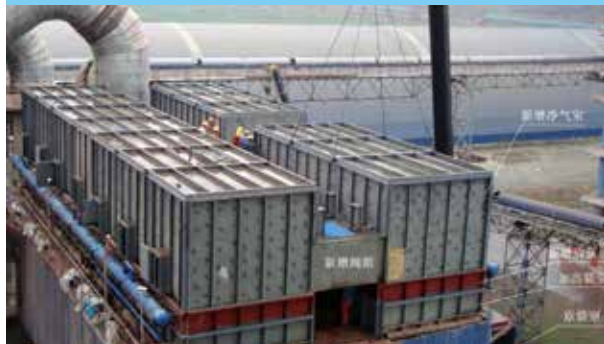
Conversion of cement mill ESP to BF (5000 t/d) for Saudi Arabia SCC Cement Plant



Conversion of high dust-laden kiln ESP to BF(4000t/d) for DOCC -The typical conversion case of high dust-laden kiln ESP to BF (16 days of kiln shutdown).

Modification of kiln bag filter (2500 t/d) for Yaobai Lantian Cemnet Plant-Improving traditional kiln bag filter with TDM pulse jet technology

Modification of coal mill bag filter (28t/h) for DOCC-Improving traditional coal mill bag filter with TDM pulse jet technology



2×600MW uint flue gas desulfuriztion project



300MW uint flue gas desulfuriztion project

5000 t/d cement line kiln flue gas desulfuriztion project

4x300MW uint flue gas desulfuriztion project



Sinoma-tec owns a complete, qualified and systematic service team. Based on professional service and effective management, we could satisfy customer's demand with timely response and the best service quality.

Respecting our customer, understanding our customer, constantly supplying over satisfied equipment & service, being a forever friend of our customer was the service faith we hold all the time.

Stand in the position of customer, to research, to design and to improve our service.

Perfecting service system, improving service of pre-sales, sales and after-sales, supplying timely solution, bring convenience to our customer.

Think highly of our customers' suggestions, share decision-making with our customers, take handling customers' comments as one of the most important part of our service.

Build a customer-centered system.

● 5S Service Principle

**5S**

SMILE

SPEED

SINCERITY

SMART

STUDY



## Reference List Of ESP Upgrading Project (Untill 2016)

S.R.	END USER	ORIGINAL ESP	GAS VOLUME (m <sup>3</sup> /h)	BAG FILTER	KILN STAND-STILL	EXECUTION TIME
1	Kiln ESP for Italy Cemntenti Group Shanxi Fuping Cement Co., Ltd. (5,000 T/D)	2x23/15/3x11/0.4 BS930 (LURGI)	1,010,000	TDM-380/12	17	2011.1
2	Kiln ESP for Sinoma Hanjiang Cement Co., Ltd.(2,500 T/D)	28/12.5/3x10/0.4 BS930 (LURGI)	460,000	TDM-209/12	18	2011.1
3	Coal Mill BF for Dalian Onoda Cement Co., Ltd. (28 T/H)	BF 28/22x2	75,600x(2)	TDM(M)-112/6x(2)	10	2011.4
4	Kiln ESP for Jinyu Group Zhenxing Cement Co., Ltd.(2,000 T/D To 2,500 T/D)	30/12.5/3x9/0.4 BS780 (LURGI)	440,000	TDM-198/12	15	2011.3
5	ESP for No.9&10 Cement Mill of SCC-Hofuf Cement Project (Saudi Cement Co., Ltd.)	KHD SUPPLIED	144,000	TDM-144/6	2x20	2012.7
7	Kiln ESP for Ganshu Xiaohu Anduo Cement Co., Ltd. (High Sea Level). (2500 T/D)	SD173/4/1 (ELEX)	570,000	TDM-320/8	18	2011.6
8	Kiln ESP for Sinoma Pingxiang Cement Co., Ltd. (2,500 T/D)	33/12.5/3x10/0.4 BS780 (LURGI)	480,000	TDM-209/12	15	2011.8
9	Kiln ESP for Sinoma Yunan Cement Co., Ltd.(2,500 T/D)	28/12.5/3x10/0.4 BS780(LURGI)	550,000	TDM-210/12	13	2012.2
10	Cooler ESP for Jinyu Group Zhenxin Cement Co., Ltd.(2,000 T/D To 2,500 T/D)	27/12.5/3x8/0.4 BS780 (LURGI)	282,000	TDM-256/6	13	2012.3
11	Cooler ESP for No.1 Line of Hebei Quzai Cement Co.(2,500 T/D)	25/10/3x9/0.4 BS930 (LURGI)	380,000	TDM-306/6	13.5	2012.6
12	Kiln ESP for No.1 Line of Hebei Quzai Cement Co.(2,500 T/D)	30/12.5/3x10/0.4 BS930 (LURGI)	550,000	TDM-396/6	13	2012.6
13	Kiln ESP for No.1 Line of Sinoma Yongdeng Cement Co., Ltd.(2,500 T/D)	30/12.5/3x10/0.4 BS930(LURGI)	600,000	TDM-220/12	13.5	2012.9
14	Cooler ESP for Hebei Jinniu Cement Co., Ltd.(2,500 T/D)	33/12.5/3x10/0.4 BS930 (LURGI)	380,000	TDM-306/6	13	2012.12
15	Kiln ESP for No.4&5 Line SCC-Hofuf Cement Project (Saudi Cement Co., Ltd.) .(2000T/D)	KHD SUPPLIED	1,000,000	TDM-480/8	20	2012.12
17	Cooler ESP for No.3 Line of Hebei Quzai Cement Co. (5,000 T/D)	30/15/3x10/0.45 BS930 (LURGI)	600,000	TDM-220/12	15	2013.1
18	Kiln ESP for No.3 Line of Hebei Quzai Cement Co. (5,000 T/D)	2x30/12.5/4x9/0.4 BS930 (LURGI)	960,000	TDM-306/16	15	2013.1
19	Cooler ESP for No.2 Line of Hebei Quzai Cement Co.(2,500 T/D)	25/10/3x9/0.4 BS930 (LURGI)	380,000	TDM-306/6	13	2013.1
20	Kiln ESP for No.2 Line of Hebei Quzai Cement Co.(2,500 T/D)	30/12.5/3x9/0.4 BS930 (LURGI)	550,000	TDM-396/6	13.5	2013.1
21	Kiln ESP for No.1 Line of Sinoma Hengda Cement Co., Ltd. (5,000 T/D)	2x26/15/3x11/0.4 BS930 (LURGI)	960,000	TDM-396/12	15	2013.1
22	Kiln ESP for Yatai Group Harbin Cement Co., Ltd. (2,000 T/D)	JP96-2x12	480,000	TDM-180/12	15	2013.12
23	Kiln ESP for No.1 Line of Sinoma Yongdeng Cement Co., Ltd.(2,500 T/D)	30/12.5/3x10/0.4 BS930(LURGI)	600,000	TDM-220/12	15	2013.2
24	Kiln ESP for No.4 Line of Bbm Handan Taihang Cement Co., Ltd. (2,000 T/D)	2x21/10/3x8/0.4 BS930(LURGI)	420,000	TDM-176/12	15	2013.3
25	Kiln ESP for No.1 Line of Sinoma Minhe Qilianshan Cement Co., Ltd. (2,500 T/D)	30/12.5/3x10/0.4 BS930(LURGI)	600,000	TDM-220/2x6	15	2013.3
26	Cooler ESP for No.1 Line of Luoyang Huanghe Tongli Cement Co., Ltd. (2,500 T/D)	30/12.5/3x10/0.4 BS780(LURGI)	600,000	TDM-462/6	15	2013.4

27	Kiln BF of Zanzhuang Jinyu Cement Co., Ltd.(5,000 T/D)	CXS1500(III)-2x14(F)(REVERSE BAG HOUSE)	900000	TDM-220/2x10	15	2013.7
28	Cooler ESP for No.1 Line of Zhumadian Yulong Tongli Cement Co., Ltd.(2,500 T/D)	32/12.5/3x10/0.4 BS780(LURGI)	660,000	TDM-462/6	15	2013.9
29	Cooler ESP for No.4 Line of Handan Taihang Cement Co., Ltd. (2,000 T/D)	25/10/4x9/0.4 BS780(LURGI),	360,000	TDM306/6	15	2013.11
	Cooler ESP for No.5 Line of Handan Taihang Cement Co., Ltd. (2,000 T/D)	26/10/3x9/0.45 BS780(LURGI)	400,000	TDM324/6	15	2013.11
30	Kiln ESP for Zhenan Yaobai Cement Co., Ltd.(2,500 T/D)	ESP 100-3(China TYPE)	370,000	TDM-162/2x6	30	2013.11
	Cooler ESP for Zhenan Yaobai Cement Co., Ltd.(2,500 T/D)	CYCLONE	220,000	TDM-273/2+231/2		
31	Kiln ESP for Pucheng Yaobai Cement Co., Ltd.(2,500 T/D)	28/12.5/3x10/0.4-BS930(LURGI)	460,000	TDM-210/2*6	15	2013.11
32	Kiln ESP for Shifeng Yaobai Cement Co., Ltd. (5,000 T/D)	2x32/12.5/4x9/0.4 BS930 (LURGI)	960,000	TDM-374/2x6	15	2013.11
33	Cooler ESP for No.2 Line for Tianjin Zhenxing Cement Co., Ltd. (2,000 T/D)	27/12.5/3x8/0.4 BS780 (LURGI)	400,000	TDM-256/6	15	2013.11
34	Kiln ESP for A Line of Huizhou Guangda Cement Co., Ltd. Longhua Factory.(5000T/D)	2x26/15/3x10/0.4-BS930(LURGI)	920,000	TDM-280/2x6	15	2013.12
35	Kiln ESP for B Line of Huizhou Guangda Cement Co., Ltd. Longhua Factory.(5000T/D)	2x28/12.5/4x9/0.4-BS930(LURGI)	920,000	TDM-280/2x6	15	2014.1
36	Cooler ESP for Tangshan Hongye Cement Co., Ltd.(2,500 T/D)	HCDPK-D115/3	360,000	TDM-216/8	15	2014.3
37	Cooler ESP for Weishan Shanshui Cement Co., Ltd.(5,000 T/D)	34/12.5/3x10/0.4 BS930(LURGI)	600,000	TDM-220/2x6	15	2014.7
38	Kiln ESP for Jining Shanshui Cement Co., Ltd.(2,500 T/D)	32/12.5/4x9/0.4 BS930(LURGI)	480,000	TDM-189/2x6	15	2014.9
39	Cooler ESP for Taiyuan Shanshui Cement Co., Ltd.(2,500 T/D)	WDJ120-3(XIANGTAN )	360,000	TDM-200/8	13	2014.2
41	Kiln ESP for Kangda Shanshui Cement Co., Ltd.(5,000 T/D)	BEL220/2-4(LONGJIN)	550,000	TDM-396/6	15	2014.9
40	Kiln ESP for Pingyin Shanshui Cement Co., Ltd.(5,000 T/D)	2x31/12.5/4x9/0.4 BS930 (LURGI)	900,000	TDM-374/2x6	18	2014.9
	Cooler ESP for Pingyin Shanshui Cement Co., Ltd.(5,000 T/D)	34/12.5/3x10/0.4 BS930 (LURGI)	580,000	TDM-220/2x6		
42	Kiln ESP for Zaozhuang Shanshui Cement Co., Ltd.(5,000 T/D)	32/15/4x8/0.4-BS780(LURGI)	550,000	TDM-288/2x4	18	2014.9
	Cooler ESP for Zaozhuang Shanshui Cement Co., Ltd.(5,000 T/D)	25/12.5/3x9/0.4-BS780(LURGI)	380,000	TDM-288/2x3		
43	Kiln ESP for Shanshui Factory 3# Kiln Shanshui Cement Co., Ltd. (5,000 T/D)	27/12.5/3x9/0.4 BS780(LURGI)	400,000	TDM-160/2x6	18	2014.9
	Cooler ESP for Shanshui Factory 3# Kiln Shanshui Cement Co., Ltd. (5,000 T/D)	20/10/3x8/0.4 BS780(LURGI)	300,000	TDM-220/6		
44	Kiln ESP for Anqiu Shanshui Cement Co., Ltd.(5,000 T/D)	2x31/12.5/4x9/0.4-BS930(LURGI)	850,000	TDM-374/2x6	18	2014.9
	Cooler ESP for Anqiu Shanshui Cement Co., Ltd.(5,000 T/D)	34/12.5/3x10/0.4 BS780(LURGI)	580,000	TDM-440/6		
45	Kiln ESP for Shijichuangxin Shanshui Cement Co., Ltd.(5,000 T/D)	30/12.5/3x10/0.4 BS930(LURGI)	400,000	TDM-160/2x6	18	2014.9
	Cooler ESP for Shijichuangxin Shanshui Cement Co., Ltd.(5,000 T/D)	20/10/3x8/0.4 BS930 (LURGI)	300,000	TDM-220/6		
46	Kiln ESP for Huainan Shunyue Cement Co., Ltd.(2,500 T/D)	EE-150	550,000	TDM-440/6	18	2014.8
	Cooler ESP for Huainan Shunyue Cement Co., Ltd.(2,500 T/D)	EE-105	400,000	TDM-304/6		



47	Kiln ESP for Linyi Yizhou Cement Co., Ltd.(2,500 T/D To 5,000 T/D)	34/12.5/3x9/0.4 BS930 (LURGI)	1,000,000	TDM-528/2x4	18	2014.10
	Cooler ESP for Linyi Yizhou Cement Co., Ltd.(2,500 T/D To 5,000 T/D)	25/10/3x9/0.4 BS780 (LURGI)	580,000	TDM-418/2x3		
48	Kiln ESP for Dalian Cement Co., Ltd.(2,500 T/D)	2x30/12.5/4x8/0.4 BS930(LURGI)	900,000	TDM-352/2x6	15	2014.10
49	Kiln ESP for Line 1 of Yatai Shuangyang Cement Co., Ltd. (2,500 T/D)	2x21/10/3x8/0.4 BS780 (LURGI)	420,000	TDM-352/6	15	2014.11
	Kiln ESP for Line 2 of Yatai Shuangyang Cement Co., Ltd. (2,500 T/D)	30/12.5/3x9/0.4 BS780 (LURGI)	420,000	TDM-352/6	15	
	Kiln ESP for Line 3 of Yatai Shuangyang Cement Co., Ltd. (2,500 T/D)	33/12.5/3x10/0.4 BS930 (LURGI)	500,000	TDM-420/6	15	
	Kiln ESP for Line 4 of Yatai Shuangyang Cement Co., Ltd. (2,500 T/D)	33/12.5/3x10/0.4 BS930 (LURGI)	520,000	TDM-420/6	15	
	Kiln ESP for Line 5 of Yatai Shuangyang Cement Co., Ltd. (5,000 T/D)	2x23/15/4x9/0.4 BS930 (LURGI)	850,000	TDM-360/2x6	15	
	Kiln ESP for Line 6 of Yatai Shuangyang Cement Co., Ltd. (5,000 T/D)	2x23/15/4x9/0.4 BS930 (LURGI)	850,000	TDM-360/2x6	15	
50	Cooler ESP for Dalian Onoda Cement Co., Ltd. (4,000 T/D)	2x30/12.5/4x9/0.4 BS930 (LURGI)	540,000	TDM-504/6	15	2014.12
51	Cooler ESP for Line 2 of Zanhuang Jinyu Cement Co., Ltd. (4,000 T/D)	FGM192-36	680,000	TDM-380/2x4	15	2015.2
53	Kiln ESP for Yixing Tianshan Cement Co., Ltd.(5,000 T/D)	2x30/12.5/4x9/0.4 BS930 (LURGI)	950,000	TDM-374/2x6	15	2015.3
52	Cooler ESP for Line 1 of Weihui Tianrui Cement Co., Ltd.(5,000 T/D)	30/15/3x9/0.45 BS930 (LURGI)	580,000	TDM-468/2x3	15	2015.3
	Cooler ESP for Line 2 of Weihui Tianrui Cement Co., Ltd.(5,000 T/D)	32/15/3x9/0.45 BS930 (LURGI)	680,000	TDM-522/2x3	15	2015.4
54	Kiln ESP for Huarun Hepu Cement Co., Ltd.(4,500 T/D)		910,000	TDM-512/2x5	15	2015.5
56	Cooler ESP for Yongdeng Qilianshan Cement Co., Ltd. (5,000 T/D)		740,000	TDM-240/2x8	15	2015.5
57	Kiln ESP for Pingliang Qilianshan Cement Co., Ltd.(3,000 T/D)	32/12.5/3x10/0.4 BS930 (LURGI)	580,000	TDM-460/2x3	15	2015.6
58	Cooler ESP for Yongdeng Qilianshan Cement Co., Ltd. (4,500 T/D)	33/12.5/3x11/0.45 BS930 (LURGI)	640,000	TDM-594/2x3	15	2015.7
59	Cooler ESP for Xiahe Qilianshan Cement Co., Ltd. (2,500 T/D)		370,000	TDM-324/2x3	15	2015.8
60	Kiln ESP for Line 1&2 of Tongchuan Yaowangshan Cement Co., Ltd.(2,500 T/D)	30/12.5/3x10/0.4 BS930 (LURGI) 32/12.5/4x8/0.4 BS780 (LURGI)	500,000	TDM-396/2x3	15	2015.9
61	Kiln ESP for Yingde Taiwan Cement Corporation(5,000 T/D)		850,000	TDM-340/2x6	15	2015.11
62	Kiln ESP for Guigang Taiwan Cement Corporation(5,000 T/D)	2x32/13.5/4x10/0.4 BS930 (LURGI)	990,000	TDM-374/2x6	15	2015.12
63	Cooler ESP for Line 1 of Huarun Changjiang Cement Co., Ltd.(2,500 T/D)		356,000	TDM-231/2x4	15	2016.1
64	Cooler ESP for Line 2 of Huarun Pingnan Cement Co., Ltd.(5,000 T/D)	33/12.5/3x10/0.45 BS930 (LURGI)	680,000	TDM-532/2x3	15	2016.2

Brighted blocks shows that owner of the project is foreigner or foreign funded.

## Reference List of The Oversea Marketing-Environmental Protection Equipments

S.R.	CAPACITY	END USER	COUNTRY	Qty.	SCOPE OF SUPPLY	DATE
1	5000 t/d	HUME Cement Project	Malaysia	65	TDM-512/10(for Kiln)	2011.2
					TDM-192/16(for Cooler)	
					TDM(M)-96/2*10(for Coal Mill)	
					TDM-192/16(for Cement Mill)	
					TDM-864-1(for Cement Mill)	
					TAHE-19x28/3(for Cooler)	
					GCTΦ9.5*39m	
2	5000 t/d	CHI-Chittaurgarh Cement Plant	India	64	TDM-512/10(for Kiln)	2011.5
					TDM-324/10(for Cooler)	
					TDM(M)-126/2*10(for Coal Mill)	
					TDM-96/2*10(for Cement Mill)	
					TDM-96/6(for Ventilation)	
					TAHE 19x28/3 (for Cooler)	
					2-Φ2800(Cyclone for Coal Mill)	
3	5000 t/d	Rio Branco	Brazil	24	TDM(M)-96/10(for Coal Mill)	2011.12
					TDM(M)-96/8(for Coal Mill)	
					Standard Bag Filters	
4	5000 t/d	Bahau No.2 Kiln Facility For NSCI Project	Malaysia	4	PJBF for kiln and cooler	2012.11
					Coal Mill PJBF	
					GCT	
5	1000 t/d	Villa Hayes, Itapucumi, (TUPI Project)	Paraguay	11	TDM-192/2x5(for Kiln)	2012.12
					TDM-192/6(for Cooler)	
					TDM(M)-140/4(for Coal Mill)	
					TDM-182/2x4(for Cement Mill)	
					GCTΦ6.5*26m	
6		Bastas	Turkey	1	TAHE352/2X2( for Cooler)	2012.12
					TDM-192/4(for Drying)	
7	300,000 m <sup>3</sup> /h	Lhoist North America of Texas,Ltd.	America	1	TDM-96/2x11(for Roller Mill)	2012.12
8	90 t/h	Standard Cement Company	Kazakhstan	13	TDM-240/10(for Kiln)	2013.1
9	750,000 m <sup>3</sup> /h	Lafarge Brasil SA-Cappora	Brazil	1	TDM-216/10	2013.3
10	100 t/h	Cimburkina Green Field Cement (Grinding Plant Project)	Burkina Faso	3	TDM-224/2X6(for Kiln)	2013.4
11	10,000 t/d	INDOCEMENT-Citeureup P14-Brownfield Cement Plant Project, Heidelberg	Indonesia	2	TDM-96/2x9(for Cement Mill)	2013.9
					TDM-96/5(for Cement Mill)	
12	1500 t/d	Rudnyi Cement Plant Co., Ltd.	Kazakhstan	4	TDM-384/2x10(for Kiln)	2013.10
					ESP27/10/3x9/0.4(for Kiln)	
					ESP20/10/3x7/0.45 (for Cooler)	
					TDM(M)-96/6(for Coal Mill)	
13		Votoratim	India	1	TDM-96/2x5(for Cement Mill)	2013.12
					TDM(M)-96/8(for Coal Mill)	



14	5000 t/d	PT Semen Bosowa Maros Line II	Indonesia	4	TDM-384/2x6(for Kiln)	2014.1
					ESP 33/12.5/4x10/0.45(for Cooler)	
					TDM(M)-160/2x12(for Coal Mill)	
					TAHE225/3x2(for Cooler)	
15		Capacity Expansion Project Cement Mill 5 Gha-cem – Takoradi	Ghana	2	TDM-96/2x9(for Cement Mill)	2014.5
					TDM-96/5(for Ventilation)	
16	5000 t/d	Line 2 perday clinker	Philipine	1	TDM(M)-160/2x10(for Coal Mill)	2014.5
17	600 t/d	Zagros White Cement Project	Iran	3	TDM-192/2x4(for Kiln)	2014.5
					ESP15/7.5/3x8/0.4(for Cooler)	
					TDM-96/2x5(for Cement Mill)	
18	2800 t/d	Standard Cement LLP The Cement Production 2ND Line in Republic of Kazakhstan	Kazakhstan	6	TDM-216/2x6(for Kiln)	2014.2
					TDM-216/2x4(for Cooler)	
					TDM(M)-96/2x6(for Coal Mill)	
					TDM-192/16(for Cement Mill)	
					TAHE399/2X2( for Cooler)	
					GCTΦ8.5*34m	
19	10000 t/d	Indocement-Citeureup P14-Brownfield Cement Plant Project, Heidelberg	Indonesia	1	ESP 16/12.5/3x12/0.4(for Coal Mill)	2014.1
20	4200 t/d	HERAT CLINKER PRODUCTION LINE PAKISTAN	PAKISTAN	6	ESP 33/12.5/4x10/0.4(For Kiln)	2014.7
					ESP 25/12.5/3x10/0.45(For Cooler)	
					TDM(M)-96/2x6(for Coal Mill)	
					TDM-96/2x11(for Cement Mill)	
					TDM-96/5( for Bypass)	
					GCTΦ9*36m	
21	3000 t/d	PPC BARNET DRC MANUFACTURING SA	Congo-Kinshasa	5	TDM-286/2x6(for Kiln)	2014.9
					ESP 25/12.5/4x7/0.45(for Cooler)	
					TDM(M)-140/3(for Coal Mill)	
					TDM-132/2x3(for Cement Mill)	
					TDM-96/3( for Bypass)	
22	5000 t/d	HUME Cement Line 2 Project	Malaysia	5	TDM-512/10(for Kiln)	2014.11
					TDM-192/16(for Cooler)	
					TDM(M)-96/2x10(for Coal Mill)	
					TAHE19x28/3( for Cooler)	
					GCTΦ9.5*39m	
23	2000 t/d	Yacuces Cement Plant	Bolivia	1	TDM-168(192)/2x4(for Cement Mill)	2014.10
24		Bastas modification	Turkey	1	TDM(M)-96/2x11(for Mill)	2015.3
25	10000 t/d	Eurocement CJSC Mikhailov Cement Modernization Project	Russia	11	TDM-512/2x7(for Kiln)	2015.4 excutory
					TDM-96/2x11(for dryer)	
					TDM-96/2x11(for Cement Mill)	
					TDM-96/5(for Ventilation)	
					TDM-126/2x3(for Bypass)	
26	4500 t/d	Votoratim Cimentos Sivas Plant	Turkey	4	TDM(M)-96/2x6(for Coal Mill)	2015.5
					TDM-216/2x4(for Cement Mill)	
					TDM-140/3(for Ventilation)	
					TAHE 19x28/3(for Cooler)	

27	5000 t/d	Nova Cimangola	Angola	6	TDM-512/2x5(for Kiln)	2015.10
					TDM-228/2x8(for Cooler)	
					TDM(M)-96/2x6(for Coal Mill)	
					TDM-216/2x5(for Cement Mill)	
					TDM-126/2x5(for Bypass)	
					TAHE399/3X2( for Cooler)	
28	5000 t/d	Limak Anka	Turkey	6	TDM-512/2x5(for Kiln)	2016.1
					ESP 33/12.5/4x10/0.45(for Cooler)	
					TDM(M)-126/2x8(for Coal Mill)	
					TDM-96/2x11(for Cement Mill)	
					TDM-96/5(for Ventilation)	

TDM-Sinoma Jet Pulse Bag Filter  
ESP-Electric Static Precipitator  
GCT-Gas Conditioning Tower  
TAHE-Sinoma Air Air Heat Exchanger

### Reference List of DeNOx & DeSOx Equipments

S.R.	UNITS	END USER	PROJECT
1	2x660 MW	Guodian Shuangyashan Thermal Power Co., Ltd.	DeNOx & DeSOx & Dedust
2	660 MW	Henan Longquan Jinheng Electric Power Co., Ltd.	DeSOx
3	3x330 MW	Henan Longquan Jinheng Electric Power Co., Ltd.	DeNOx & DeSOx & Dedust
4	300 MW	Dalian Dagushan Thermal Power Co., Ltd.	DeNOx & DeSOx & Dedust
5	220 t/h	Sinopec Group Yangzi Thermal Power Co., Ltd.	DeNOx & DeSOx & Dedust
6	2x410 t/h	East Hope Baotou Rare Earth Aluminum Co., Ltd.	DeNOx & DeSOx & Dedust
7	75 t/h	Shaanxi Yahua Coal Electricity Group Jinjie Thermal Power Co., Ltd.	DeNOx & DeSOx & Dedust
8	220 t/h	Shaanxi Yahua Coal Electricity Group Jinjie Thermal Power Co., Ltd.	DeNOx & DeSOx & Dedust
9	3x170 t/h	Shandong Zibo Wanjie Hi-Tec Boshan Thermal Power Co., Ltd.	DeNOx
10	150 t/h	Jiangsu Kunshan Xinyuan Thermal Power Co., Ltd.	DeNOx



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