Kleenair
Systems P. Ltd.
Delivering Quality Products is our Habit

Air Pollution Control Systems

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About us

An efficient and long lasting Air Pollution Control System has become mandatory for every industry, as work zone environment as well as stack emission norms are getting stringent to protect the environment.

Emerged as a vision of two young & dynamic technocrats, **Kleenair** offers efficient and long lasting **Air Pollution Control Systems And Also Automated Yet Power Efficient Solid & Powder Handling Systems** for various applications in the industry.

Since its incorporation in 1987, the company's long history is built on endless challenges offered by world wide customers to provide CORRECT SOLUTIONS to their problems in these areas.

With expertise in this field, **Kleenair 's** strong foundation is built on its core values, vision & mission which distinguish and guide them :

- To offer efficient Air Pollution Control and Solid & Powder Handling Systems.
- To protect the environment for benefit of customer & community.
- To become leader in the field of **Air Pollution Control and Solid** & **Powder Handling Systems** by exceeding customer expectations.

Kleenair 's dedicated & loyal team of professionals convert customers demand to innovative yet correct solutions with “we can do it” attitude & ingenuity.

We work hard to continuously enhance our reputation for accessibility, professionalism, performance and the depth & quality of our long term relationship with clients

A world renowned reputation :

For more than 25 years we have been in this business of providing quality technology – a proven track record that speaks for itself.

Commitment to Quality Products :

Always exceeding customers expectations on product quality by continuously improving methods and systems.

Unparalleled Customer Support :

As a customer driven solution provider, we earn credibility and establish mutually beneficial relationship by exceeding expectations of professional services at each stage of project engineering

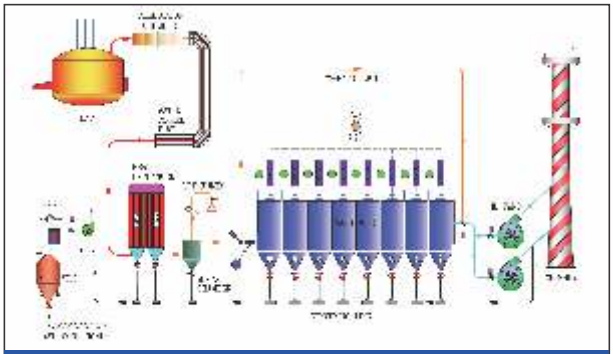
Innovative and committed team of professionals:

Always, we keep the technology at the forefront ensuring continuous product advancements through ongoing investments in Research & Development, Design and Manufacturing.


AIR POLLUTION CONTROL SYSTEMS
STEEL
FERRO ALLOY
CEMENT
POWER
REVAMP
PROCESS

STEEL

Gas Cleaning Plant on 25T EAF and 25T LRF- Zambia



Typical P & D for EAF

Suction at 4th hole when system in operation

EAF - PRIMARY FUME EXTRACTION

Kleenair has expertise in handling high temp sub-micron furnace dust/fumes coming from 4th hole of EAF.

The gases/fumes coming out @ 950 deg C are cooled in various stages-a)tube-to-tube cooler b)water cooled duct c) Air-to-Air Heat exchanger or Trombone cooler to achieve desired filtration temperature.

The un-burnt CO from process is burnt in combustion chamber installed prior to water cooled ducts.

An efficient off-line pulse jet bag-house filters the submicron dust to achieve upto 10 mg/Nm3 emission levels.

The filter dust is taken out by either pneumatic conveying or mechanical conveyor and elevator to a silo. A dust conditioner below ensures complete wetting of fine dust before being discharged to truck/trolley.High efficiency ID fan provided at exhaust handles clean gas to achieve higher impeller life.

The entire operation is automated through PLC/MCC along with logic to achieve optimized power consumption of GCP so also achieving higher life for the involved equipments.

Kleenair has installed fume extraction systems on number of EAF along with corresponding LRF/AOD on turnkey basis in India as well as abroad.

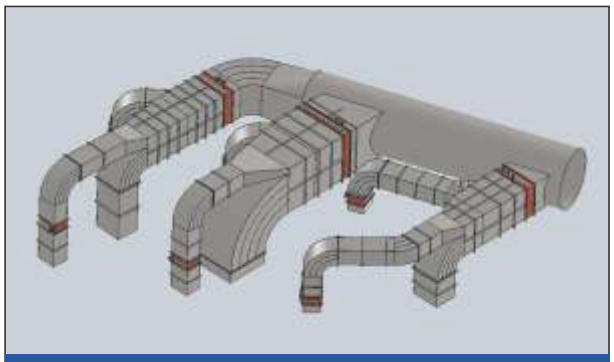
Kleenair's vast experience in handling high temperature gases coming out from steel making process and subsequent cooling and filtering ensures that customer gets a perfect system.

Gas Cleaning Plant for 50T EAF & LRF

STEEL

SECONDARY FUMES EXTRACTION - EAF/LRF INDUCTION /AOD

Erection of Secondary FES for 50 Ton EAF handling 600000 MCH volume



Typical view of hoods at the top of the roof above EAF shed

View of Secondary FES handling 600000 MCH from ID fan side

Erection of Secondary FES

Kleenair handled challenges of efficient capture of fumes along with submicron dust produced during operation of the EAF & near-by LRF to improve EAF/LRF work zone environment and also to reduce problems of early failure of electrical items due to dust.

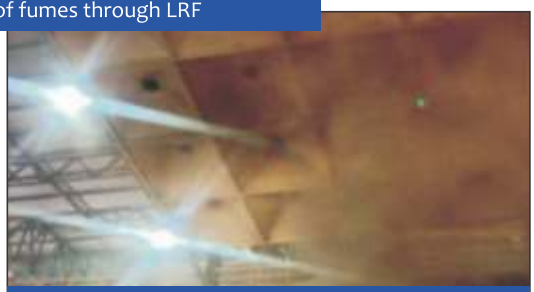
The secondary fumes are being captured by determining the air volume by scientific methods followed by analysing the fume profile based on the EAF size and process temperature zones so also the distance at which the canopy needs to be located .The effect of cross wind currents in the shed also contribute to the air volume calculations.

For efficient capture of these fumes ,either a canopy on top of the shed(above crane area)or DOG HOUSE designs are adopted taking into consideration the stability of structural members .For weak structures , specialized clustered hoods can be provided for quick evacuation of generated fumes.

For collection of these submicron fumes, special design of bag-house is provided to achieve up to 10 mg/Nm3 of emission levels. The extremely fine dust captured in baghouse is removed either pneumatically or by mechanical handling system.

The fume extraction system is programmed through PLC to make it suitable to run with EAF /LRF operation and also ensures that optimum power is consumed for the fume extraction system.

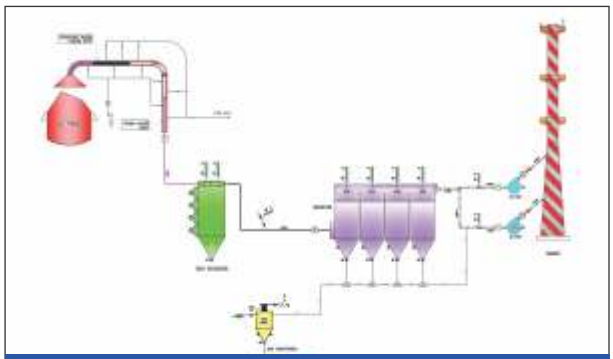
Suction of fumes through LRF



Suction of EAF secondary fumes through clustered hoods

STEEL

Erection of swivel hoods on AOD



Typical PFD for AOD furnace gas cleaning plant

Suction of fumes through AOD when GCP in operation

AOD FURNACE

The fumes generated during operation of AOD are effectively captured by positioning a special hood over the mouth of the furnace, which is movable on trolley or by a swivel joint.

Once the operation is complete the hood along with water cooled duct is either moved horizontally backward or swivelled in the same plane to other position so that the pouring of metal is carried out.

The fumes having very fine metal oxide dust are captured at 500-700 deg C(depending on additives and process) by the specialized hood and are cooled by water cooled duct followed by air cooled ducts to approx. 300 deg temperature. Further cooling is achieved by air-to-air heat exchanger to ensure that the gases are cooled to desired filtration temperature, which depends on type of filter bags used.

An efficient off-line pulse bag-house is used for filtration of this metal oxide dust to achieve emission level as low as 10 mg/Nm3.Correctly designed ID fan provided at outlet of bag-filter ensures that fumes capture is efficient and heat loss is minimal.

The entire system is provided with adequate instrumentation controlled by PLC to ensure an efficient operation with minimum manpower.

Installation of photograph of FES on 25T AOD

STEEL

Baghouse on lime Kiln

KLEENAIR'S OTHER AREAS OF EXPERTISE OFFERING BAG HOUSES OF TURNKEY BASIS ON

- INDUCTION FURNACE
- BLAST FURNACE
- PELLET PLANT
- SINTER PLANT
- COKE OVEN
- LIME KILN
- RMHS

Installation of DE system on RMHS area

FERRO ALLOYS

Installation of GCP on 2 x 27 MVA furnace handling 540000 MCH volume

Clean work zone area near 18 MVA furnace when gas cleaning plant in operation

Installation and GCPs on 4 x 9 MVA furnaces handling 5,20,000 MCH volume

FERRO ALLOYS - SUBMERGED ARC FURNACES

Kleenair is leader in supply of gas cleaning plants for ferro alloy Industry, with more than 50 installations all across India and abroad ,on open and close type of submerged arc furnace for silico-manganese, ferro-manganese, ferro-silicon of capacity varying from 4 mVA to 45 mVA.

A gap between the furnace shell of open submerged arc furnace extract ambient air from atmosphere during furnace operation. The ambient air cools gases & burns CO evolved in the process .Depending on the furnace type and also the additive, the fumes/gases comes @ 250-450 deg C which are cooled in air-to-air heat exchanger/trombone cooler to a temperature of 130 -230 deg C depending on type of filter bags used.

The difficult to separate, extremely fine and sometimes low density ferro alloy dust, is filtered in off-lined pulse jet bag-houses to achieve emission levels up-to 10 mg / Nm3.

The high efficiency centrifugal fans installed after bag-houses sucks right amount of air through furnace gaps to ensure that furnace levels are free from fugitive emissions and also ensure no over cooling.

Gas cleaning plant at Oman on 2x24 MVA furnaces handling 4,60,000 MCH of emission of less than 15 mg/Nm^3

FERRO ALLOYS

Typical view of GCP on 2 x 24 mVa furnace at OMAN

Erection work of GCP in progress at OMAN

Erection of Plenum

Instruments provided at various points to measure temperature and pressure, ensure that temperature do not exceed preset limits and optimized power is used by the plant.

The fine sticky & light-weight ferro-alloy dust is very difficult to handle . A specialized conveying system ensures that the removed dust from filter is conveyed to storage silo and then moisturized in ash-conditioner to discharge into the truck.

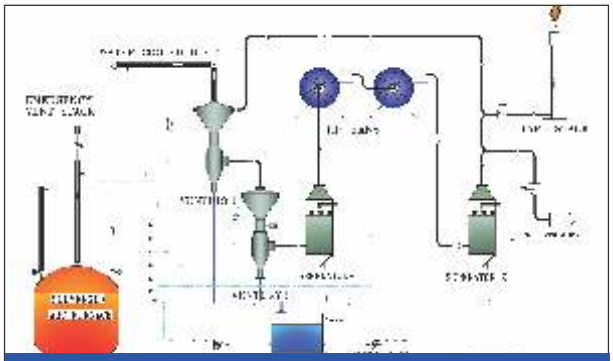
Kleenair's optimized gas cleaning plant ensures continuous furnace operation and no shut downs occur due to GCP failure. The centralized MCC & PLC makes operation automatic which helps customer to run the plant effortlessly with minimum manpower.

Careful design & manufacture of each component of gas cleaning plant ensures every equipment gives long – life and the spares/replacement cost is minimum, subject to periodic check-up.

MCC panels under installation

FERRO ALLOYS

Installation of GCPs on 4 x 27 mVA handling 9,00,000MCH volume



Typical scheme for 45 mVA closed furnace for CO purification

GAS SCRUBBING PLANT FOR FERRO ALLOYS CLOSED FURNACE

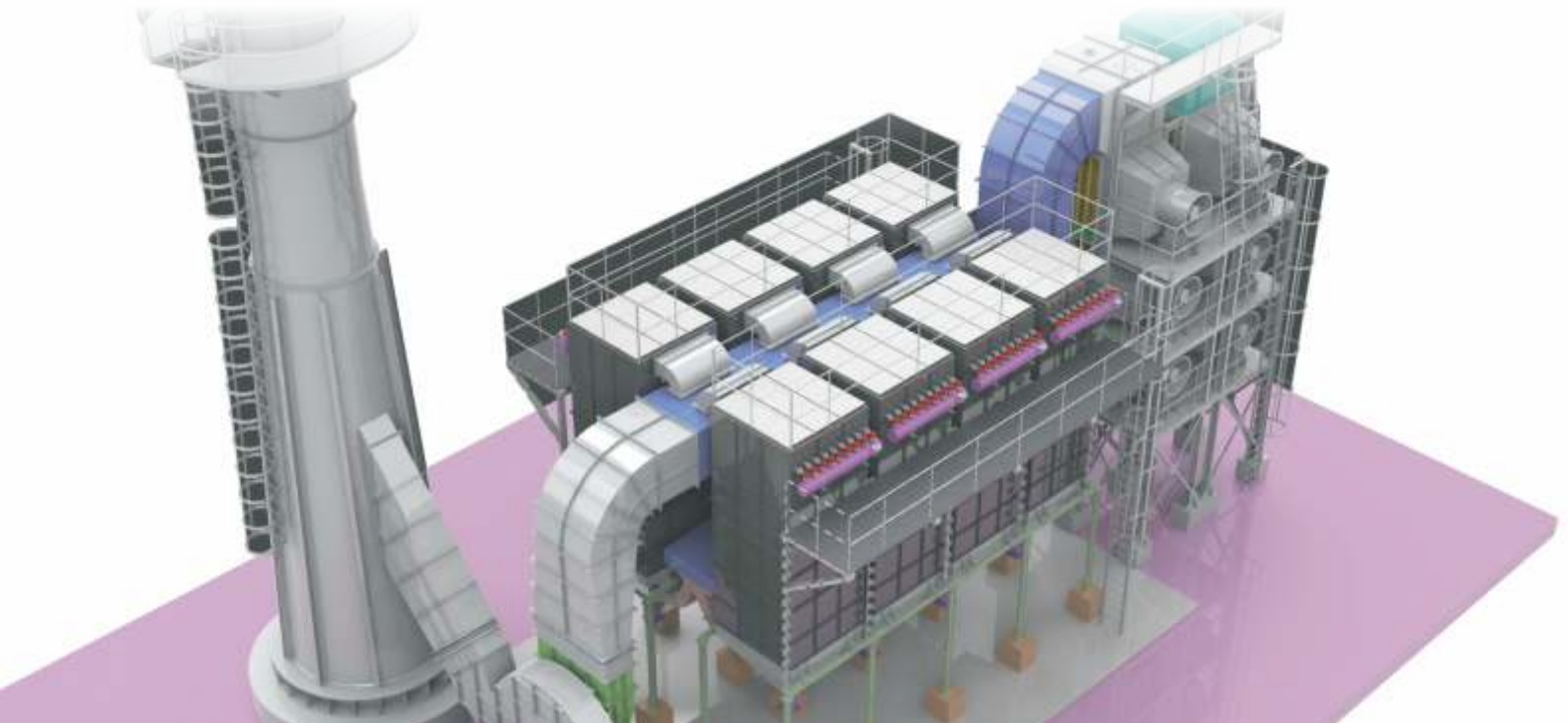
Kleenair has extended its expertise on high temperature gas cooling and filtration to the closed submerged arc furnaces.

In closed submerged arc furnaces ambient air is not allowed which results in gases coming out at a high temperature of 800 deg C. The gases which contain hazardous CO & fine dust are extremely difficult to cool & clean.

Kleenair has supplied a state of the art cooling and wet scrubbing plant along-with the balance of plant such as sludge separation/disposal system, flared stacks, CO monitoring system ,opacity meters to clean the CO which is fed to the power plant boiler as a fuel. The explosive nature of CO made the job critical and challenging.

The cooling of high temp gases is done by specially designed water cooled heat exchanger and ducts which cools gases . The gases are scrubbed and dust is removed by combining twin venturi scrubbers with specialized moisture removal separators. System is automated for air-flows and temperature variation to ensure a steady operation.

The plant is provided with best possible accurate & reliable instrumentation to measure various parameters online at every critical stage of gas cooling and cleaning process.



Model of actual GCP using solid works

Revamped Gas Cleaning Plant

Revamped Gas Cleaning Plant on 12 MVA Furnace

REVAMP

REVAMP OF OLD BAGHOUSES / ESP

Kleenair extensive knowledge and experience in filtration helped many customers to revamp their old baghouses / ESP to an efficient pulse jet bag-filter to meet new process conditions and achieve lower emission levels apart from saving freight erection and civil costs.

A careful study of existing baghouse/ESP is done before taking up any revamp operation. New process air-flow requirements as well as other requirements of equipments before and after the modified unit are analyzed critically.

Supply of PLENUMS, TUBE-SHEETS and other critical components are supplied to meet the new process needs.

Kleenair also helped its many customers by revamping, modifying their inefficient, pulse jet bag-houses by reducing the pressure drop and achieve higher air-flow through the modified bag-house thereby increasing throughput .

Revamp of complete GCP on 2x27 mVA furnace helping customer to achieve higher furnace load, lower emission & reduced down time

Cement silo on which revamped baghouses installed

CEMENT

Kleenair offers unique blend of in depth knowledge of filtration and process coupled with international quality manufacturing and engineering for cement industry.

Kleenair offers bag-houses at various stages of cement manufacturing process such as :

- Kiln and Raw Mill.
- Clinker Cooler.
- Cement Mill.
- Coal Mill.
- Packing Plant.
- RMHS Section.
- Revamp of ESP to Bag-house.

Cement Mill section where revamped baghouses installed

Baghouse installed on RMHS area

Overview of Cement plant -Kazakhstan

Baghouse installed on crusher house

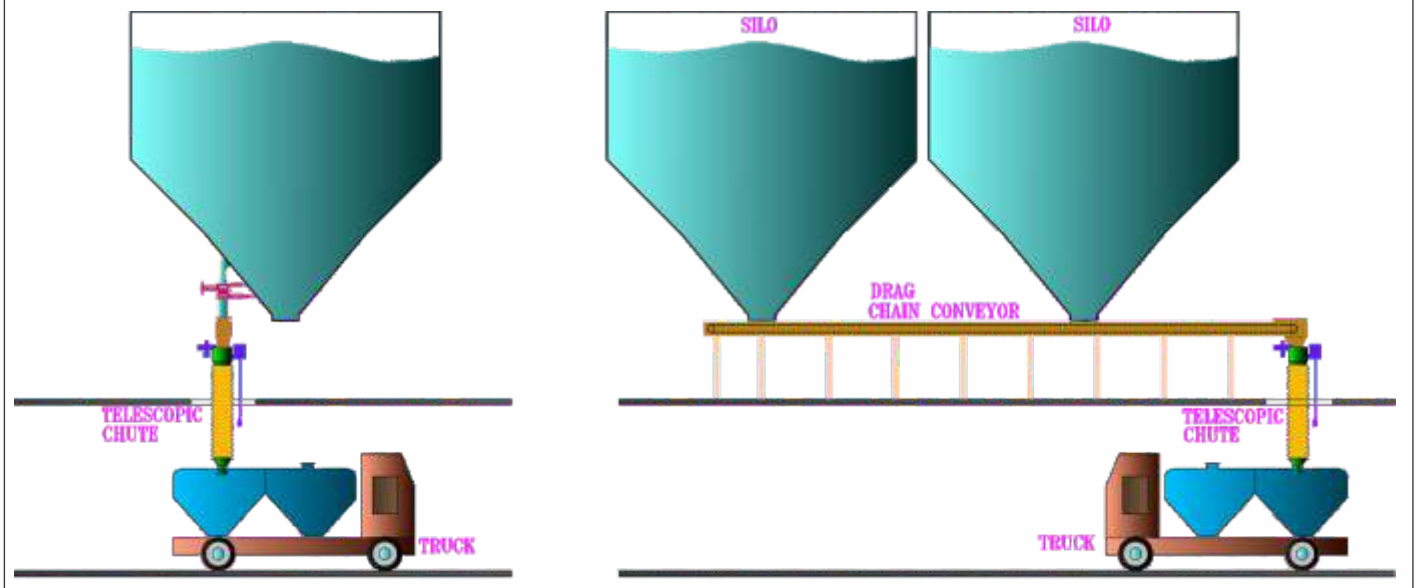
Baghouse installed on various RMHS area

CEMENT

CEMENT

The revamp of shaker bag-filter to pulse jet, revamp of ESP to pulse jet bag house or enhancement of existing bag house to suit higher process conditions offers the biggest challenge and Kleenair has successfully handled contract for conversion of 35shaker type bag-houses to pulse jet for 3 million TPD cement plant in Kazakhstan involving design and engineering of complete duct work ,supports, modification of housing and hoppers, defining specification of centrifugal fans.

Smart spares were supplied from India and supervision provided for bag-houses on 8 cement mills,3 clinker mills,8 cement silos,5 RMHS,5 crusher house& 6 transfer points.
Customer saved cost for new bag-houses, transportation cost as well as erection cost to achieve higher throughput .
Kleenair also design/engineered and supplied key equipments for cement dispatch system suitable for trucks and wagon loading.



Cement loading arrangement for trucks/bulkers

Baghouse on coal fired Boiler

Baghouse on multifuel boiler

View of dust extraction system in power plant

POWER

POWER

Kleenair has rich experience in providing air pollution control equipment for

a) Boilers

b) Dust Collection systems for RMHS

Kleenair has supplied bag houses on boilers handling various fuels such as (a) coal of various calorific value (b) bagasse (c) multi-fuel (d) effluent of various types(e) various types of oils .

Depending on boiler and fuel and depending upon the flue gas temperature, Kleenair supplied bag-houses for each specific condition. SO2, CO2 & O2 content along with moisture present in flue gases are also critical factors while making the right choice of bags.

Kleenair has number of installations on RMHS area where effective dust collection is required to ensure clean plant conditions.

High efficiency cyclone

Drier Baghouse on clay application

Baghouse for drier on food grade powder

Baghouse on pneumatic conveying and drying application

Bagfilter for drier on pharmaceutical powder

PROCESS

PROCESS

Kleenair has supplied more than 270 bag-houses on various type of Drying application handling complex material and at varied temperature range from 80 deg C to 240 deg C.

Kleenair has developed expertise in process filtration applications.

a) Dryers such as spin flash, spray driers, Ring drier, rotary driers, pneumatic driers etc.

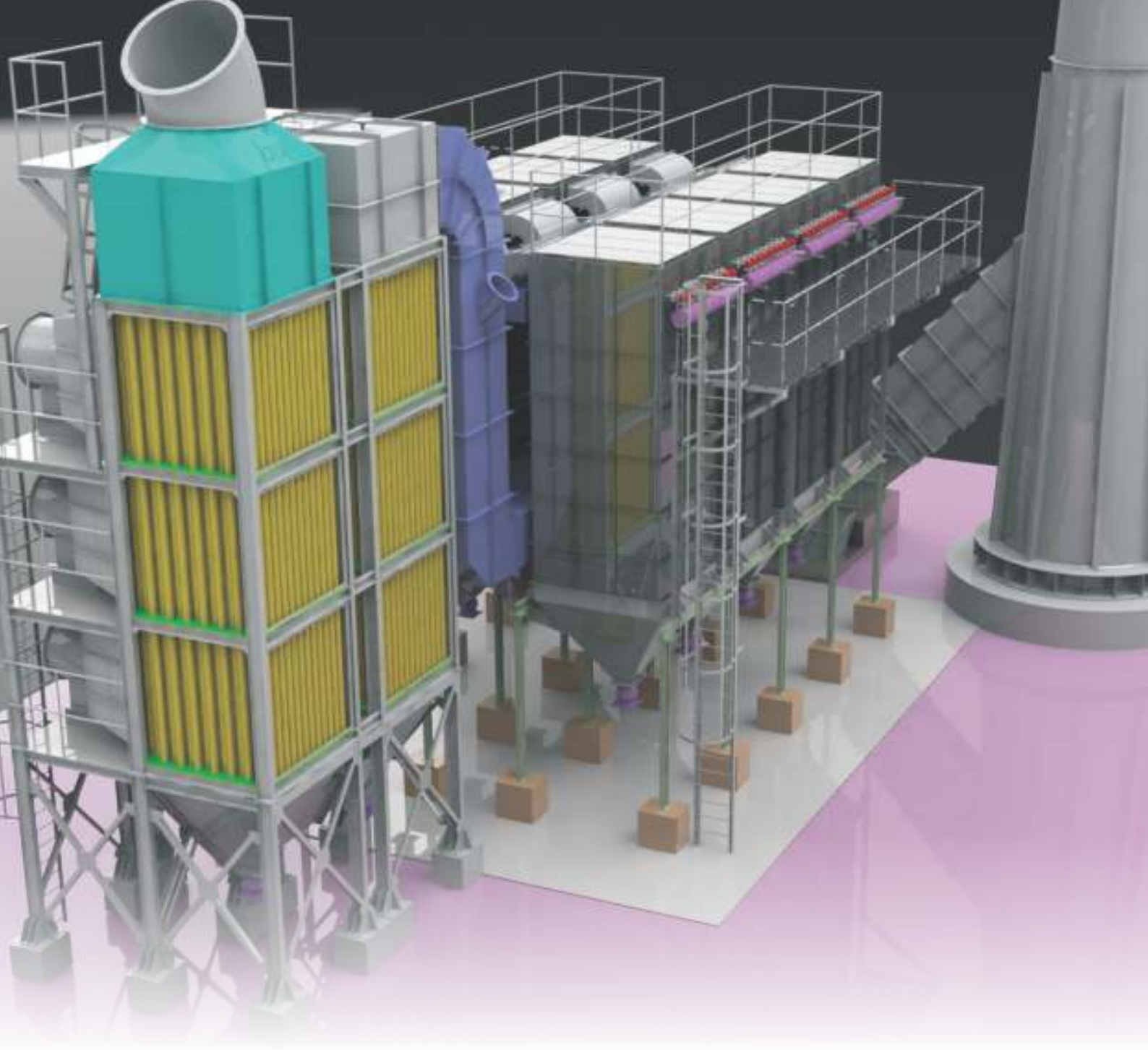
b) Calcination Plants

c) Pulverizer discharge, classifier product collection

d) Rotary Kilns, Lime Kilns.

Kleenair has been able to achieve emission levels as low as 10mg/Nm3 on critical bag-houses where inlet dust load is more than 1kg/m3.

Baghouse for product collection from rotary kiln handling explosive dust



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Kleenair House , Gat No.120-122, Pirangut, Tal : Mulshi , Dist. Pune : 412115 , Maharashtra, India
Tel : 91 20 6675 0380/81/82/84 | Fax: 91 20 6675 0394
Web: www.kleenairsystems.net