

Exclusive Licensee of
Envirotherm GmbH, Germany
(Holder of Lurgi Technology)



AIR POLLUTION
CONTROL EQUIPMENT

ESP

(Electrostatic Precipitators)

*180 MW, Unit IV, Coal Based Complete Power Plant
for OPG Power, Tamil Nadu, India.*



ENGINEERING FOR EXCELLENCE



Isgec Heavy Engineering Ltd. is an established leader in the field of engineering with vast experience - 150 Sugar Projects, 675 Boilers and 25 Power Plants across 47 Countries.

Isgec, under exclusive license agreement with Envirotherm GmbH, Germany, offers customers in India internationally acclaimed solutions in Electrostatic Precipitators.

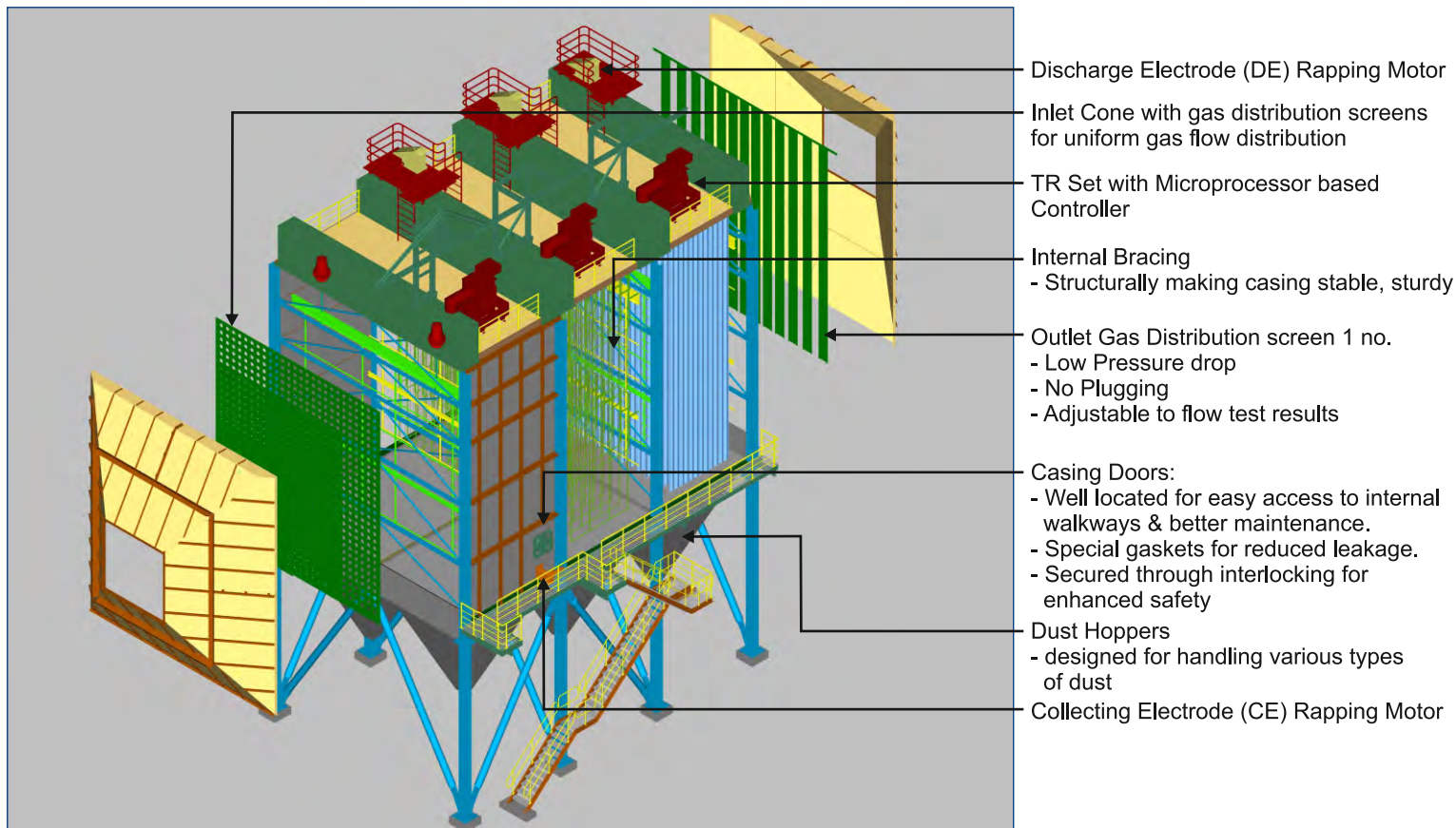
These include unique technologies that have been successfully tested by Envirotherm, across projects set up by them around the world.

ENVIROTHERM GmbH
Germany

(Holder of Lurgi ESP Technology)

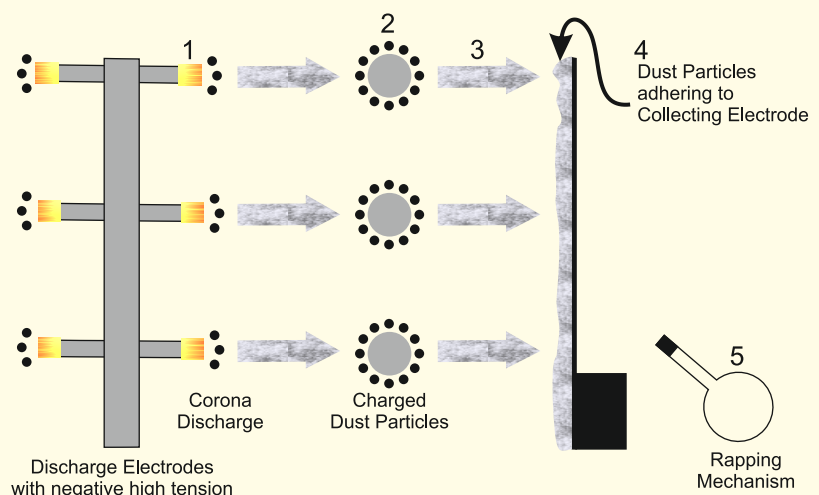
Exclusive License & Cooperation Agreement for Design, Engineering, Manufacturing and Commissioning of ESPs up to 1000 Mw_{el}

Electrostatic Precipitator with advanced Lurgi design - ZT 24 CE & Variodyn DE configurations



Principle of Operation

1. Ionization - Charging of the particulate matter / dust particles with the help of uniform corona discharge through Variodyn discharge electrodes, placed perpendicular to gas flow.
2. Charging of dust particle
- Diffusion charging for particles $< 0.5 \mu\text{m}$
- Field charging for particles $> 0.5 \mu\text{m}$
3. Migration of the charged particles towards (aerodynamically shaped) ZT 24 profile type collecting plates.
4. Dust collection / dust agglomeration on ZT 24 profile type collecting plates.
5. Tumbling hammer rapping provides effective dust removal / dislodging from ZT 24 profile type collecting plates.



Major Components: Discharge electrodes • Collecting electrodes

Advantages of Discharge Electrodes

Effective charging of particulate matter due to perpendicular placement of Variodyn pins to gas flow.

Uniform corona discharge covering entire cross section due to symmetrical placement of spikes.

Better collection efficiency.

Strong and sturdy design due to bolting / welding in a rigid frame assembly.

Ideal for Indian Coal Ash, having high ash content.

A few of the application-dependent pin configurations Variodyn 0, Variodyn 15, Variodyn 25, Variodyn 40

Advantages of Collecting Electrodes

Optimized & uniform current profile.

Optimized / maximum secondary voltage.

Better transmission of rapping forces across the width & height of collecting plate.

Good strength / rigidity.

Improved collection efficiency.

Close to theoretical ideal profile with regard to current density distribution.

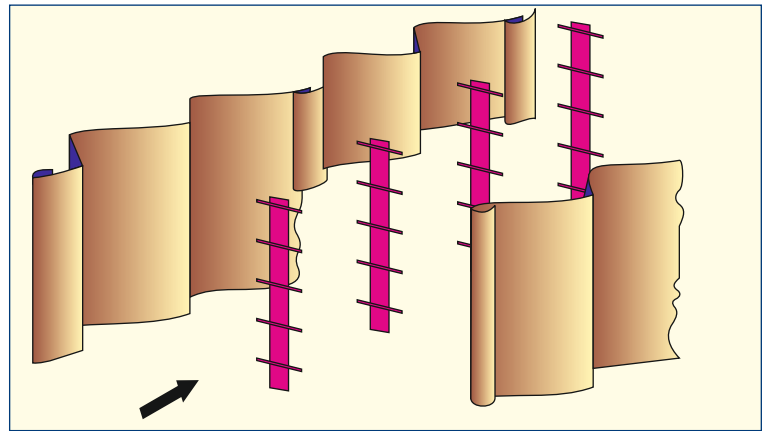


Discharge Frame with VARIODYN 15 Electrodes

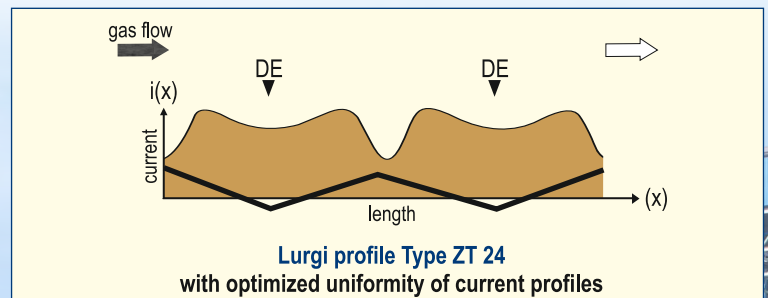


View of VARIODYN 15 Electrode

ZT 24 / VARIODYN 15



Current Density Distribution

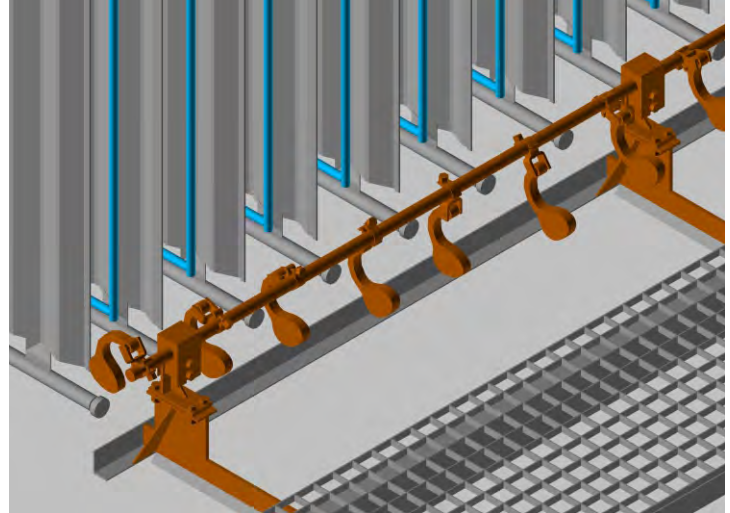


Panoramic View of 180 MW, Unit IV, Coal Based Complete Power Plant for OPG Power, Tamil Nadu, India



Advantages of Bottom Rapping on Collecting Electrodes

- Each row of collecting electrode rapped independently - less re-entrainment of dust.
- Uniform distribution of high rapping acceleration resulting in effective dust removal from the entire surface area of individual collecting plate.
- Easy maintenance & trouble free operation as placed adjacent to walkway / catwalk.
- Less number of moving parts.

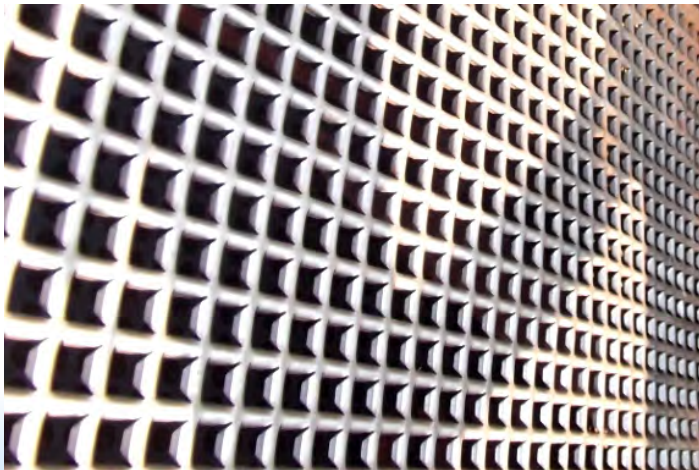


Collecting Electrode Rapping

Improved Flow Distribution

Customized Gas Distribution (GD) Screen combinations for even gas flow distribution

GD Screens - 'X' Type / Circular / Combination of 'X' Type & Circular holes • In house CFD (Computational Fluid Dynamics)

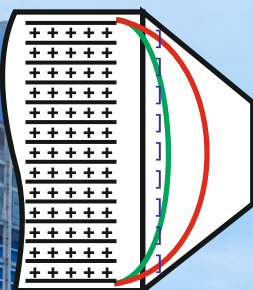


'X' type holes GD Screen



Circular holes GD Screen

Benefits of Outlet GD screen with 'U' / Plate-Type Baffles



Red Distribution without "U"- Baffles

Green Distribution with "U"- Baffles

- Uniform Gas Flow Distribution through Gas Passages - for high dust collection.
- Low Pressure Drop resulting in lower power consumption.
- Easy Adjustment based on CFD analysis to minimize downtime.
- No plugging & cleaning required.
- No wear & tear.





Air Pollution Control Equipment

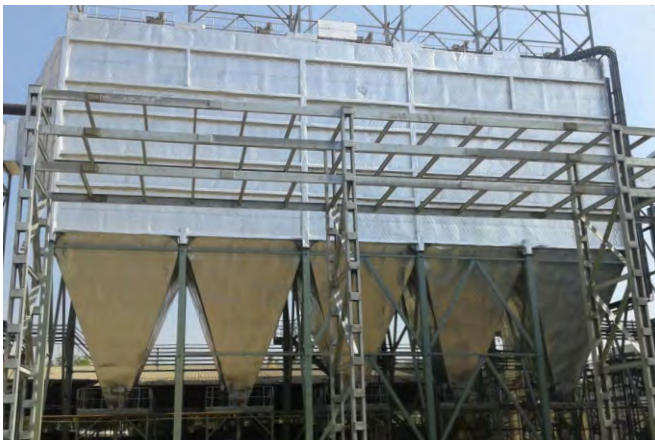
Prestigious Customers of Isgect-Envirotherm ESPs

Customers	No. of Units	Boiler Capacity	Types of Boiler	Fuels
OPG Power Generation Pvt. Ltd., Tamil Nadu	1	180 MW	Pulverised Coal	Indian Coal / Indonesian Coal
Nirma Ltd., Bhavnagar, Gujarat	1	100 MW	CFBC	Imported Coal / Indonesian Coal / South African Coal
Shriram Alkali & Chemicals Ltd., Gujarat	1	75 MW	CFBC	Lignite / Petcoke / Indonesian Coal / South African Coal
Bhubaneswar Power Pvt. Ltd., Orissa	2	67.5 MW	CFBC	Washery Rejects / Indian Coal
Generadora Chinchontepic, S.A.DE C.V, El Salvador, South America	1	52 MW	Travelling Grate	Bagasse
Spectrum Coal and Power Pvt. Ltd., Chhattisgarh	1	50 MW	Travelling Grate	Washery Rejects
Casur, Nicaragua, North America	1	42.5 MW	Travelling Grate	Bagasse
United Phosphorus Ltd., Gujarat	1	35 MW	CFBC	Indian Coal / Imported Coal
VNT19 Pulp-Paper Joint Stock Company, Vietnam	1	33.5 MW	CFBC	Vietnam Coal
Bharathi Cement Pvt. Ltd., Andhra Pradesh	1	30 MW	CFBC	Indian Coal / Petcoke / Indonesian Coal
Vithal Power SSK Ltd., Maharashtra	1	30 MW	Travelling Grate	Bagasse
Consumar, Sidibenour, Morocco	1	25 MW	CFBC	Imported Coal
La Grecia, Honduras, South America	1	21 MW	Travelling Grate	Bagasse
Welspun, Gujarat	1	17 MW	CFBC	Lignite
South India Paper Mill, Karnataka	1	12 MW	CFBC	Indonesian Coal / Indian Coal
Cavite Biofuel Producers, Philippines	1	10.5 MW	Travelling Grate	Indonesian Coal / Indian Coal
Tokyo Eastern Cement Company, Sri Lanka	1	9 MW	WHR Boiler	Rice Husk
J K Tyre & Industries Ltd., Karnataka	1	8 MW	AFBC	Indian Coal / Imported Coal / Rice Husk
Ghankun Steels Pvt. Ltd., Chhattisgarh	1	6 MW	AFBC	Indian Coal / Dolochar / South African Coal

CFBC - Circulating Fluidised Bed Combustion • AFBC - Atmospheric Fluidised Bed Combustion



30 MW Coal based Power Plant
at Bharathi Cement Corp. Pvt. Ltd., Andhra Pradesh



35 MW CFBC Power Plant
at United Phosphorus Ltd., Gujarat



67.5 MW CFBC Power Plant
at Bhubaneshwar Power Pvt. Ltd., Bhubaneshwar



22 MW AFBC Power Plant
at Gujarat Fluorochemicals Dahej, Gujarat

Other Isgec Offerings

STEAM GENERATORS

- Pulverised Coal Fired
- Circulating Fluidised Bed Combustion (CFBC)
- Atmospheric Fluidised Bed Combustion (AFBC)
- Oil & Gas Fired
- Travelling / Pulsating / Pinhole / Dumping Grate
- Slop / Vinasse Fired
- Waste to Energy
- Waste Heat Recovery

AUXILIARY EQUIPMENT

- Air Pollution Controller (ESP)
- Deaerator
- SNCR
- SCR

STEAM GENERATOR SERVICES

- Site Construction & Commissioning
- Retrofitting and Modernisation
- Replacement / Upgradation of Parts
- Trouble Shooting & Services
- Residual Life Assessment (RLA) Studies
- Training
- Spares

EPC PROJECTS

- Independent Power Plants
- Co-Generation Plants
- Sugar Plants

Feed Cycle Equipment (HP Heater, LP Heater & Condenser)

Process Equipment • Presses • Castings • Metal Cutting Machinery • Contract Manufacturing



**ISGEC HEAVY
ENGINEERING LTD.**

CIN: L23423HR1933PLC000097

A-4, Sector 24, Noida - 201 301 India

Tel.: +91-120-484 7010 Fax: +91-120-408 50 00

India Contact: Piyush Jain E-mail: piyushj@isgec.co.in

Exports Contact: Yogesh Marwaha, E-mail: exports@isgec.co.in

www.isgec.com