



UNICON

Electrostatic Precipitators (ESP)

www.uniconinter.com



■ ABOUT US

Setting the standard for environmental protection. At UNICON we are constantly investing in resources for Product development with an objective to provide Market-leading products that reduce our customers Downtime as well as keeping the environment safe.

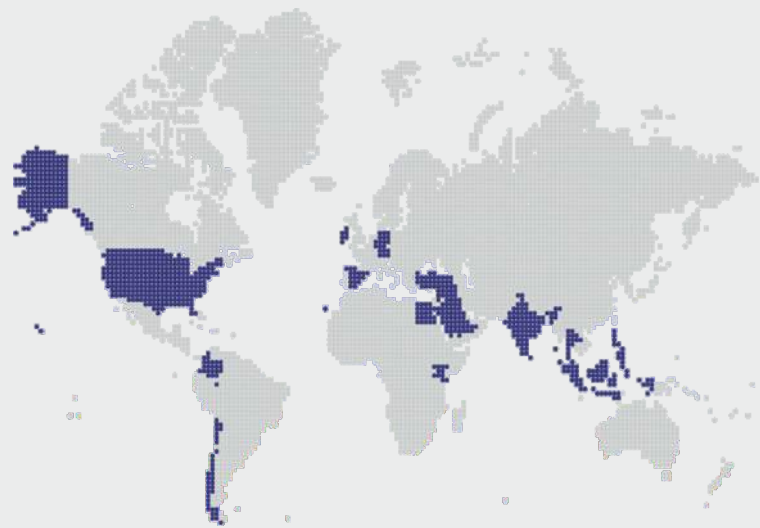
Delivering technology and services with more than 30 years of experience



Global presence over 20+ countries across the world

Our Strength is the vast pool of expertise already mobilized from various fields of Design, Manufacturing, Project management, Servicing, Up-gradation and Augmentation of Air Pollution Control equipments.

We have created our organization with a vision to provide world-class service to our clients in all the above areas where we are unquestionably strong. Our greatest strength lies in our highly skilled and committed work force.



VISION



To become the world-class Environmental protection industry by delivering Technology and Services

MISSION



Passionate commitment to provide cost-effective & world class manufacturing process and Services

QUALITY POLICY



Design, Engineering, Manufacture, Supply, Erection & Commissioning of Quality products on Time, Enhance the Customer satisfaction, Meet the needs and expectation of the organization & interested parties.

ELECTROSTATIC PRECIPITATORS (ESP)

UNICON has a credential record of success in designing, engineering, fabricating, supplying, erection and commissioning of electrostatic precipitator (ESP)

Lower emission

Unicon has the technical know-how & design, Engineering to reduce the emissions to as low as 10 mg/Nm³.

Easy maintenance

The electrode system is so designed that approach to any level is possible for inspection and maintenance.

Engineered for longevity

High performing and long lasting electrostatic precipitators with very low cost of operation & maintenance



PRODUCT SPECIFICATIONS

Parameter	Data
Gas Flow Rate (m ³ /s)	5 – 1500
Gas Temperatures (°C)	70 – 400
Capacity (TPH)	6 to 2400
ESP inlet dust loading (g/Nm ³)	0.2 - 200
Guaranteed ESP outlet emission (mg/Nm ³)	10 - 200 (suitable design for ESP as pre-collector), filterable PM only
PM Collection Efficiency	Up to 99.95%
Availability	Up to 98%

Applications / Industries

Boiler : Power/Biomass - Bagasse, Rice husk, Straw, Spent Wash/Slop/Syrup, EFB, Wood chips, Briquettes, Palm Kernel/Shell etc...

Cement: Kiln, Mills, Cooler;

Iron & Steel: Sintering, Pelletization, Sponge Iron Kiln, Cast House, Stock House, Dedusting etc...

Waste to Energy plants;

Pulp & Paper: Recovery Boiler, Lime Kiln;

Non-Ferrous- Smelter, Converter;

Oil & Gas: FCCU etc.



OTHER SPECIAL FEATURES OF UNICON ESP(S)

- Proven Particulate Matter Removal $<10\text{mg}/\text{Nm}^3$
- High Availability
- Low Maintenance
- Reduced breakdown
- Most Economical Design
- Lower Operating Cost
- Optimum Performance under Varying Load Conditions
- Optimum Power Consumption in Operation
- Next Generation Electronic Controllers
- Minimum Horizontal Space Occupation in the Project
- Guaranteed free of cost spares replacement for first 2 years of operation*



- Ease of O & M at all conditions
- All spares are available indigenously with short lead time
- Digital monitoring of the performance

SPECIAL FEATURES OF SPIRAL ELECTRODE DESIGN

- The spiral is a spring which is stretched and hooked at both ends to form an electrode. Hence it automatically is very stiff and perfectly aligned
- Spiral is the best electrode as it is very thin and hence the voltage / thickness ratio is high leading to an early corona generation
- It has uniform geometry from end to end hence every finite length in it generates corona
- When corona is generated at one point and the space around it gets saturated with ions, the point of corona generation shifts along the wire and generates more ions. Since every point in the wire can generate corona, the corona distribution is very good. Highly suitable for finer dust collection.
- The spring effect, makes the electrode very tight and hence gives it a good vibration or rapping effect. Hence electrodes can be kept clean easily.



SPECIAL FEATURES OF PIPE AND SPIKE TYPE EMITTING ELECTRODES

- Superior Corona Generation Ability at sharp edges.
- In Rigid or Pipe and Spike Emitting Electrode System, we will be using a higher high voltage system and therefore the Corona generation will be more.
- Reducing the impact from oscillation.
- Higher efficiency and increased reliability during ESP operations @ high dust loads & Coarser Particles
- Stiffness and stability for best rapping efficiency and cleaning effect (As Corona Generation is from sharp edges where chance for dust coating is very less).
- During initial start-up with oil firing, oil soot will not deposit at sharp edges.



UNICON is having Expertise in Both Tumbling Type and Top Rapping System

Advantages of Tumbling Type Rapping	Advantages of Top Rapping
Individual Electrode rows are rapped separately by individual hammers.	Rapper rods are dropped on frames connected to electrode rows
Rapping being directly applied to the collecting plate has good rapping effect with lower effort.	High force is transferred while dropping rod from the top and getting good rapping effect through the frames to the electrodes.
Rapping puff is low since only one electrode row is rapped at a time.	Since one drop rod imparts rapping to a few electrodes, rapping frequency required will be less.
Rappers are inside ESP chamber with only one drive per field outside, keeps the roof area less crowded.	Separate rapping panel will be provided with PLC for Top Rapping. So it will be easy for the control.
Only one shaft insulator per field.	Top Rapping system uses special type FRP insulators for Discharge / Emitting electrodes. The chance for insulator breaking will be very less
Comparatively much lower control components and cabling.	As Major parts of the rapping systems are at outside of the electrical field, can do the services without a shutdown.
Tumbling hammer is a very proven system and is widely used in large power plants.	As there is no rotating parts, the wear and tear will be less
	Less power consumption.



ESP Controllers

We are using New Generation Controllers which Guarantees Optimum Corona Power for Generation of ESP Power supplies. We use SCR Based Single Phase & Three Phase Tr. Sets, High Frequency (HF) based and combination of HF & Pulse Based Tr. Sets as per the requirements.

Vai & Vp values comparison			
Description / Type	SCR (1 ϕ & 3 ϕ)	HF	HF + Pulse
Vai	45kV	60kV	60kV
Vp	63kV	62kV	140kV
Vai $\times$ Vp	2835kV2	3720kV2	8400kV2
Increased times of ω	1	1.3	3

HF + Pulse Type Tr. Set – the effect on particle is 3 times that of SCR Type power supply and 2.3 times of HF type power supply, where ω is the migration velocity. Vai is the average voltage & Vp is the peak voltage.

5 Types of Tr. Sets for Corona Generation

- SCR Type - 1 ϕ Tr. Set
- SCR Type - 3 ϕ Tr. Set
- HF Type Tr. Set
- Pulse Type Tr. Set
- HF + Pulse Type Tr. Set

For Green Field Projects, where space is available, we can use SCR Based Tr. Set - 1 ϕ or 3 ϕ as per the requirement. Where space constraints are there, we can reduce ESP Sizing by usage of HF Type Tr. Sets and Pulse Type Tr. Sets. If we have to go for outlet emission < 20 mg/Nm³ or <10 mg/Nm³ with space constraints, we can opt for HF + Pulse Type Tr. Sets.

We are ready with Industry 4.0 Techniques for Design, Engineering, Installation and O & M of Electrostatic Precipitators. Please find below some features of our Industry 4.0 Techniques.

Remote Operation and Maintenance through Cloud Connectivity.

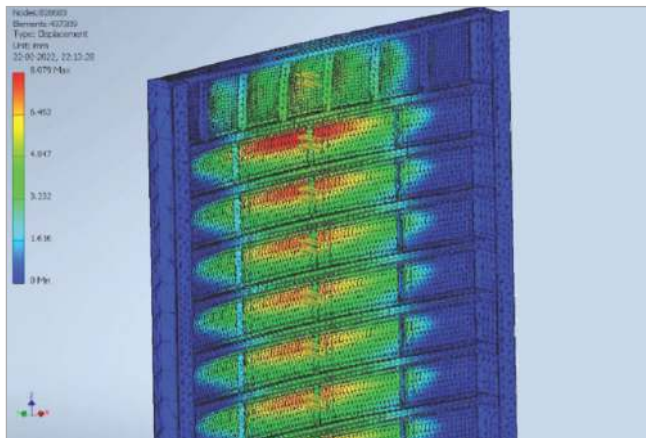
We are ready with remote Operation and Maintenance of our Electrostatic Precipitators. With the automated MCC Panel & Connected PLC with internet, we will be able to control the all the operating parameters of the Electrostatic Precipitators. We can suggest the corrections and in real time remotely from our Head Office.



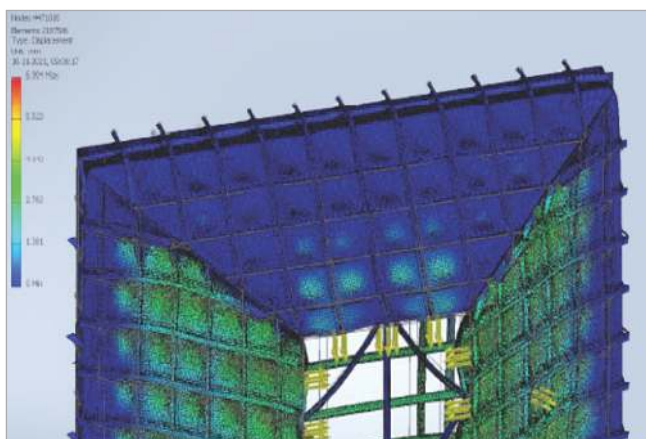
Design & Engineering

At UNICON we use state of the art technology and software for designing of ESP to deliver the best result to our customers

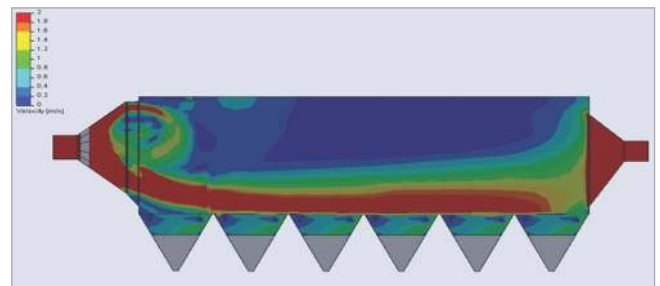
Finite Element Analysis (FEA)	Computational fluid dynamics CFD
- FEA - Finite Element Analysis (FEA) is a computerized method for predicting how a product reacts to real-world forces, vibration, heat, fluid flow, and other physical effects. Finite element analysis shows whether a product will break, wear out, or work the way it was designed. - Unicon uses FEA analysis for higher capacity ESPs with high pressure (negative pressure) and high temperature. - Apart from the above, we use latest structural analysis software to choose safe and economical designs.	- CFD is used for Optimum Gas Distribution inside the ESP - In an ESP the dust laden gas is treated to electrically charge the particles and thereby attract them to a collecting surface thereby allowing clean gas to be vented to the atmosphere. - Distribution of gas so that the collecting area provided is effectively utilized essentially ensures a good performance. - Gas distribution studies are conducted to ensure Optimum Gas Distribution inside the ESP



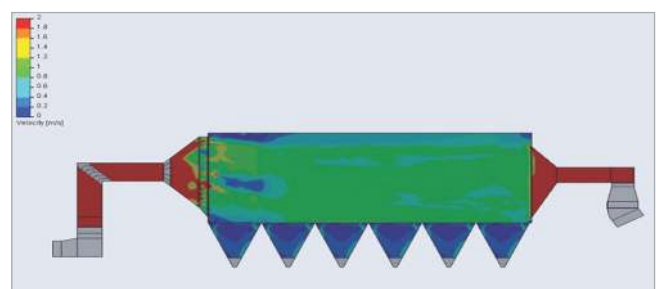
Casing Panel – Analysis



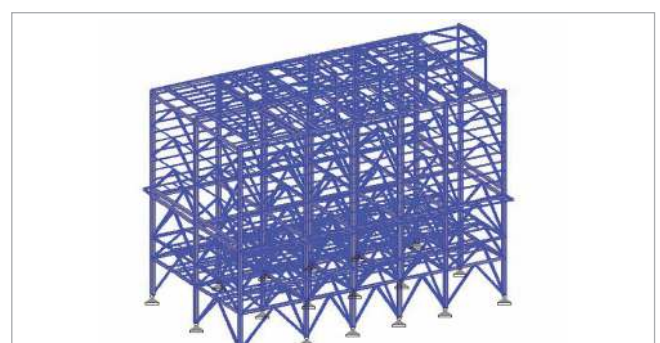
Inlet cone - Analysis



CFD Study Initial result with splattered gas distribution



CFD Study Final result with optimum gas distribution



Structural Analysis for Safe and Economical Designs



UNICON

UNICON ENGINEERS

513-A/6, Bharathi Road, Chinnavedampatti Post, Coimbatore - 641049.
Tamil Nadu, INDIA., Tel : 0422 - 2362167,
E-Mail : marketing@uniconinter.com, Website : www.uniconinter.com



Authorised Channel Partner

