# 18th Paper Tech 2024 Organized by CII – Hyderabad

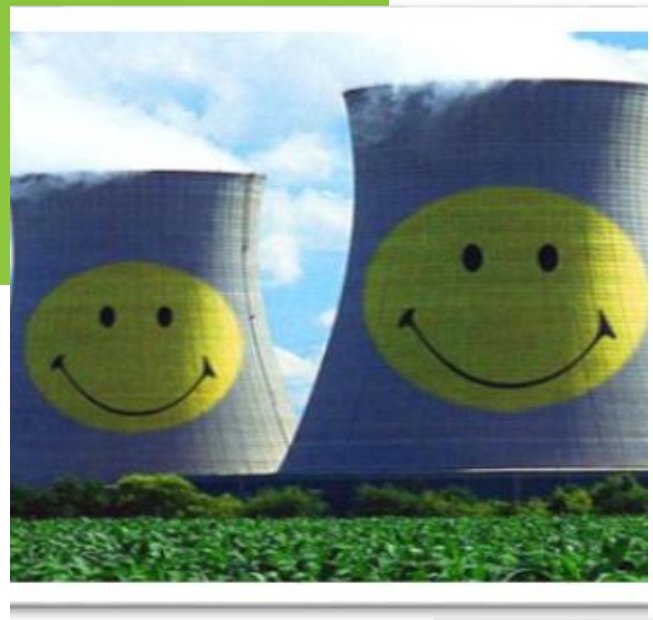
Topic: VT Corp's ESP Technology & ESP Retrofit Solutions with Case Studies

Featuring: Mr. Anil Sutar, Business Head


Visit Our Website
www.vtcorpindia.com

# ABOUT VT CORP…

- An engineering company that designs and manufactures machinery for a variety of industrial domains, including the cement industry, chemical sponge iron, power plants, cogeneration plants, paper plants, the food and sugar industry, and many other applications.
- For over 57 years, our Weighing Division has produced and supplied weighing and bagging equipment such as Automatic bag handling and filling line , Belt Weigh Feeders, Electronic Roto-Packers, Bagging Packing Machines, Jumbo Packers, etc.
- Renowned for its commitment to design, and high caliber of production.
- More than 650+ ESPs certified by VTC.



POWER

STEEL

CEMENT

SUGAR

# TYPES OF ESP MODELS

VE-1 : BOTTOM RAPPING TUMBLING HAMMER DESIGN

VE-2 : TOP RAPPING TUMBLING HAMMER DESIGN

VE-3 : TOP RAPPING –EMIGI DESIGN

# FEATURES OF ESP

## Collecting Electrode

- Optimized and Uniform Current distribution Profile
- Better transmission of rapping forces across the width and height
- Better collection efficiency.
- Good strength/ rigidity.

## Rigid Type Emitting Electrode

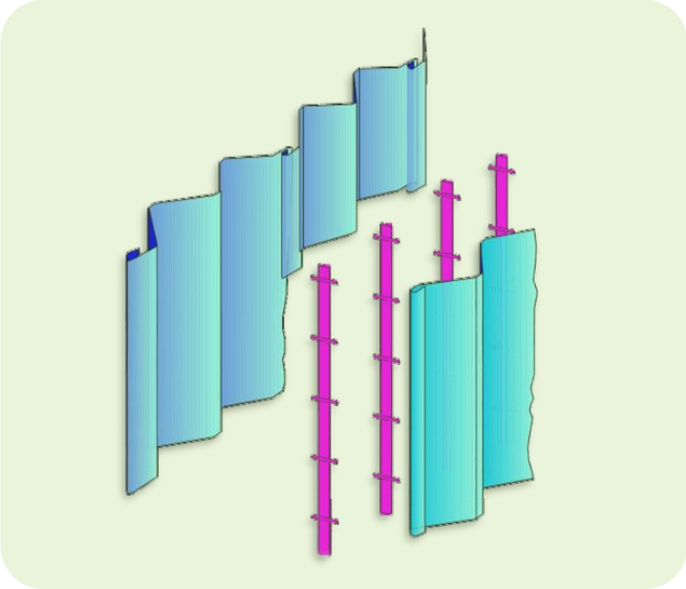
- Effective charging of particulate matter
- Perpendicular placement of Emitron pins to Gas flow
- Uniform corona discharge covers the entire cross-section due to the symmetrical placement of pins.

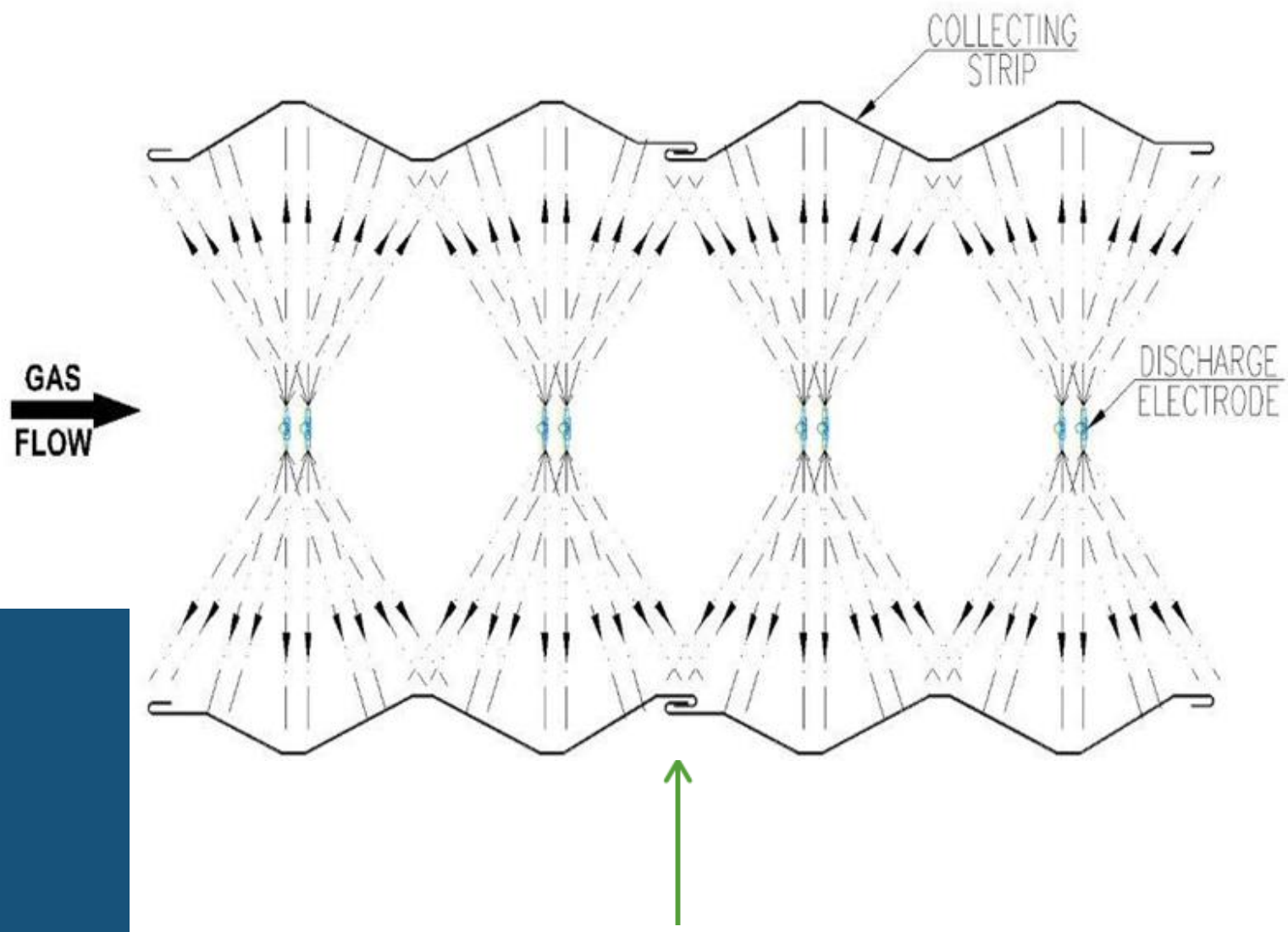
## Star Type Emitting Electrode

- Intense corona generation throughout the length
- Mechanically stable electrodes for optimum rapping vibration
- Durability and VERY long life.

## Gas distribution screens

- Ensure proper gas distribution.
- Aligned within beams to ensure the straightness of plates and long life.



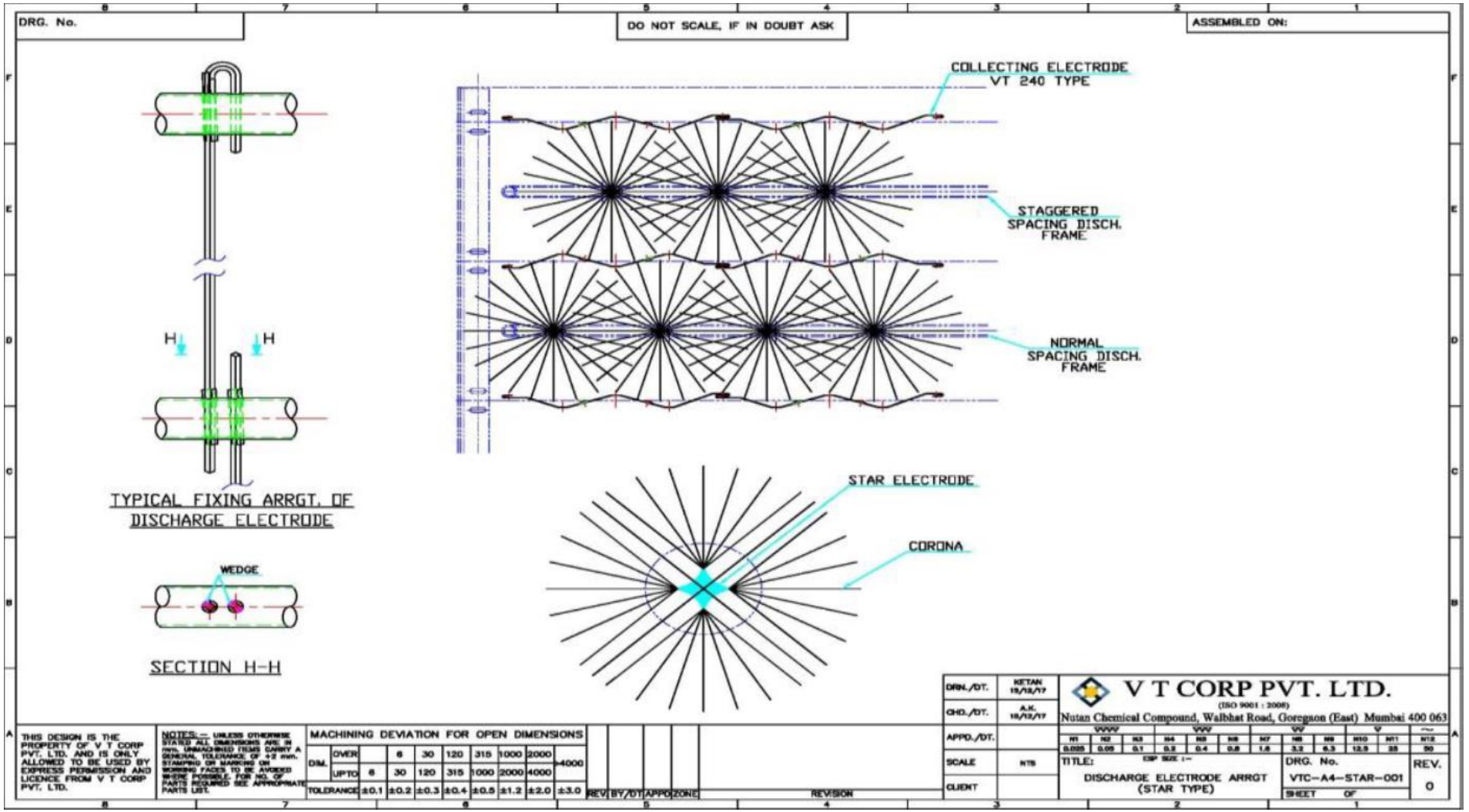



# CE & DE- SYSTEM

Electrode System: VT 240 Collecting Electrode / Rigid Type Emitting Electrode

Corona Discharge

# UNIFORM CORONA GENERATION



# KEY FEATURES: 4D TYPE DE

1. Intense corona generation throughout the length properties among various types of Rigid Electrode.

2. Mechanically stable electrodes for optimum rapping vibration transmission and effective dislodgement.

3. Light weight, ease of handling at site.

4. Durability and Long life

# STAR ELECTRODE vs OTHER ELECTRODES

1

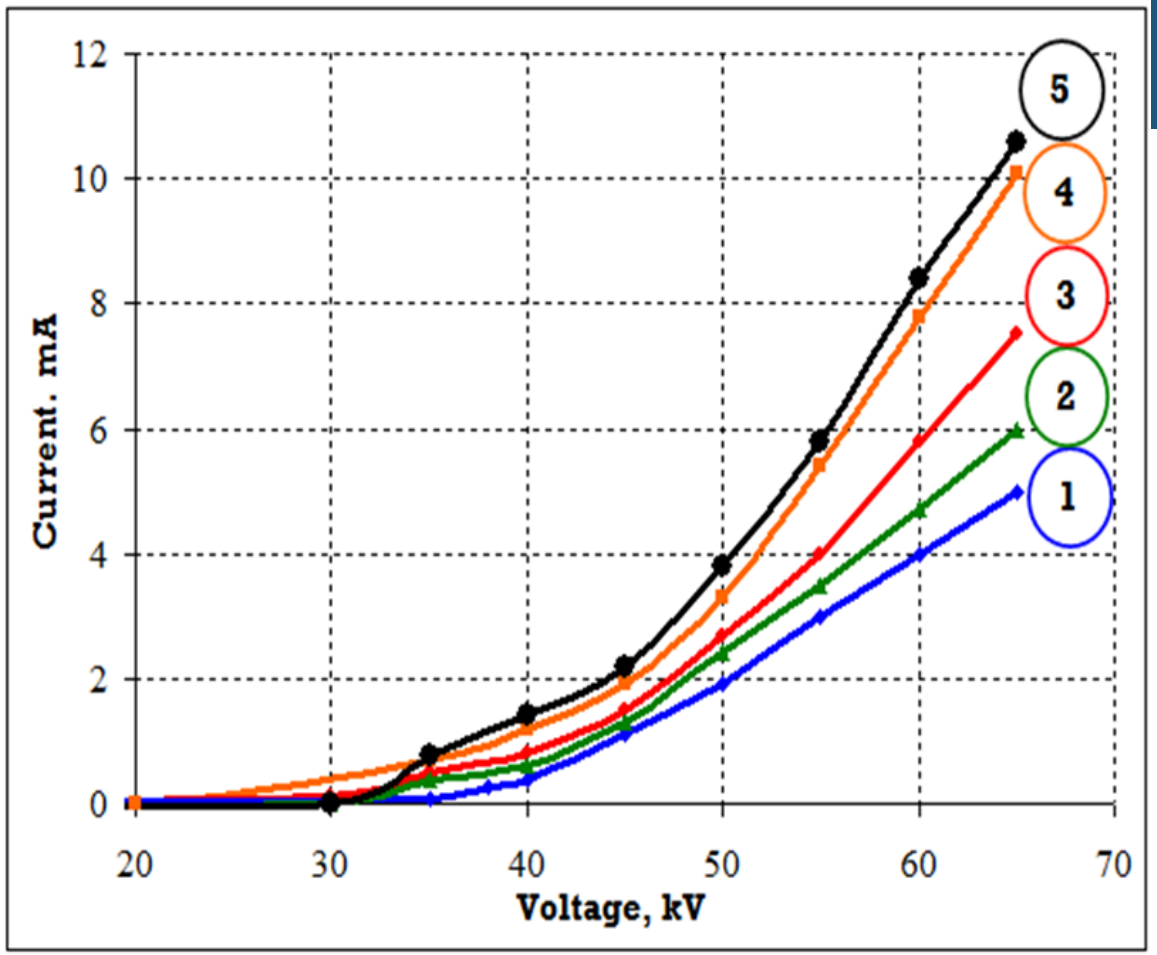
2

3

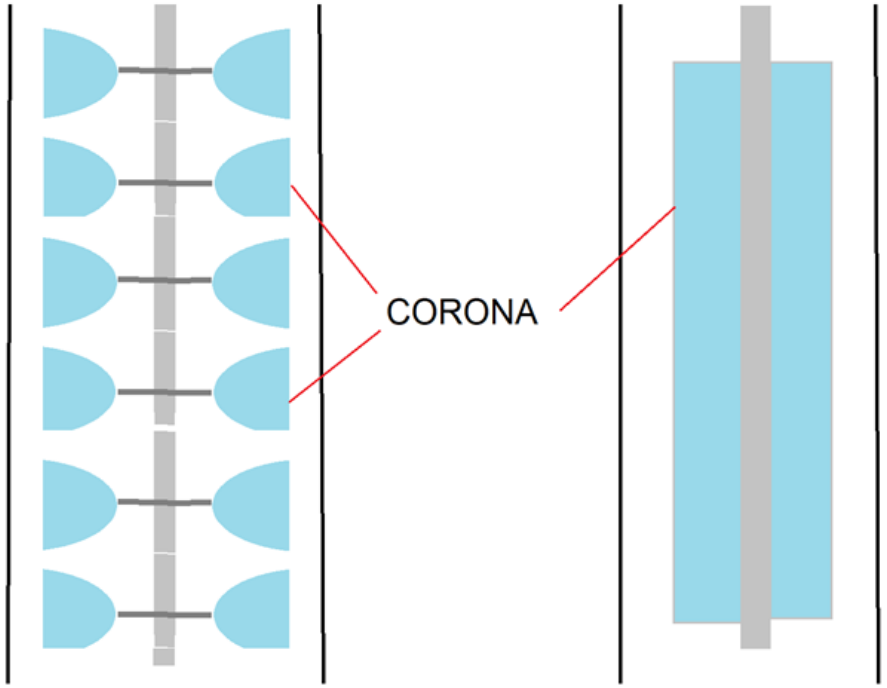
4

5

# VI- CURVES



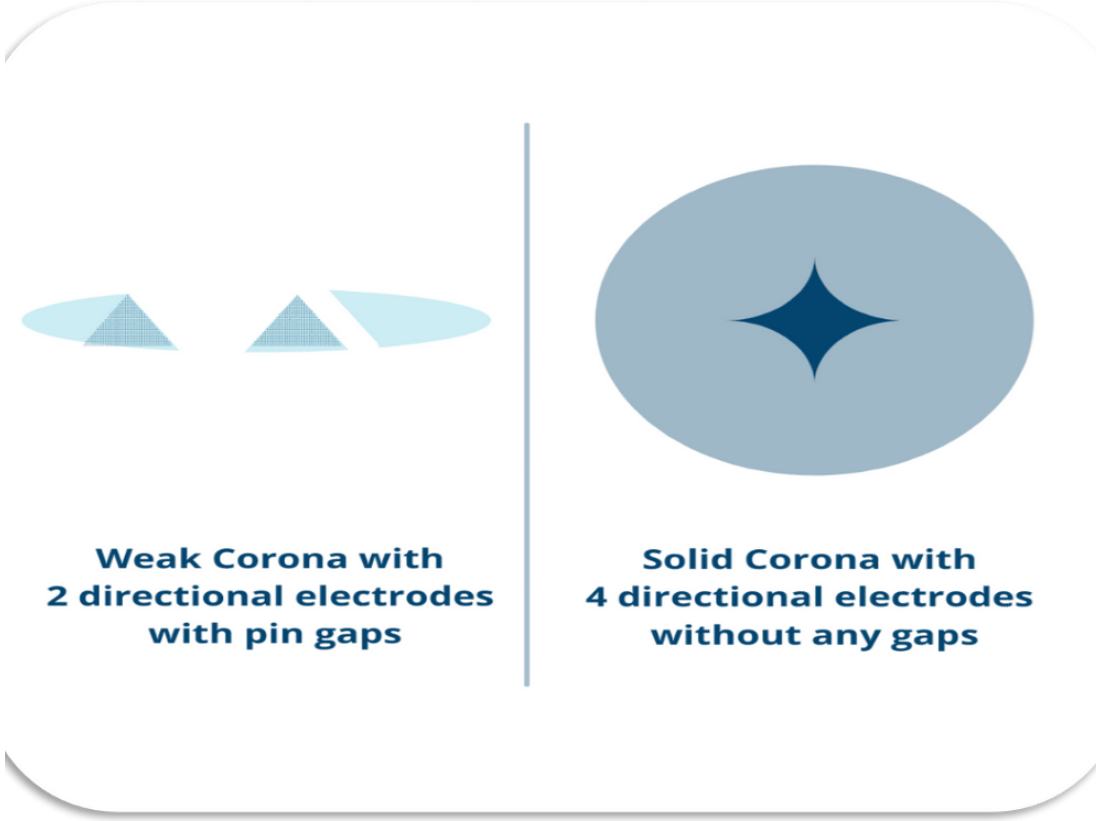
## STAR ELECTRODE vs OTHER ELECTRODES




Rod and Pin Electrode

Star Electrode

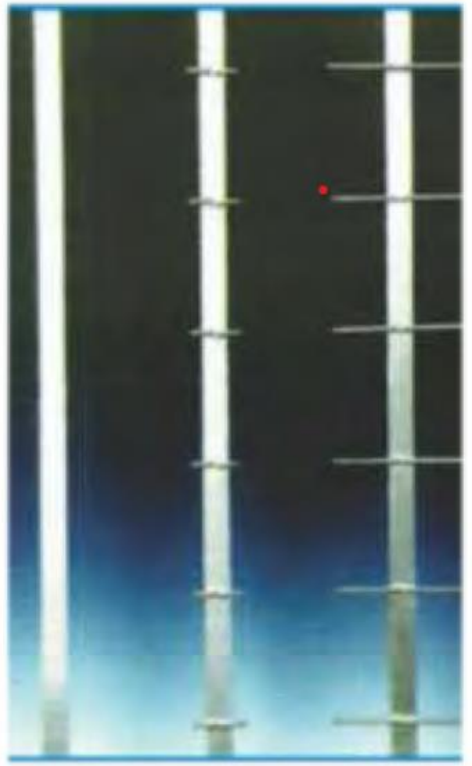
## STAR ELECTRODE vs OTHER ELECTRODES



Discharge electrodes type 'Emitron-15' in the first field and 'Emitron-0' in second field to achieve an optimal current/voltage characteristic. The discharge electrode strips are fastened to strong tubular frames in a way to exclude any mechanical wear as well as spark erosion. The shape of the discharge electrodes and their type of fastening to the tubular frames can be seen from the Sketch. The tubular frames are firmly suspended to avoid swinging. In case of considerable field heights, there will be two separate frames arranged one above the other.

# EMITRON ELECTRODES

***Emitron***




# GAS DISTRIBUTION PLATES

Designed ESPs are supplied with specially Designed ‘X’ Type and ‘Flap’ Type GD plates at inlet cone to ensure an even distribution of the incoming gas flow throughout the cross-section of the Precipitator.

# COLLECTING ELECTRODE RAPPING MECHANISM

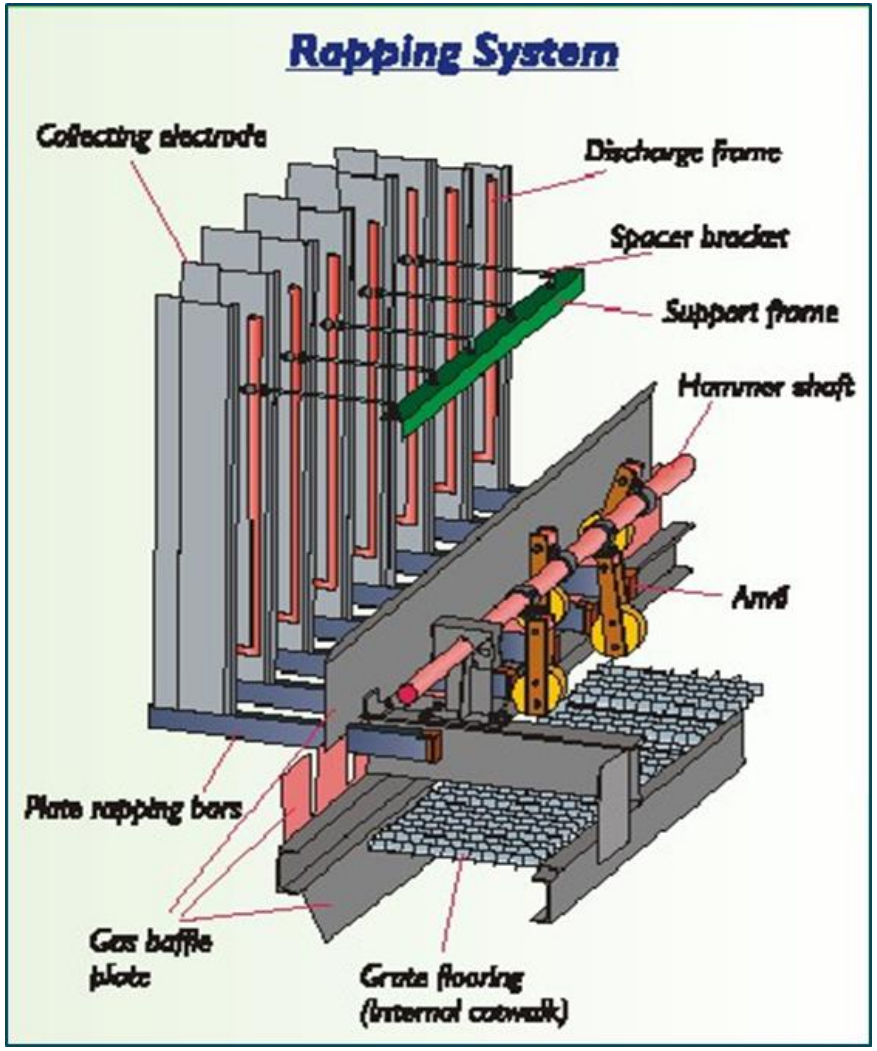
(BOTTOM RAPPING)

The collecting electrode wall hangs loosely from the carrier beam support at the roof beam level at the top

The wall is connected by a rapping bar at the bottom each wall is rapped by its individual Hammer which operates by means of the ‘Tumbling Hammer Mechanism.

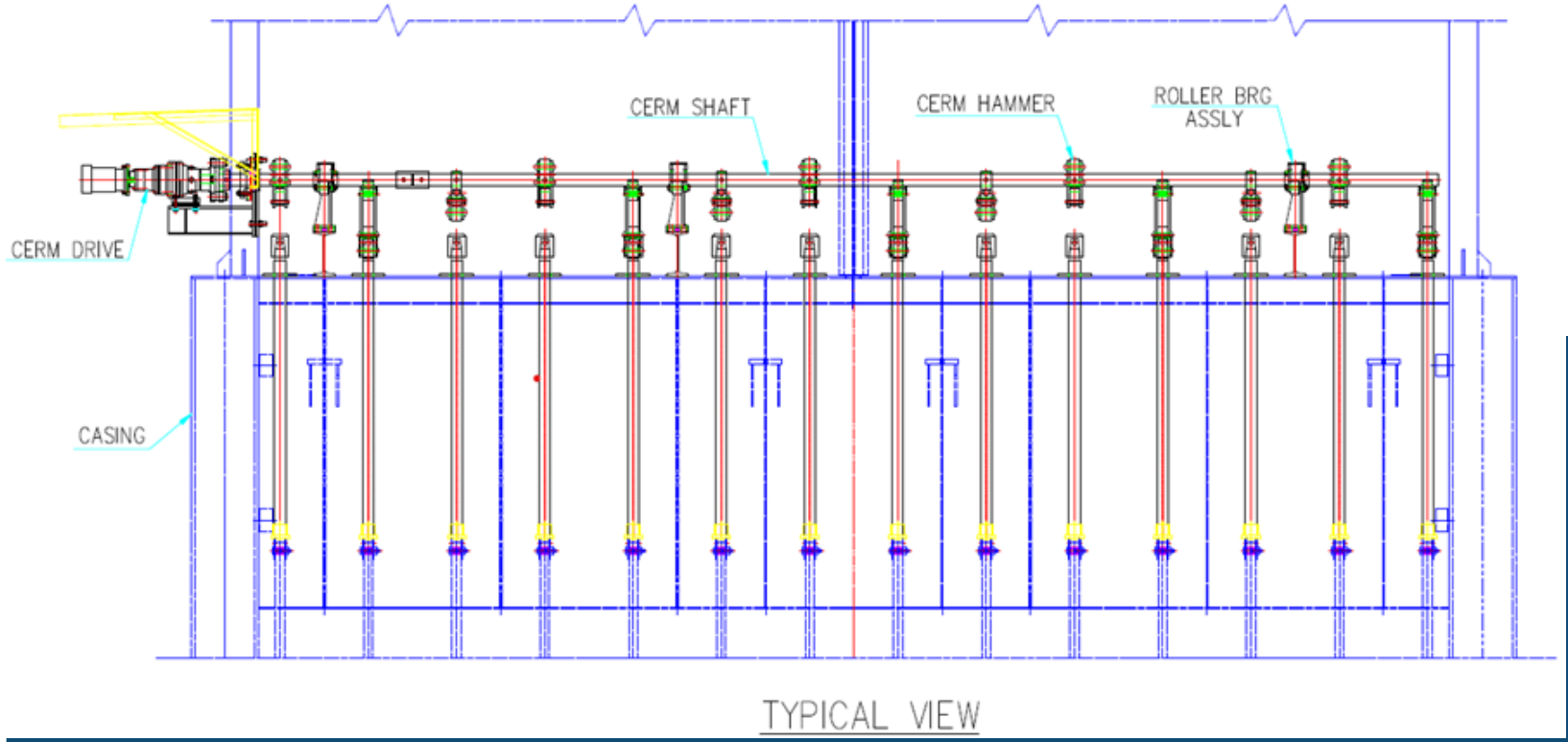
# COLLECTING ELECTRODE RAPPING MECHANISM

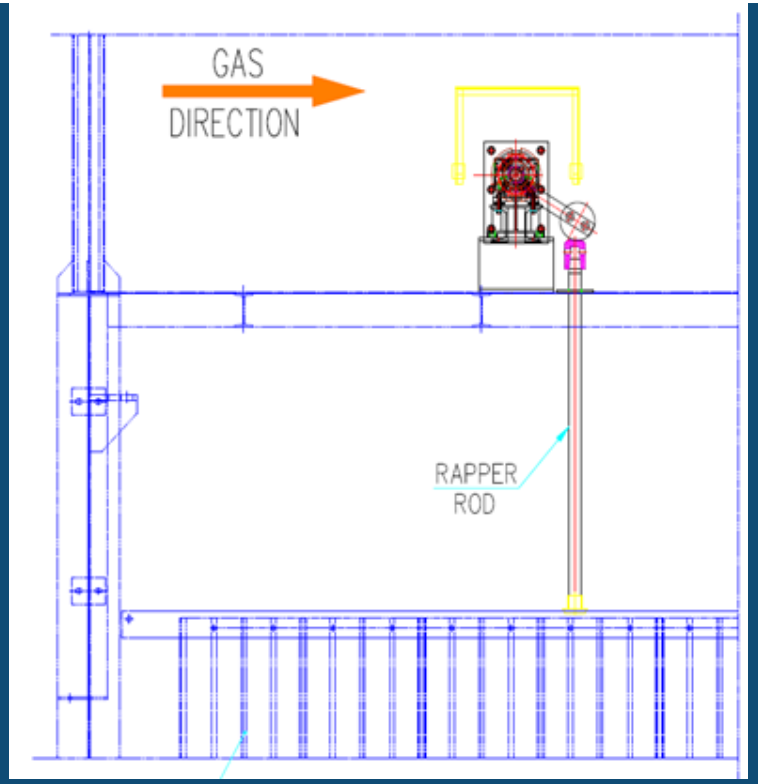
(BOTTOM RAPPING)



# COLLECTING ELECTRODE RAPPING MECHANISM (TOP RAPPING)

**The collecting electrode RAPPING mechanism is mounted outside the flue gas path.**



Compact model and no moving parts in the flue gas path

Less footprint area

Less wear and tear

Easy maintenance and easy to install at site.

Minimum erection time.

# ADVANTAGES OF VTC -TUMBLING HAMMER RAPPERS AT TOP

# ESP Retrofit / Upgrades for PM Emissions Improvements

(CASE STUDIES)

# CASE STUDY:1

Customer : M/s Godavari Power Limited
Capacity : 70 TPH (ABB) AFBC Boiler
Location : Raipur

The customer has decided to enhance the performance of the existing ABB make ESP and reduce the emission level from 150 mg/Nm³ to less than 20 mg/Nm³ without affecting the existing footprint area. VTC offered a solution to the customer to retain the existing ESP support structure and hopper as per the existing system.

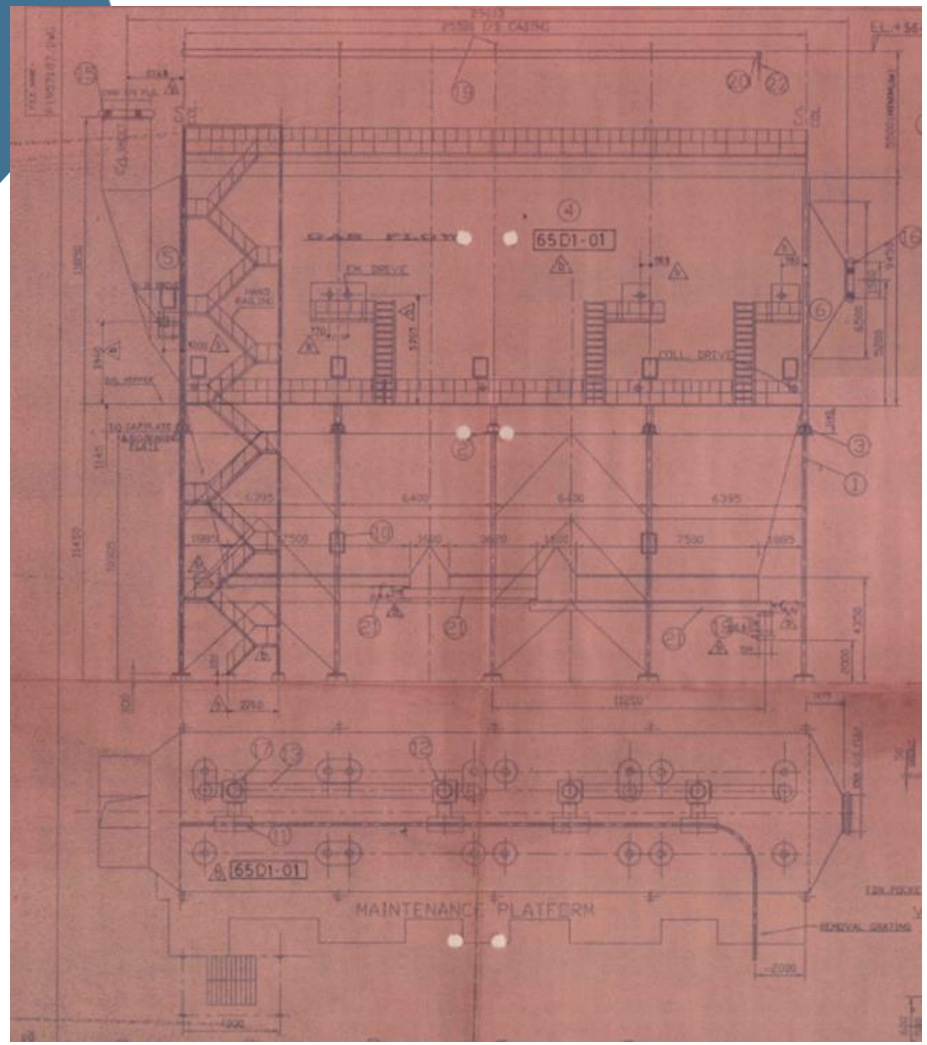
VTC has increased the height of the CE plate, changed the complete internals according to VTC standards, and added a pre-collector type nozzle at the inlet side within the available footprint area.

VTC has increased the total collection area by approximately 46% with our design within the available footprint area. The detailed comparison is listed below.

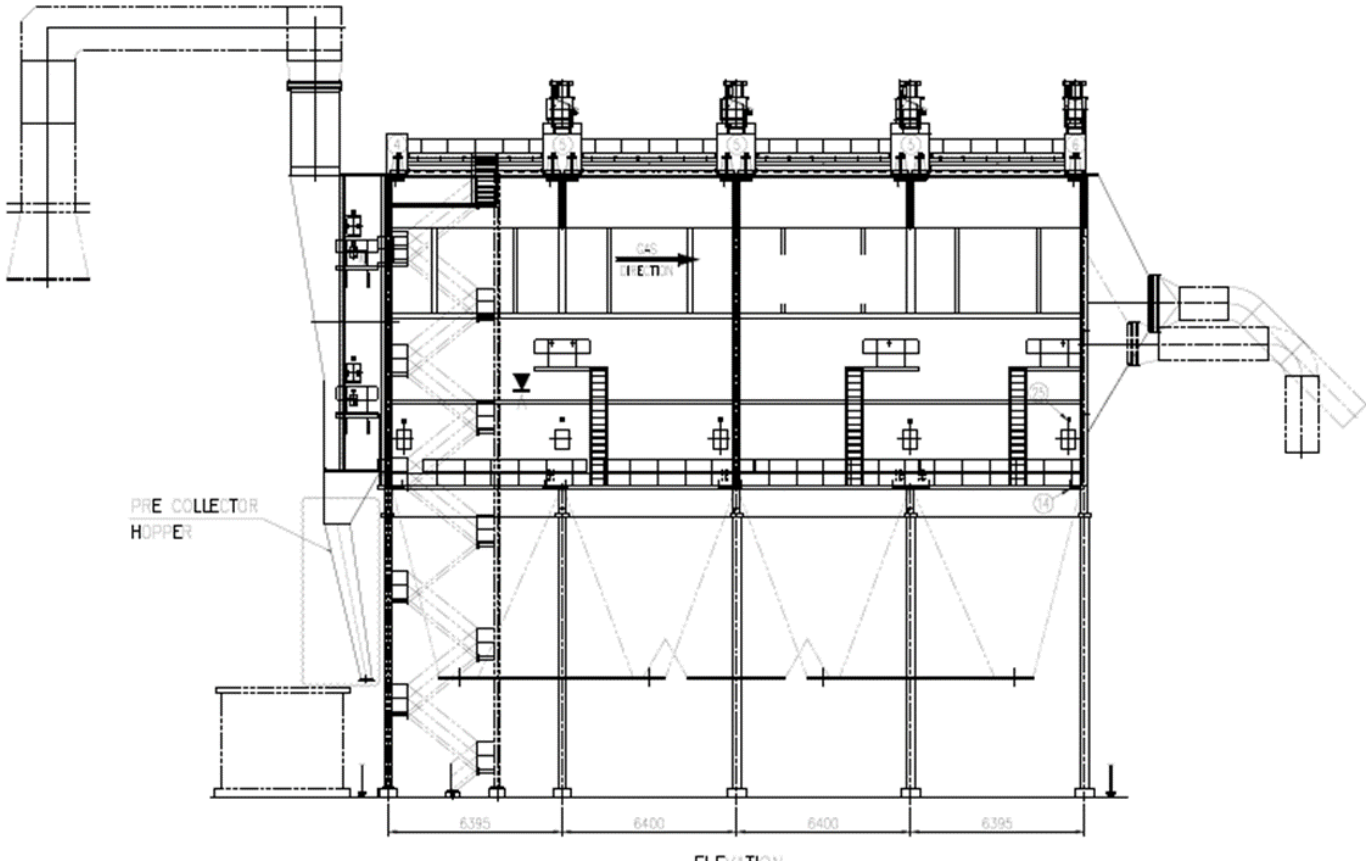
# DESIGN PARAMETER

| S.No | Description | Units | Existing | After R&M (70 TPH) |
|---|---|---|---|---|
| 1 | Type of Boiler | - | AFBC | AFBC |
| | ESP Make | - | - | ABB |
| 2 | Fuel Firing Conditions | - | Coal | Coal + Dolochar |
| 3 | Boiler capacity | TPH | 70 | 70 |
| 4 | Flue gas Volume | m3/hr | 170700 | 146877 |
| 5 | Flue gas Temperature | Deg C | 230 | 180 |
| 6 | Inlet Dust load | gm/Nm3 | 222 | 100 |
| 7 | Outlet Emission | mg/Nm3 | **150** | **20** |
| 8 | Total No fields | Nos | 4 | 4 with One pre-collector at the Inlet side |
| 9 | Total Collection area | m2 | 5184 | 7603 |

# EXISTING




# AFTER MODIFICATION



# CASE STUDY: 2

Customer : M/s Dalmia Bharat Sugar Industries Ltd
Capacity : 21TPH Slop-fired Boiler (After enhancement)
Location : Kolhapur, Maharashtra

The customer has enhanced the capacity of the boiler from 18 TPH to 21 TPH. Considering this, the customer intends to modify/upgrade their existing Electrostatic Precipitator (ESP) system, which is installed for an 18 TPH slop-fired boiler, to achieve an outlet emission level of <80 mg/Nm³ with the enhanced capacity.

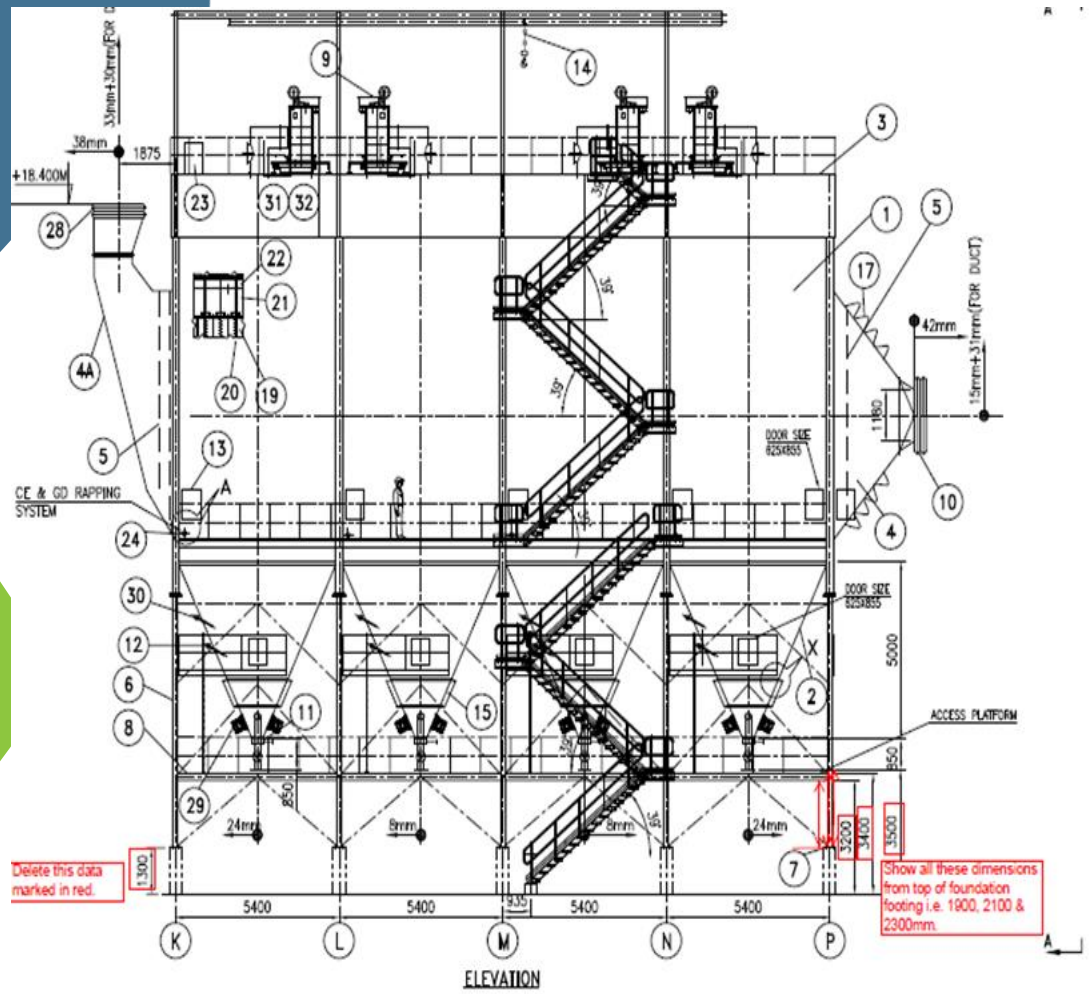
VTC offered a solution to the customer to retain the existing ESP support structure, hopper, and casing as per the existing system, and change the complete internals according to VTC standards within the available footprint area.

VTC has increased the total collection area by approximately 18% with our design within the available footprint area. The detailed comparison is listed below.

# DESIGN PARAMETER

| S.No | Description | Units | Existing | After R&M |
|---|---|---|---|---|
| 1 | Type of Boiler | - | Slop Fired Boiler | Slop Fired Boiler |
| 2 | Fuel Firing Conditions | - | Slop + Bagasse | Slop + Bagasse |
| 3 | Boiler capacity | TPH | 18 | 21 |
| 4 | Flue gas Volume | m3/hr | 64800 | 88560 |
| 5 | Flue gas Temperature | Deg C | 190 | 230 |
| 6 | Inlet Dust load | gm/Nm3 | 19.6 | 22 |
| 7 | Outlet Emission | mg/Nm3 | ➢ 200 | 80 |
| 8 | Total No fields | Nos | 4 | 4 |
| 9 | Total Collection area | m2 | 1764 | 2089 |

# EXISTING

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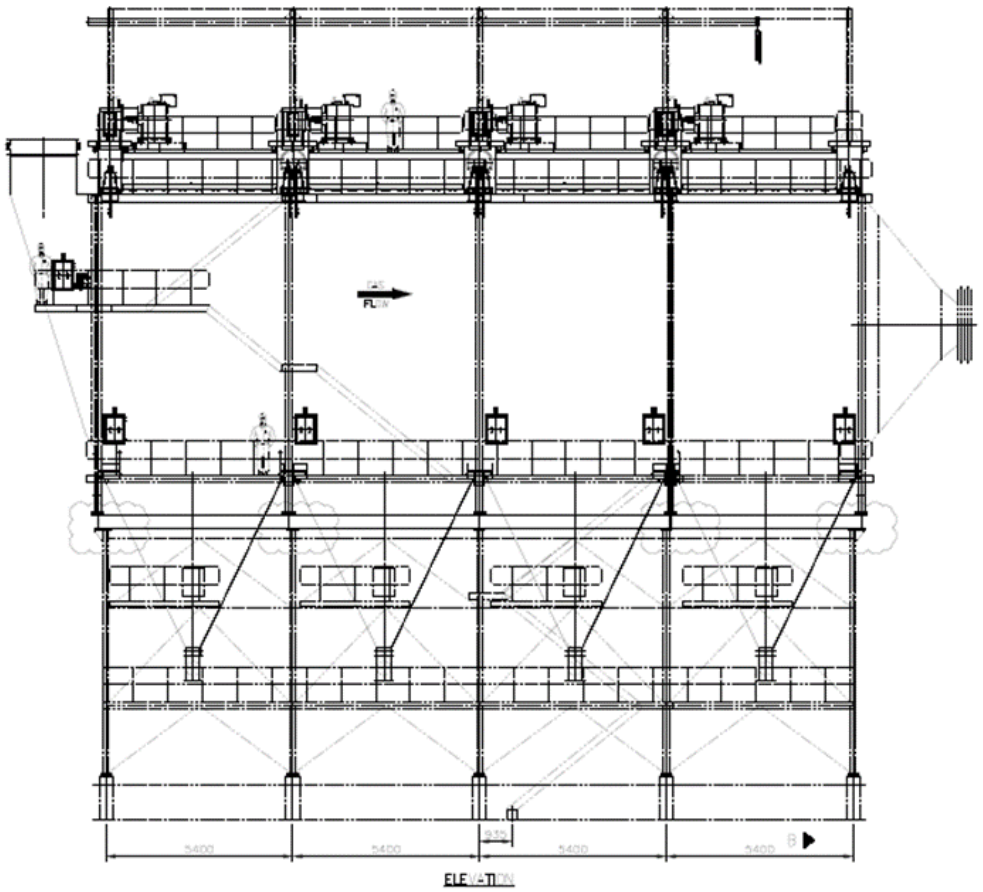


# Retrofitting Of ESP For 500 MW Power Plant For The Tata Power Ltd, Mumbai

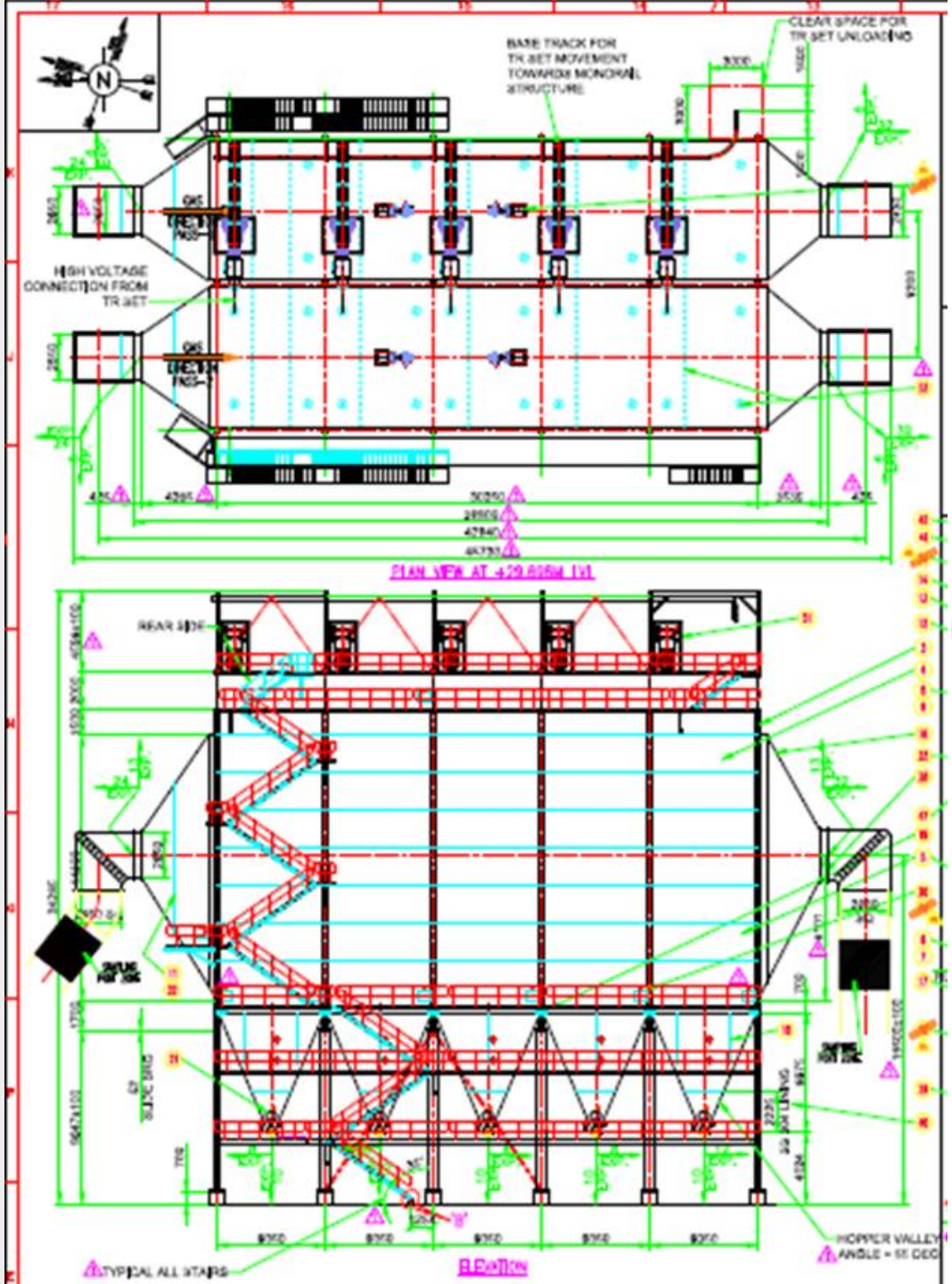
**Successfully replaced all internals, facing unknown constraints inside the ESP.**

**Carried out dismantling and erection activity in a confined space and time-bound manner under strict safety conditions**

Outlet emission **: ≤ 50 mg/Nm3**

**Actual Results achieved :** Inlet dust burden **: 3409 mg/Nm3,** Outlet emission **: 23.76 mg/Nm3**

# ESP For 3 x 357 TPH Coal Fired Boiler at Talcher Fertilizer Limited



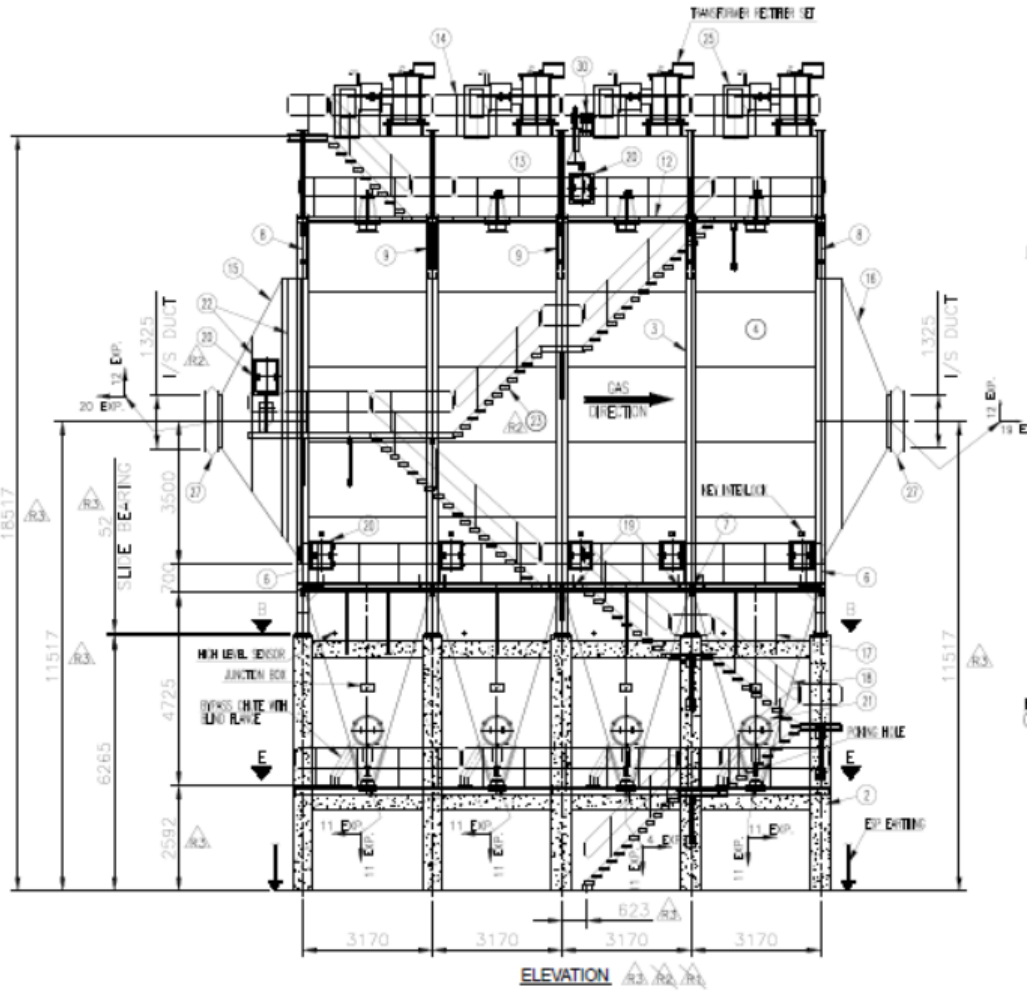

ESP erection is under process for all three Boiler ESPs.

Inlet Dust Burden: 62000mg/Nm3

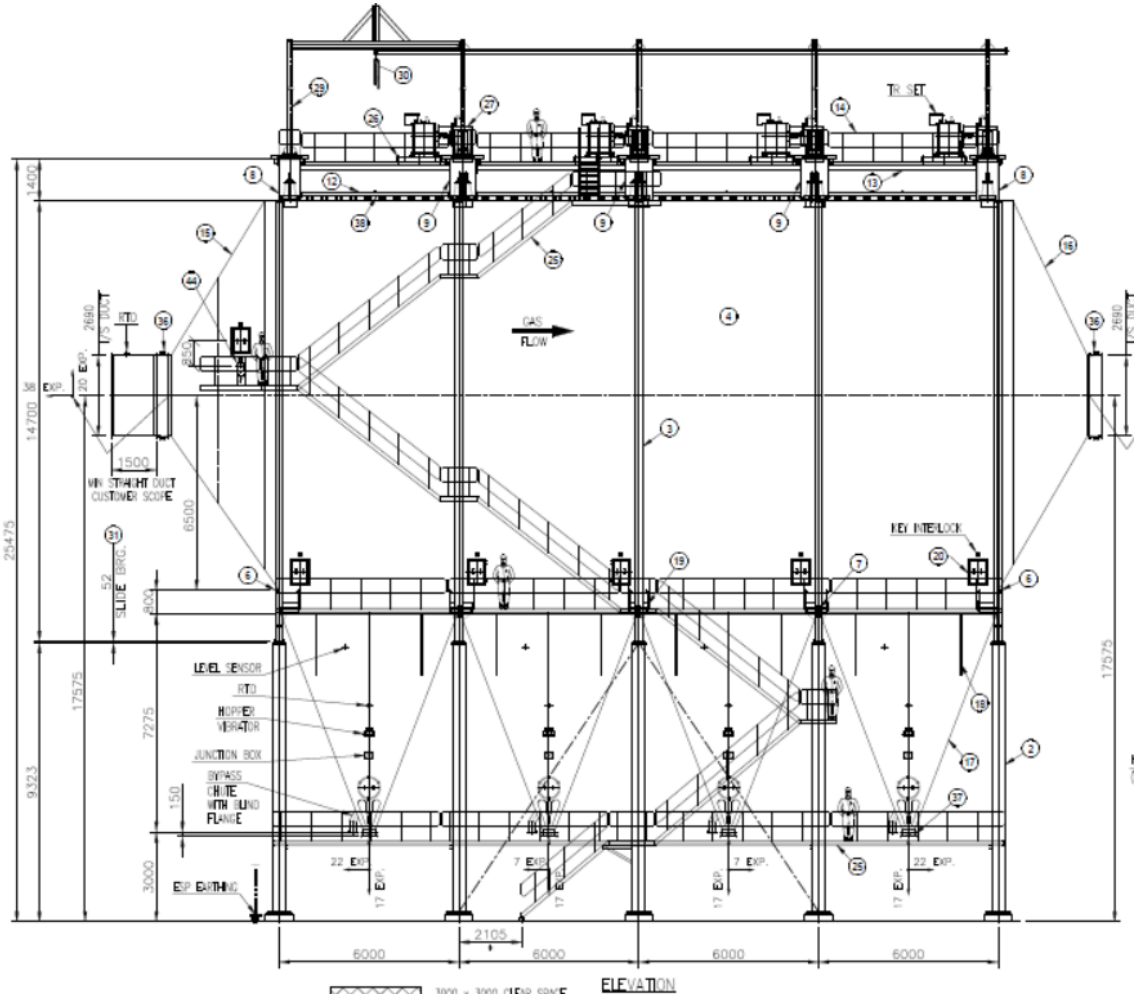
Outlet Emission : ≤ 30 Mg/Nm3

# Major customer references in Steel and other industries

## Rashmi Cement Ltd- ESP for 100TPD DRI plant-Under execution




## Sundaram Steel Pvt Ltd- ESP for 1x 500TPD DRI KILN plant-Under execution



## Minera Steel & Power Ltd, Karnataka

- Successfully installed ESP for 0.6 MTPA rated capacity
- Iron ore pellet plant at Sultanpur, Bellary
- Working on travelling grate technology
- Gas Volume: 2,10,000 Nm3/hr
- ODC: 30 mg/Nm3

## SAIL Steel Limited, Odhisha

- Wind Box Exhaust Gas ESP
- Successfully installed ESP for 0.6 MTPA rated capacity Iron ore pellet plant
- Gas Volume: 1,63,436Am3/Hr
- IDC: 1 gm/Nm3
- ODC: 50 mg/Nm3

## Jindal Stainless Steel, Odhisha

- Successfully installed ESP for 0.6 MTPA rated capacity
- Iron ore pellet plant
- Gas Volume: 138.89 Am3/Hr
- IDC: 12 gm/Nm3
- ODC: 25 mg/Nm3

## SAIL Steel Limited, Odhisha

- Hood Exhaust Gas ESP
- Successfully installed ESP for 0.6 MTPA rated capacity Iron ore pellet plant
- Gas Volume: 1,47,961 Am3/Hr
- IDC: 1.5 gm/Nm3
- ODC: 50 mg/Nm3

# ESTEEMED CUSTOMER APPRECIATION CERTIFICA

thyssenkrupp

thyssenkrupp Industries India Pvt. Ltd., Pimpri, Pune 411 018, India — Industrial Solutions

**TO WHOMSOEVER IT MAY CONCERN**

This is to confirm that we had placed 3 orders on M/s. V T CORP PVT LTD for Design, Engineering, Manufacturing, and Supply along with supervision of Erection & commissioning of 6 Nos. Electrostatic Precipitators to be supplied to our Bajaj Hindustan Ltd Projects. The details are as below.

- PO No. 2500002300 Dated 17.03.2010 – Project- Bajaj Hindustan Ltd, Site – Kamberkhera 2 Nos. ESP having capacities to handle 3,60,000 m3/hr gas volume for 190 TPH CFBC Boiler
- PO No. 2500002301 Dated 17.03.2010 – Project- Bajaj Hindustan Ltd, Site – Maqsoodpur 2 Nos. ESP having capacities to handle 3,60,000 m3/hr gas volume for 190 TPH CFBC Boiler
- PO No. 2500002299 Dated 17.03.2010 – Project- Bajaj Hindustan Ltd, Site –Berkhera 2 Nos. ESP having capacities to handle 3,60,000 m3/hr gas volume for 190 TPH CFBC Boiler

We also confirm that the supplies have been completed as per the scope of the purchase order.

Thanking you

Your's sincerely,

**For Thyssenkrupp Industries India Pvt Ltd**

04/07/17

**Authorized Signatory**

CEAT

Date – 25.01.2024

**TO WHOMSOEVER IT MAY CONCERN**

This is to confirm that we have an **Electrostatic Precipitator** installed at our **Bhandup Plant** which was Designed, Engineered, Manufactured, Supplied and Installed by M/s. V T CORP PVT LTD having their registered Office at 901, Windfall, Sahar Plaza, Sir M V Road, J B Nagar, Andheri (East), Mumbai - 400059, Maharashtra.

We have purchased this **Electrostatic Precipitator for our 25 TPH Biomass/Mustard Briquette Fired Boiler** vide PO no. 4200047636 dated 19.11.2021. The Electrostatic Precipitator is performing to our satisfaction and within the specified parameters.

We are also appeased with the after sales service provided by M/s. V T CORP PVT LTD

Your's truly,

Mr. V S Fernandes

Sr. Manager - Utility

Ceat Tyres Ltd

VT Corp

HEG

BHILWARA GROUP

PROUD TO BE INDIAN PRIVILEGED TO BE GLOBAL

Date: 01.12.2010

TO WHOM SO EVER IT MAY CONCERN

This is to certify that against HEG order No. HEG/COMM/BOILER/2837 dated May 22, 2007, placed on M/s. ThyssenKrupp Industries India Pvt. Ltd, Pune for supply /erection /commissioning of 140 TPH CFBC boiler of Unit-2 Captive Power Plant at HEG, Mandideep. M/s VT Corp Pvt. Ltd. had supplied ESP on behalf of M/S ThyssenKrupp Industries India Pvt. Ltd, Pune.

The commercial operation of ESP started in May 2009.The said ESP is operating within guaranteed outlet emission of 80 mg/Nm3, the average outlet emission so far has been observed between 50-60 mg /N M3.

The overall performance of said ESP (which is user and maintenance friendly) is quite satisfactory. Also after sale services rendered by M/s VT Corp so far has been quite satisfactory.

The above certificate is being issued for the purpose of its utilization as supporting document in terms of performance of said ESP and not for its use for other purposes.

O P Manchanda
Vice President- CPP
HEG Limited

# KANISHK STEEL INDUSTRIES LTD
## SPONGE IRON DIVISION

**Factory :** OPG Nagar, Periya Obulapuram Village, Near Nagarajakandigai, Gummidipoondi to Madharpakkam Road, Gummidipoondi - 601 201. Thiruvalluvar Dist. Phone : 37901619, 37903070

Date: 21-May-2011

TO WHOMSOEVER IT MAY CONCERN

M/s VT CORP has supplied ESP size: 11/7.5/3x8/400 against Indure Pvt Ltd's order No. I-0125/KSIL/ESP/VTC/Jan-01 dtd. 14.01.2008 on them for our 10MW captive power plant at Gummidipoondi (TN). The performance of the ESP is satisfactory.

The system is user friendly and maintenance friendly. We are also appeased by the after sales support rendered by M/s VT CORP to run our ESP.

Yours truly,

For M/s Kanishk Steel Industries Ltd.

Date: 03.12.2014

minera

## PERFORMANCE GUARANTEE CERTIFICATE

M/s MINERA Steel and Power have installed a 0.6MTPY rated capacity Iron ore pellet plant at Sultanpur, District-Bellary (Karnataka), working on Travelling-grate technology.

M/s URALMASH have done the basic engineering, design, manufacturing, supply and supervision of erection and commissioning of Travelling-grate Indurating machine MOK-108 against Contract No 890-045-1269 dated 28.09.2012 between MINERA STEEL AND POWER and URALMASH.

M/s VT CORP has provided basic and detailed plant engineering & design, supplied specific core equipment, supervision of erection and commissioning services in compliance with the Contract No: MINERA/VTCORP/PELLETPROJ/786-001/12-13, dated 27/09/2012 and Tripartite agreement No: MINERA/ URALMASH&VTCORP/ PELLET PROJECT/786-002/12-13 dated 31st October 2012, between MINERA STEEL AND POWER, URALMASH and VTCORP.

The Pellet plant is successfully commissioned on 18th August 2014. The performance guarantee test is conducted from 27th November 2014. The PG test results are as shown below which confirms to the agreed values.

| No. | Parameter Description | Guarantee Parameter Value (Avg) | Actual Parameter Value for Rated Capacity (Avg) | Actual Parameter Value for Design Capacity (Avg) |
|---|---|---|---|---|
| 1 | Pellets Production, t/day | 1875 | 1908 .76 | - |
| 2 | Design production rate, t/day | 2500 | - | Above 2500 |
| 3 | Specific Fuel Consumption, kcal/t product pellets | 265 000 | 247 767.86 | Below 250 000 |
| 4 | Specific Process Fan Electric Power Consumption, kWh /t product pellets | 25 | 18.33 | Below 25 |
| 5 | Specific Power consumption per Tonne of Pellet Production including dry grinding KWh/T | 50 | 47.79 | Below 50 |
| 6 | Cold Compression Strength of product pellets as per ISO 4700, kg/pellet | 250 | 233 | Above 250 |
| 7 | Product Pellets Size | 85% between 9 mm and 16 mm | 89.12 | Above 85 |
| 8 | Tumbler Index of product pellets as per ISO 3271, % | 94 | 93.91 | Above 94 |
| 9 | Abrasion Index of product pellets as per ISO 3271, % | 5 | 4.48 | Below 5 |

**For and on behalf of**
**Minera Steel & Power Private Limited**

**Tanveer Ahmed**
**Managing Director**

TATA

Date: 20/03/2015

**To whomsoever it may concern**

M/s VT CORP PVT LTD. have carried out Retrofitting of ESP by replacing the Internals of one stream out of four stream size: 4(1x4-258,6-68x14x22-300) for our Unit 5 (500Mw), at Trombay Thermal Power Station. The ESP was successfully commissioned on 28th JAN 2015. Performance of the ESP is satisfactory and the outlet emission measured was in the range of 20Mg/NM3 to 25Mg/NM3.

We appreciate M/s VT Corp for carrying out replacement of ESP internals successfully and have met our expectation.

(P. L. Manjrekar)
Chief – Trombay Thermal Power Plant

SKS ISPAT AND POWER LIMITED

Date: 07.11.2011

TO WHOMSOEVER IT MAY CONCERN

M/s VT CORP PVT LTD. have Designed, Supplied and commissioned the ESP size: 16 / 12.5 / 3 x 11 / 400 for our **110 TPH(30 MW) FBC** at Raipur. Subsequently two fields having size 16/12.5/2x11/400 were added to this ESP against our order no. SKSIPL/PP/VTC/PO-ESPAUG/01/08-09 dt. 27.12.08. The ESP was successfully commissioned in May '10. The performance of the ESP is excellent and its outlet emission is within the pollution control norms and as committed.

The system is user friendly and maintenance friendly. We are also happy with the after sales support rendered by M/s VT CORP PVT. LTD. to run our ESP.

**K. L. Dewangan**
**Executive Director (works)**
S.K.S. Ispat & Power Ltd.
Raipur

VT Corp

# TOP KEY CLIENTS

TATA

thyssenkrupp

Baramati agro™
Linking the Basics

किसन वीर
Kisan Veer Satara Co-operative Sugar Factory

bajaj energy private limited

Godrej

पूर्ती
पूर्ती पॉवर अॅण्ड शुगर लिमिटेड

FORBES MARSHALL

Dalmia
Bharat Limited

uttamenergy

# ESTEEMED CLIENTS

JSL JINDAL STAINLESS

TATA

SREE METALIKS

SINGHAL GROUP OF INDUSTRIES

JSW

NR GROUP

LLOYDS METALS

SURAJ PRODUCTS LIMITED

Registered Office & Works :

AND MANY MORE.....

# THANK YOU

Contact Us,

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E-mail ID: anil.sutar@vtcorp.in

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