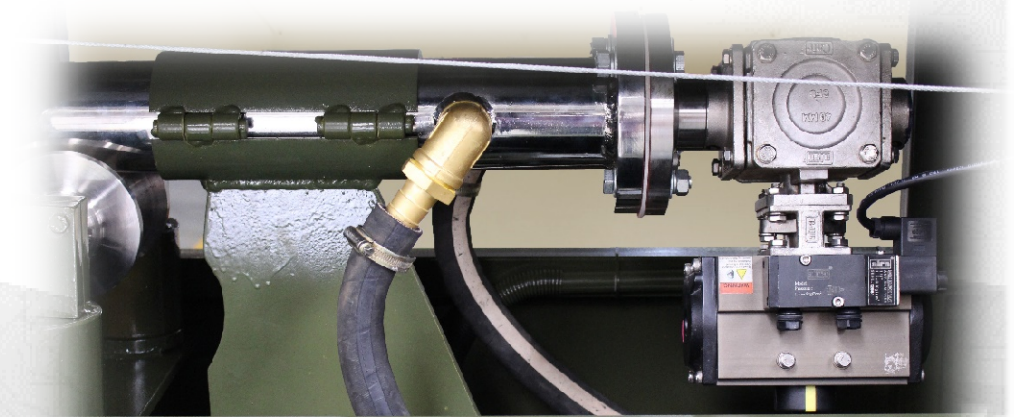




A CEMENT SECTOR SPECIAL

23 - 24 June 2022, Country Inn & Suites - GOA



Welcome

Gas Analysis Systems in Cement Plants



Brief Company Introduction

Business Trade Name :

Adage Automation Private Limited.

Head Quarters:

Goa, India

Nature of Business :

Manufacturer

Shop floor Area:

50000 Sq Feet

Date of Incorporation :

30th August 2001

Kind of Ownership :

Private Limited

Contact Numbers :

Phone : (0832) 6620 500

Email :

info@adage-automation.com / acmg@adage-automation.com

Website :

www.adage-automation.com

- Established in 2001 and Siemens partner since 2005
- ADAGE is amongst the largest analytical set up in India with SI factory & modern Repair Centre
- ADAGE has 220+ trained engineers for :-



- Office in New Jersey, USA & UAE for Middle East Region

- Adage have Technology Collaboration with Siemens for Process Analytics and is a certified Solution Partner by Siemens AG , Germany.
- The Regional Repair Centre associated with the Adage Factory is under 50:50 Joint Investment between Siemens AG and Adage India .
- The expertise is lent by some of the senior members who have very long working experience in the Industry and gels with the exuberance of those who are young, energetic and enthusiastic.



QUALITY POLICY

- Adage is ISO 9001:2015 & 45001 : 2018 certified company and have an integrated quality process into our entire operations
- Consistently meeting & exceeding our customer's expectations for product quality and performance.
- Timely delivery of products and services to meet our customer's requirements.
- Continuous improvement of our processes, and systems
- Ensuring our personnel are properly trained so they are fully competent to serve our customers.



State of the Art World class factory in GOA



- **Phase-I Factory**
- **Total Shop floor Area of 36000 square feet**

State of the Art World class factory in GOA

- 
- **Upcoming Phase-II Factory**
 - **Total Shop floor Area of 15000 square feet in Stage 1 & 75000 square feet in Stage 2**

Largest Analytical Company in India

Largest in terms of ;-

Factory Set up :

Largest by far at the present moment in India . With the expansion undergoing for Phase II , This will be amongst the 3 largest facilities in the world .

Man Power Infrastructure :

220+ strong workforce .

India Presence :

HQ & Factory + 11 own offices spread across the country , unmatched by any competition .

Global Presence :

Adage is one of the Largest Analytical Solution provider in the world with installations in Far East , South America , Africa , Middle East and Europe . Subsidiary companies in USA and UAE and soon to be acquired company in Spain for European Market

Company History and its Operation

- Formed in 2001 Adage is the largest Gas Analytical total solution provider in India .
- Profit making and robust cash flow .
- Privately Hold company . Zero Debts .
- Most diverse portfolio . Presence in all market domain and with diverse product portfolio for Process Industries as well as Environment Market domain . Unmatched by anyone in India .
- Largest after sales customer support team with 100+ engineers and a dedicated team of 20 engineers for international installations .



Adage Automation - In the Recent Times

- **Awarded by the Industry Ministry – Govt of India in 2018 as one of the India's Small Giants**
- **CAGR of >20 % over last 12 years**
- **Leader in the Steel and Cement Industry domain with more than 66% market share as on 31.03.2021**
- **Adage won in 2016 , worlds single largest ever CEMS order for 150 stacks from RIL .**



- **PROCESS ANALYTICAL SYSTEMS FOR VARIOUS PROCESS APPLICATIONS**
- **CONTINUOUS EMISSION MONITORING SYSTEM & AIR QUALITY MONITORING SYSTEM**
- **WATER AND EFFLUENT MONITORING SYSTEM**



- Gas Analytical Solution for process and quality optimization. Our world class products for process analytics include Field Proven Solutions with Gas Chromatographs, NDIR , Paramagnetic , FID , TCD , UV , CLD, Laser Analyzers , SRU & Sulphur Analyzers , Physical Property Analyzers, CV Analyzers, Liquid Analyzers etc. encompassing almost all kind of Industrial applications ...from stand alone systems to very complex solutions in Analyzer Shelters with HVAC....
- A team of expert designated for manufacturing of Process Gas Analyzer Solution & Sample Handling System which envisage Design ,Engineering & testing of all components used
- The System Integration expertise includes SRU Packages , GC and Analyzer Shelters in Oil & Gas , Cement Plant Kiln Inlet systems, All kind of CEMS solutions , Steel Plant systems, Ex-Proof systems for Oil & Gas and Fertilizer Plants , Calorimeter based CV solution and small to large size Analyzer shelters



SOLUTIONS FOR THE INDUSTRIES



CEMENT INDUSTRY

- Kiln Inlet Application
- Pre Heater Application
- Pre Calciner Application
- Fine Coal Bin Application
- Coal Mill Inlet & Outlet Application
- MBF Application
- Inert Gas Application
- ESP Application
- Emission Monitoring System
- Effluent Monitoring System



STEEL INDUSTRY

- Blast Furnace Applications
- HS Waste gas Application
- LD Converter Applications
- Sinter Plant Applications
- Coke Oven Plant Application
- Air Separation Plant Applications
- Gas Mixing Station Applications
- Emission Monitoring System



POWER INDUSTRY

- Gas Monitoring In Turbo Generator
- Air Pre Heater Application
- Coal Silo Applications
- Custody Transfer Application
- SCR Application
- Emission Monitoring Systems

SOLUTIONS FOR THE INDUSTRIES



OIL & GAS INDUSTRY

Applications in Upstream
(Exploration) Downstream
(Refining Hydrocarbon Processing) for
Process efficiency , Process Safety &
Quality Control.
Downstream Applications like Syngas
Generation , Gas Processing ,
Petroleum refining , Petrochemical
Processing
SRU analyzers /PPA analyzers
Emission Monitoring Systems



CHEMICAL INDUSTRY

Countless applications for all kind
of Analyzers for Process
efficiency Process Safety and
Quality Control for Base, Fine &
Special Chemical in Numerous
processes and plants like Air
Separation , Chlorine Production,
Vinyl Chloride Plants, Pigments
etc



FERTILIZER INDUSTRY

Various Solutions in Fertilizer Plant
Applications in Ammonia Urea Plant ,
Complex Fertilizer Plant (DAP/ NPK)

Emission Monitoring System
Effluent Monitoring System

Kiln Inlet Gas Analyzers



Reasons for Gas Analysis in Cement Plants

■ Environmental protection

- emission control by monitoring the burning process
- emission monitoring

■ Safe plant operation

- protection of the electrostatic precipitator
- protection of the coal grinding plant

■ Process Control

Saving of Energy

minimizing the fuel consumption by optimizing the burning process

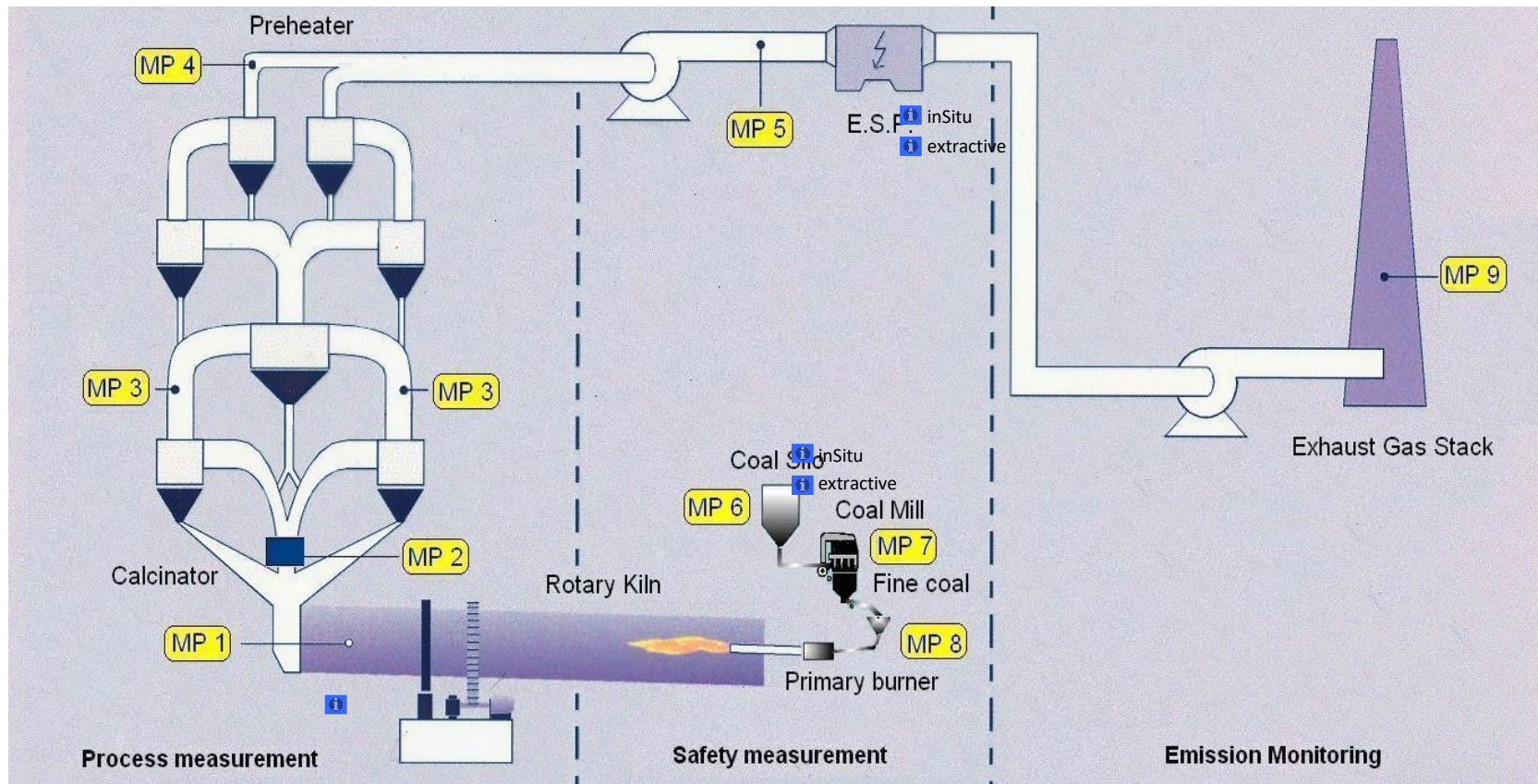
Constantly high production quality

optimizing the clinker quality by kiln operation control

• APPLICATIONS IN CEMENT PROCESS

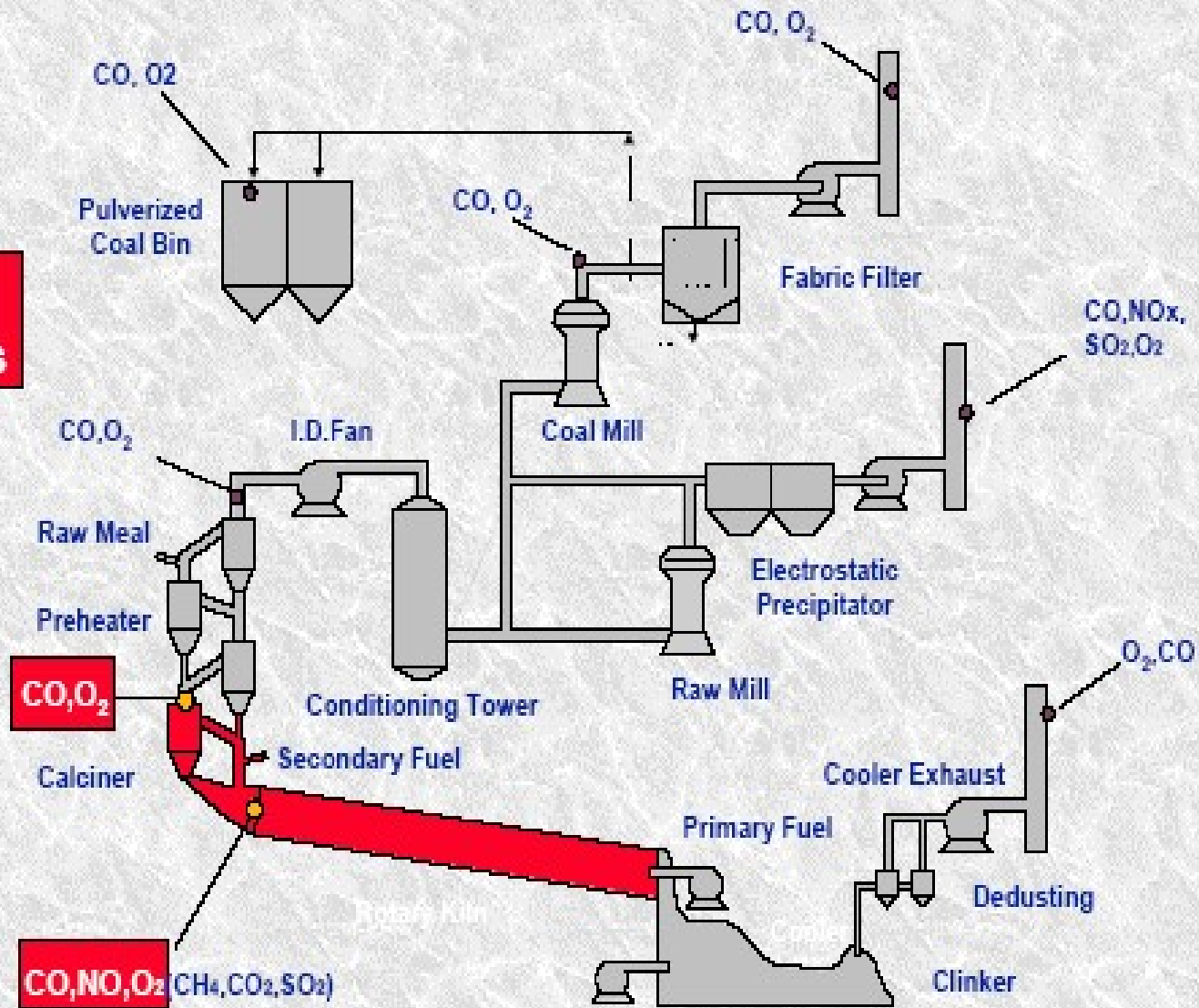
- KILN INLET : CO, O₂, (CO₂, NO)
 - *Temp 1000~1350 degC, Very High Dust 2000g/m³*
- PRE-CALCINER : CO, O₂, (CO₂)
 - *Temp 800~1100 degC, High Dust 1000~2000g/m³*
- PRE-HEATER : CO, O₂
 - *Temp 300~600 degC, Dust load < 500 mg/m³*
- COAL MILL : CO
 - *Temp ambient, Dust load < 100 mg/m³*
- COAL SILO : CO
 - *Temp Ambient, Dust load < 100 mg/m³*

Applications of Gas Analysis in Cement Plants



Measurement Points

Process Measurements



Challenges for Kiln Inlet Systems

Gas sampling systems in cement works must be able to withstand a very tough environment:

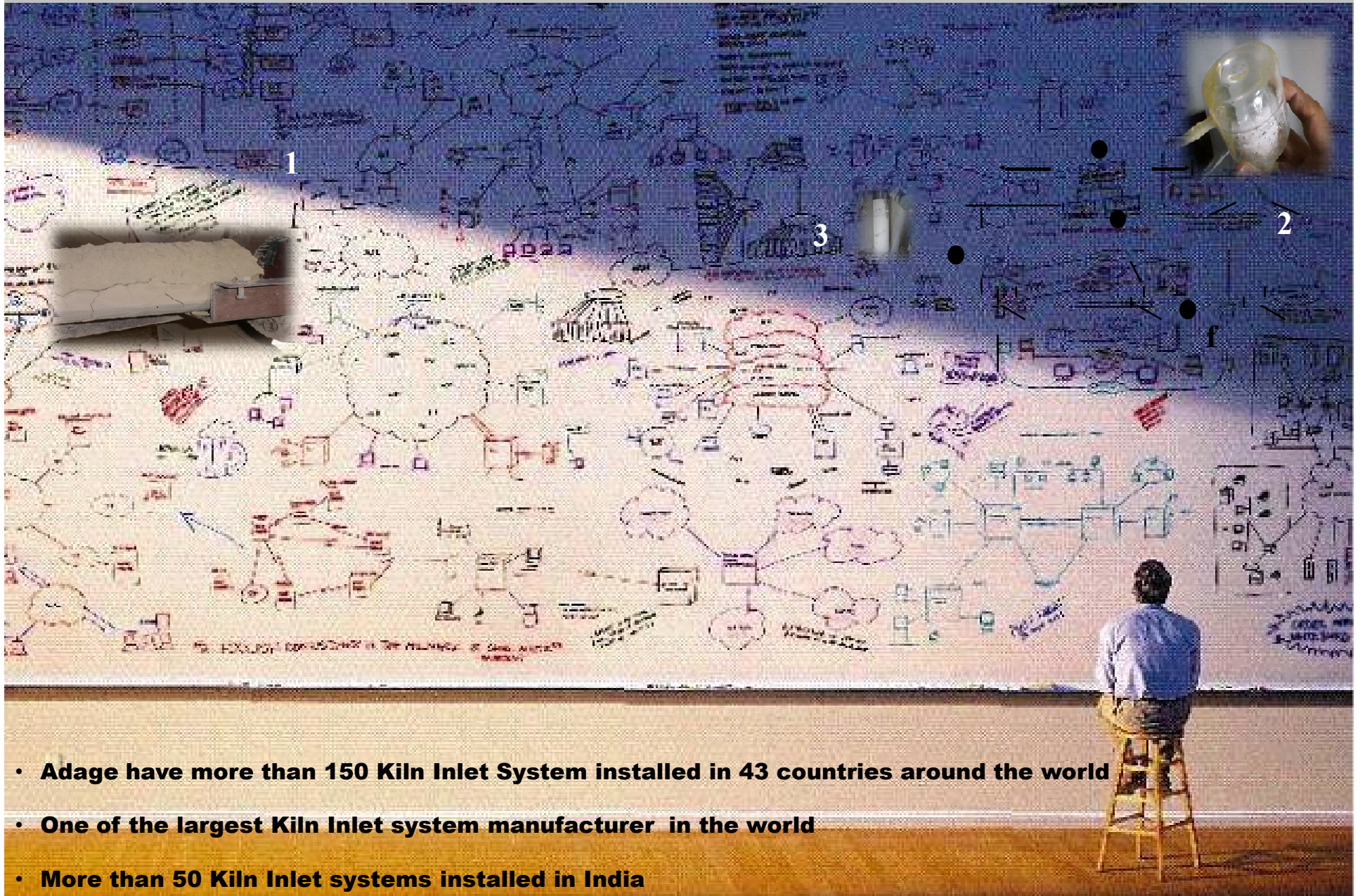
High gas temperature up to 1400 °C . Probe Bending

High dust concentration up to 2000 g/m³ .Probe Chockage

High content of Alkalis, Sulfates and Chlorides

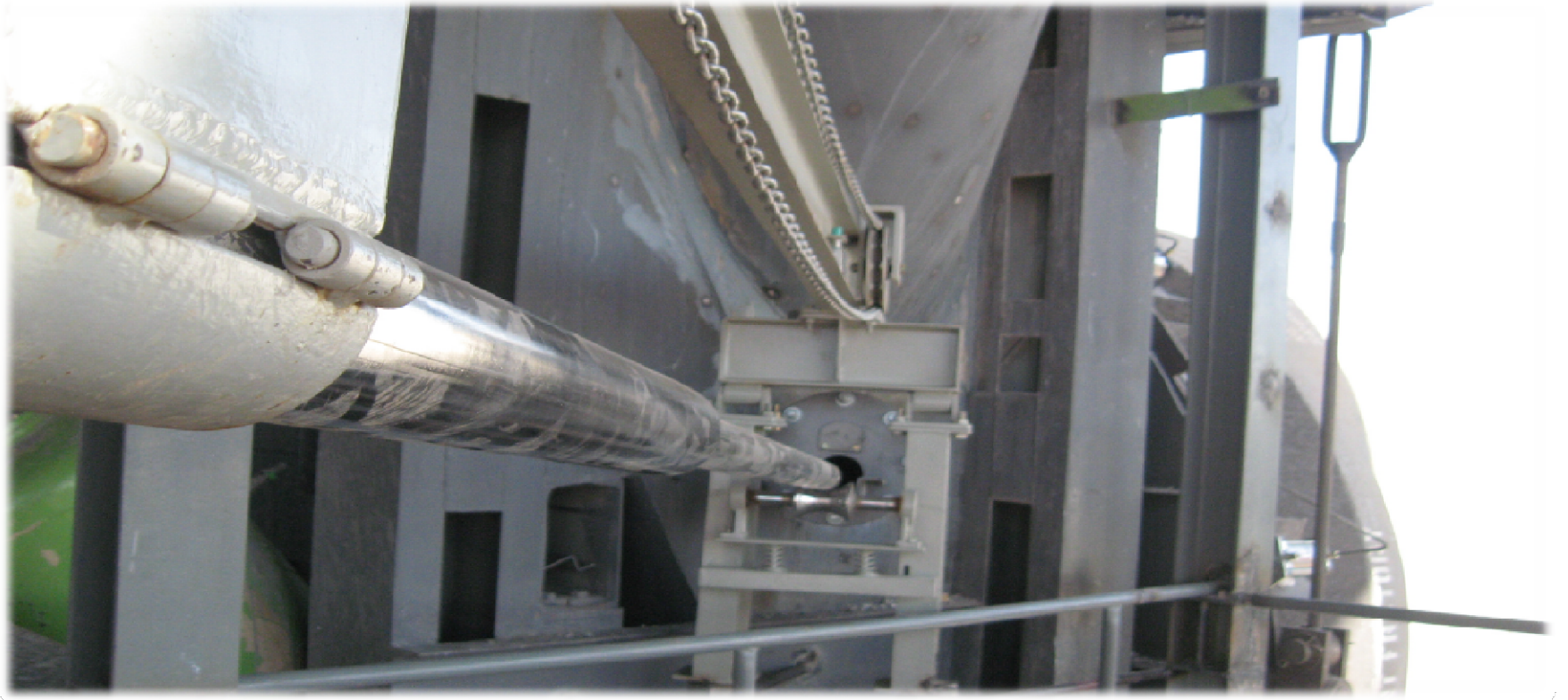
High level of mechanical stress and strain

Usual Complaint of wrong O₂ reading due to False Air



- **Adage have more than 150 Kiln Inlet System installed in 43 countries around the world**
- **One of the largest Kiln Inlet system manufacturer in the world**
- **More than 50 Kiln Inlet systems installed in India**

A nice Kiln Inlet System during Initial Installation



KILN INLET SYSTEM AFTER SOME MONTHS



KILN INLET SYSTEM AFTER SOME MONTHS



Major Requirements of The Kiln Inlet System



1. The System Should Have the Maximum Availability.
2. Analysers Should be independent of each other so that there is maximum Availability.
3. The Frequency Of Daily/ Regular Maintenance is to be minimum
4. There Should be minimum or No break Down Maintenance
5. There should be no False Reading of O₂ and the readings should be Reliable.

TYPICAL PROBLEMS OBSERVED IN A FEW KILN INLET INSTALLATION

- **The Probe Filter need to be cleaned once every day. With the clogging of the filter the flow was reducing.**
- **There is a huge deposition of Materials on the probe which has to be poked and removed every two hours.**
- **The Oxygen reading was on the higher side- though there was no leakage in the system**
- **At the Entry point of the Gas in the probe (port of the probe) was getting blocked with dust and as a result flow was reducing.**
- **The Blow back is required every 10 to 15 minutes and reading is not available for 1 to 1.5 minutes**

Just HAVING A PRODUCT is not Enough

For a successful Kiln Inlet Design

you need KNOWHOW & EXPERTISE & FIELD PROVEN EXPERIENCE

1. Power Cylinder based advanced retraction design
2. Kiln Probe design with Straight tube Probe
3. External Surface Cleaning of Kiln Probe with Air Blaster & scrapper
4. We have 6 (Six) stages of Probe cleaning
5. Direct Probe Tube back purge, apart from 2 stage probe filter cleaning
6. Process Tube or Bushing tube cleaned automatically by Air Blaster
7. Color Touch Screen Graphic MMI for alarm log & preventive maintenance
8. Minimum 4 level of Filters
9. Special Probe Material *
10. Many more design considerations to have successful reading

(* patent pending)

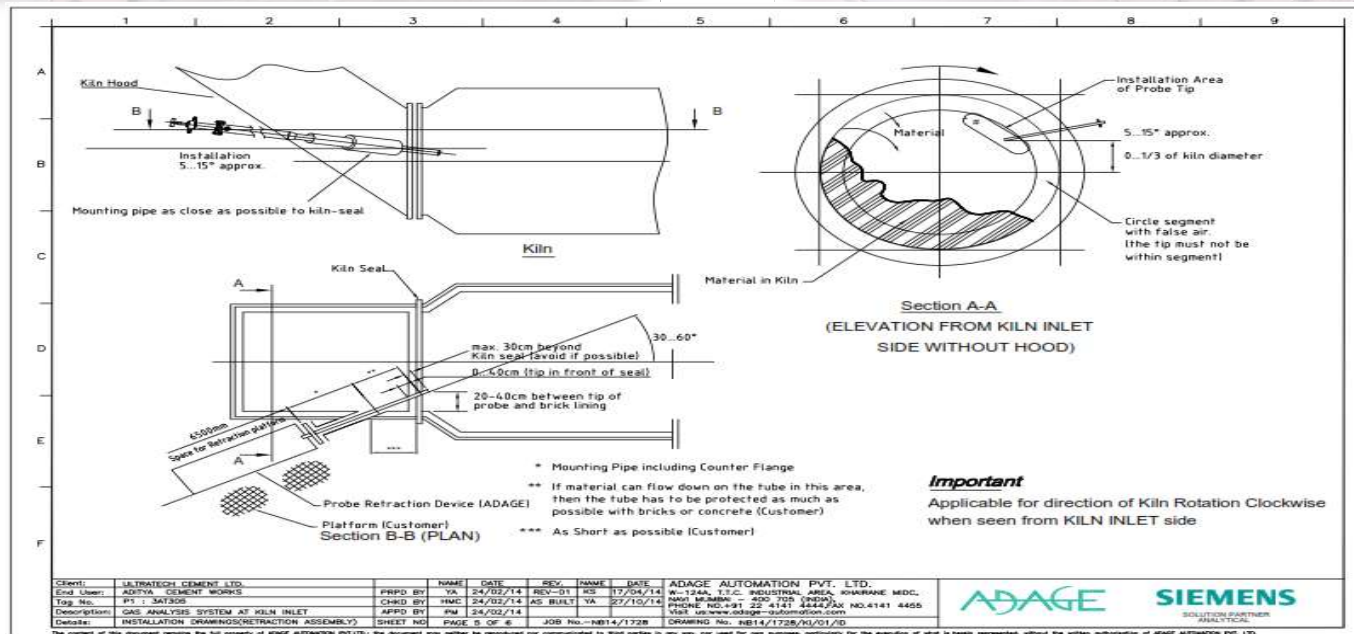
ADAGE Kiln Inlet System



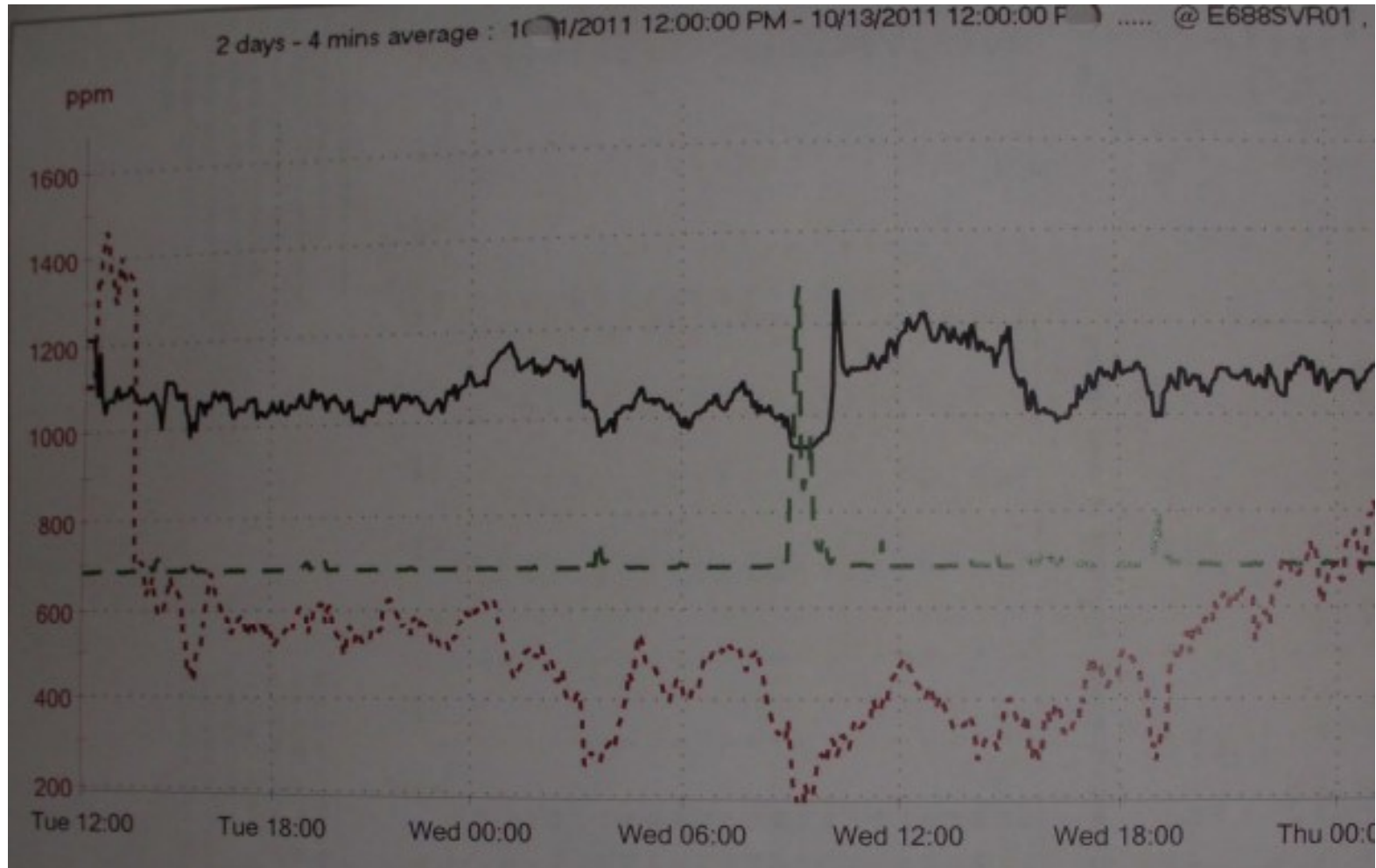
CEMENT KILN ... Toughest Analytical Application



CEMENT KILN SYSTEM ---- NEED EXPERTISE FOR GOOD READING



CEMENT KILN SYSTEM ---- NEED EXPERTISE FOR GOOD READING



CHANGES IN THE HEATED PROBE FILTER FOR KILN INLET FOR CEMENT PLANTS USING PET COKE OR ALTERNATE FUEL

Conventional Kiln Inlet Probe Filter



Ceramic Filter
With membrane gasket
Filter Length : 130 MM

New Design Kiln Inlet Probe Filter



SS Filter
No Gaskets
Filter Length : 260 MM

HIGHLIGHTS OF THE NEW KAS 9002 PROBE HEAD

SL No.	Features	Benefits
1	Easy To Open and Maintain	Reduced Time and ease of maintenance.
2	No Special Tools needed to Dismantle the Filter	Reduced Time and ease of maintenance.
3	No Glass Wool Gaskets Necessary	Reduced Inventory
4	Old Filter is of 130 mm Length.. New Filter of 260 mm length	Increased surface area.. More sampling time... Increased availability
5	Filter of Sintered SS.. Having more retention of Particles	Increased Filtration
6	Filter Easy To Clean with long Life	Reduced Inventory Reduced Down Time.

CONVENTIONAL KILN PROBE HEAD !!



TO Clean or Replace the filter
(make sure to put the gaskets on the top and bottom of the filter)

Replace and connect the probe as previously. Ensure that all the gaskets are put, and there is no leakages.

WE NOW HAVE A NEW PROBE !!



What Are The Other Problems ??

WATER CIRCUIT

Deposition on the Probe

PROBE COOLING

Probe Withdrawal due to Pressure Fault.

The Temperature of the Water needs to be kept at 60 -70 deg. This also means that the dust (cement) settles over the probe and solidifies.

Probe Gets Bent.

Daily maintenance done on the probe.

Reduced Availability.

CONVENTIONAL PROBE CONDITIONING

WATER CIRCUIT

PROBE COOLING



PROBE CONDITIONING UNIT



©©© Samsung Triple Camera
Shot with my Galaxy A7 (2018)

©©© Samsung Triple Camera - 020 - Adage Automation

BENEFITS :-



Sl. No	Features	Benefits
1	Volume of water Circulated is more	Better Cooling
2	Use Of Water Tank .. With the addition of additives with the water the Temperature of the circulating liquid can be increased.	No requirement of make-up water every day. Higher Temp
3.	Pressure Fault due to temperature difference (inside the Kiln and out Side the Kiln)	Pressure Fault thing of the Past.
4.	Water Can be circulated at Higher Temperature	Deposit over the probe doesn't solidify
5	Since there is always a buffered volume- there is no need of the pressure signal- therefore no withdrawal of the Probe due to pressure fault.	Reduced Maintenance
6	Eliminates water being inside the Analyser room making the total thing easy to maintain.	Reduced Maintenance

CEMENT KILN SYSTEM

---- Common Problem and Solution



Dust On the Probe is often be a problem..



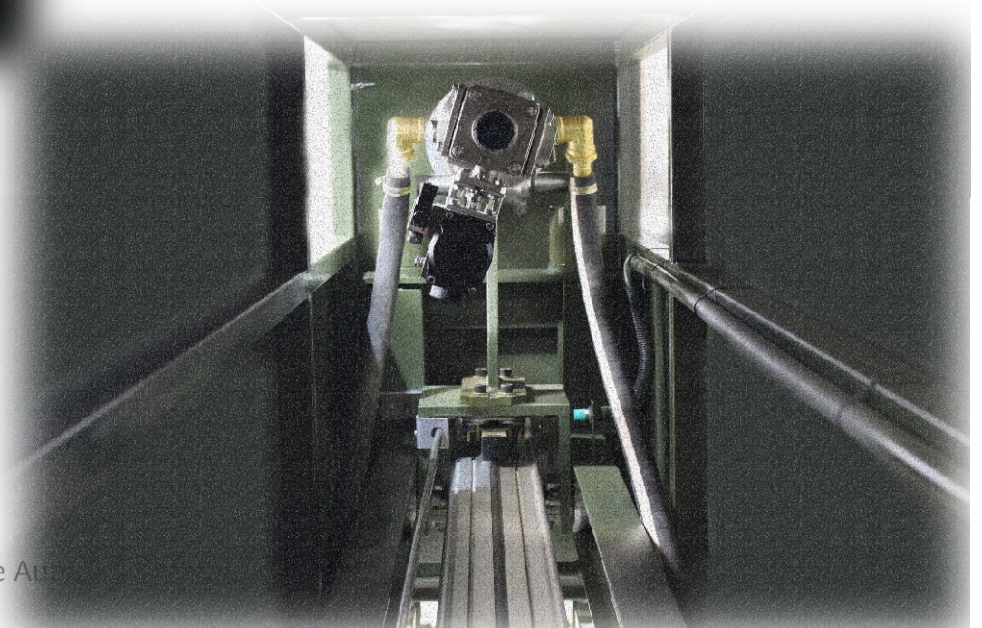
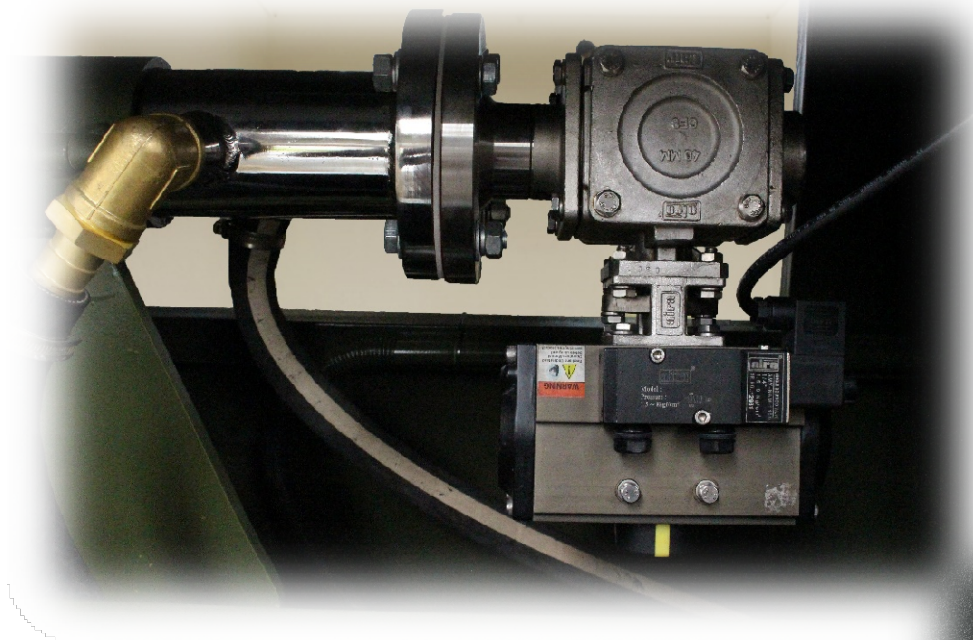
With Probe Tube Top Purging

With Dust Scrapper in counter flange



Probe With Pneumatic Actuator

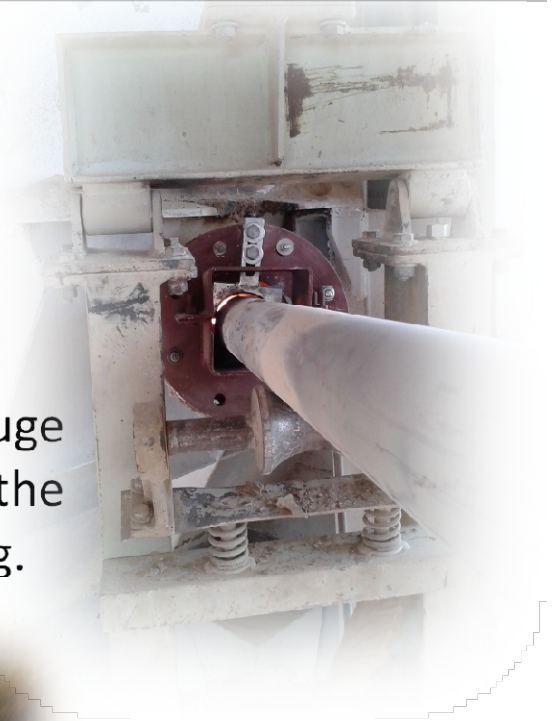
The New Pneumatic actuator makes Direct Tube Purging with High Pressure Air Possible.



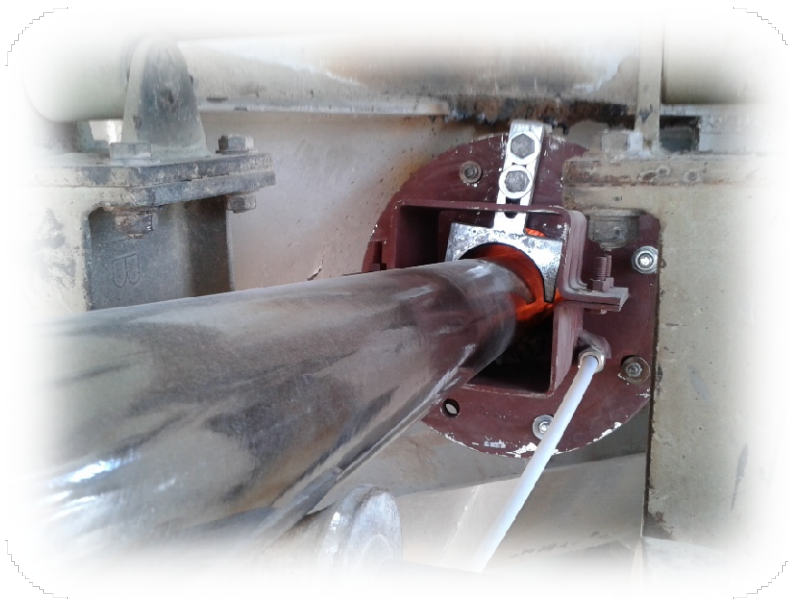
Deposits on the Probe Tube



The Kiln Inlet is Filled with Dust and there are huge deposits on the Probe. This dusts solidifies on the surface making the Probe heavier leading to bending.



A simple Scrapper arrangement removes the deposits on the Probe on each retraction.

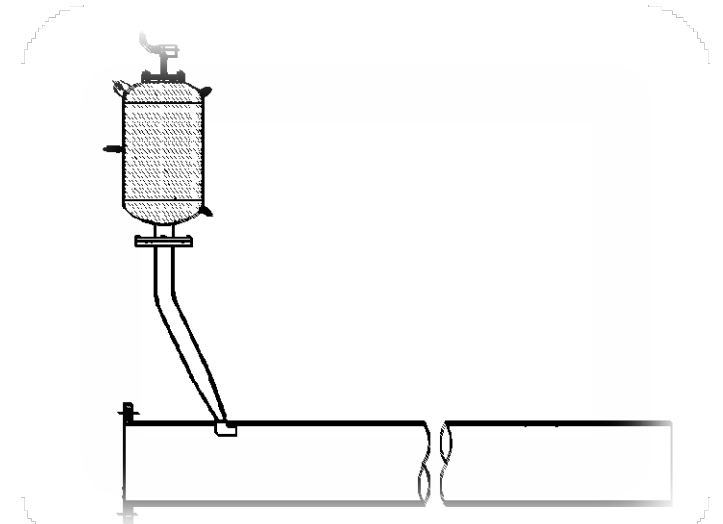
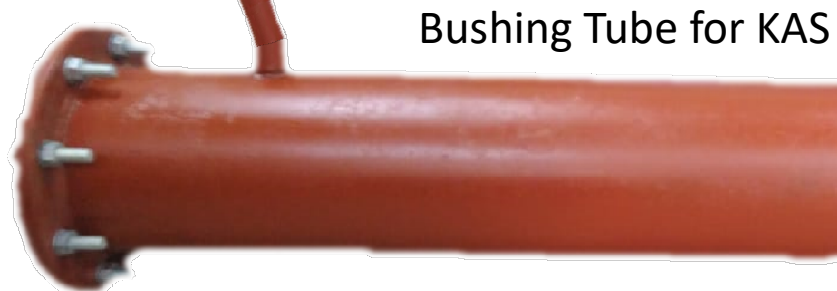


Deposits In the Bushing Tube

- The Dust removed by the Scrapper falls inside the Bushing Tube.
- Shift Maintenance has to poke and push the dust back in the process.
- The Probe while insertion also faces resistance due to the accumulated Scrapped dust.
- Mechanism for automated removal of the dust deposits is necessary

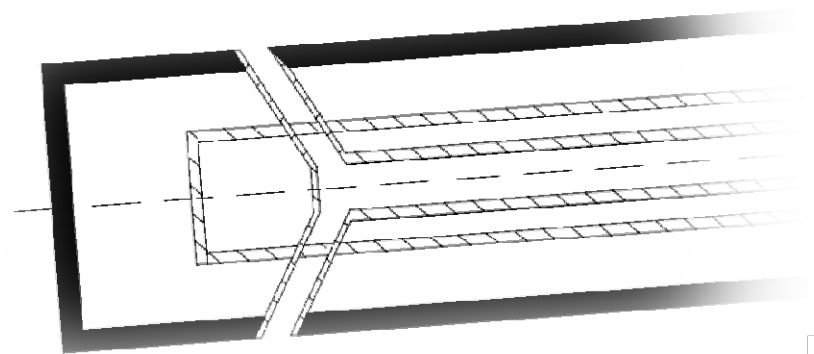
Air Blasting of Bushing Tube

An Air Blaster is installed on the Bushing Tube, and after every withdrawal of the Probe, the Blast of air makes all the debris fall back into the process.



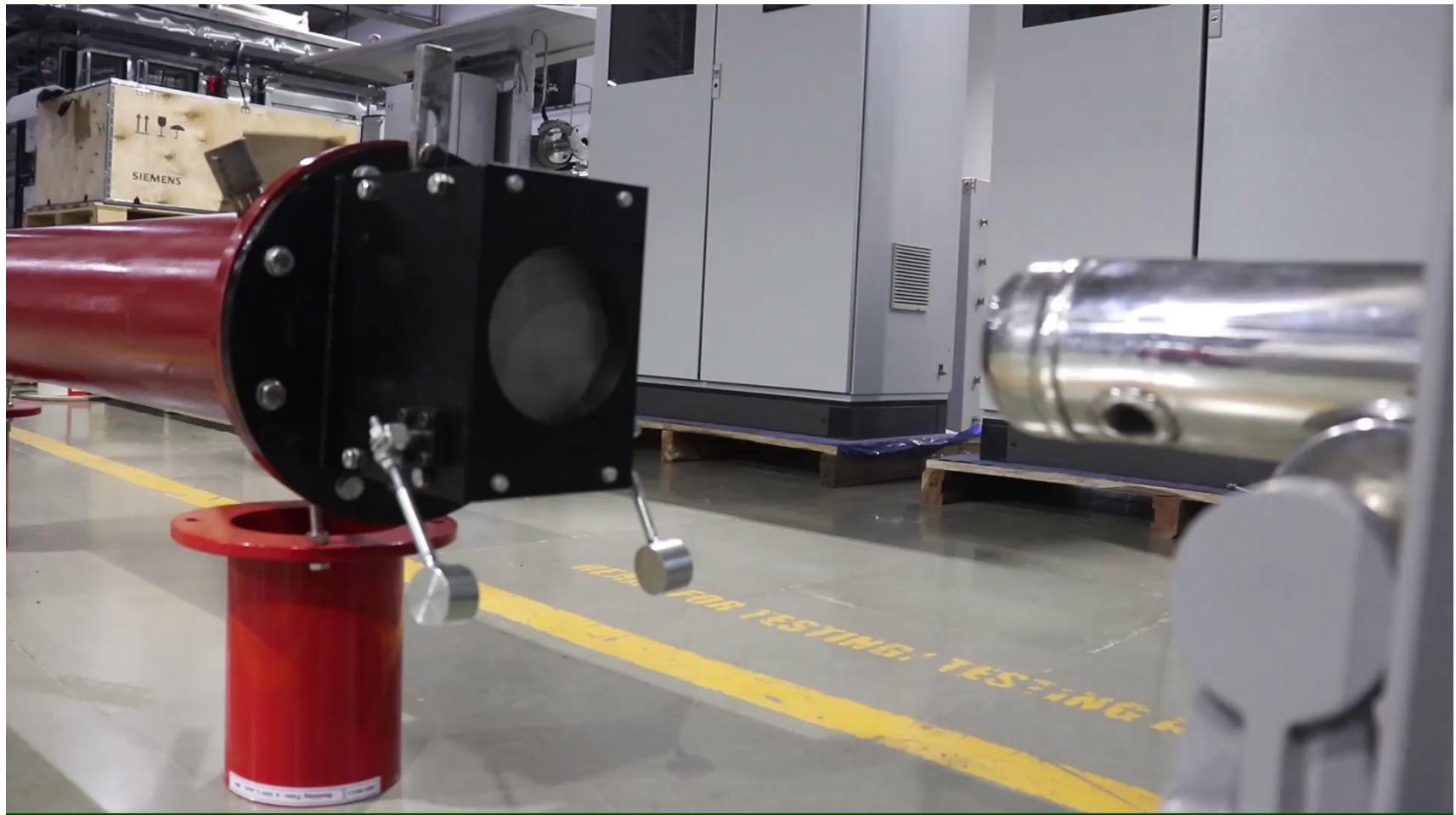
Old Probe Design with Twin Inlet at the bottom

- The Sample Inlets are small and tends to get clogged.
- Due to prolonged usage of the probe there is a slight Sagging of the Probe. The Probe if rotated the openings are now on the top side of the Probe. This makes direct dust entry in the Probe.
- The Angle of construction creates many welding points inside the Probe, leakage from these spots are a cause of huge concern after some period of usage.

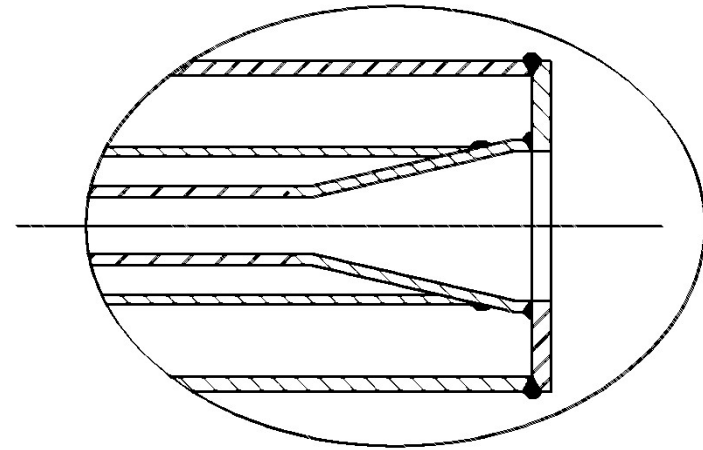


Safe Operation

The Safety of the Plant operation is of Utmost importance. When the Probe is withdrawn there is a automatic shut off of the Probe entry point. It prevent any back fire and accidents.



New & Improved Probe Design



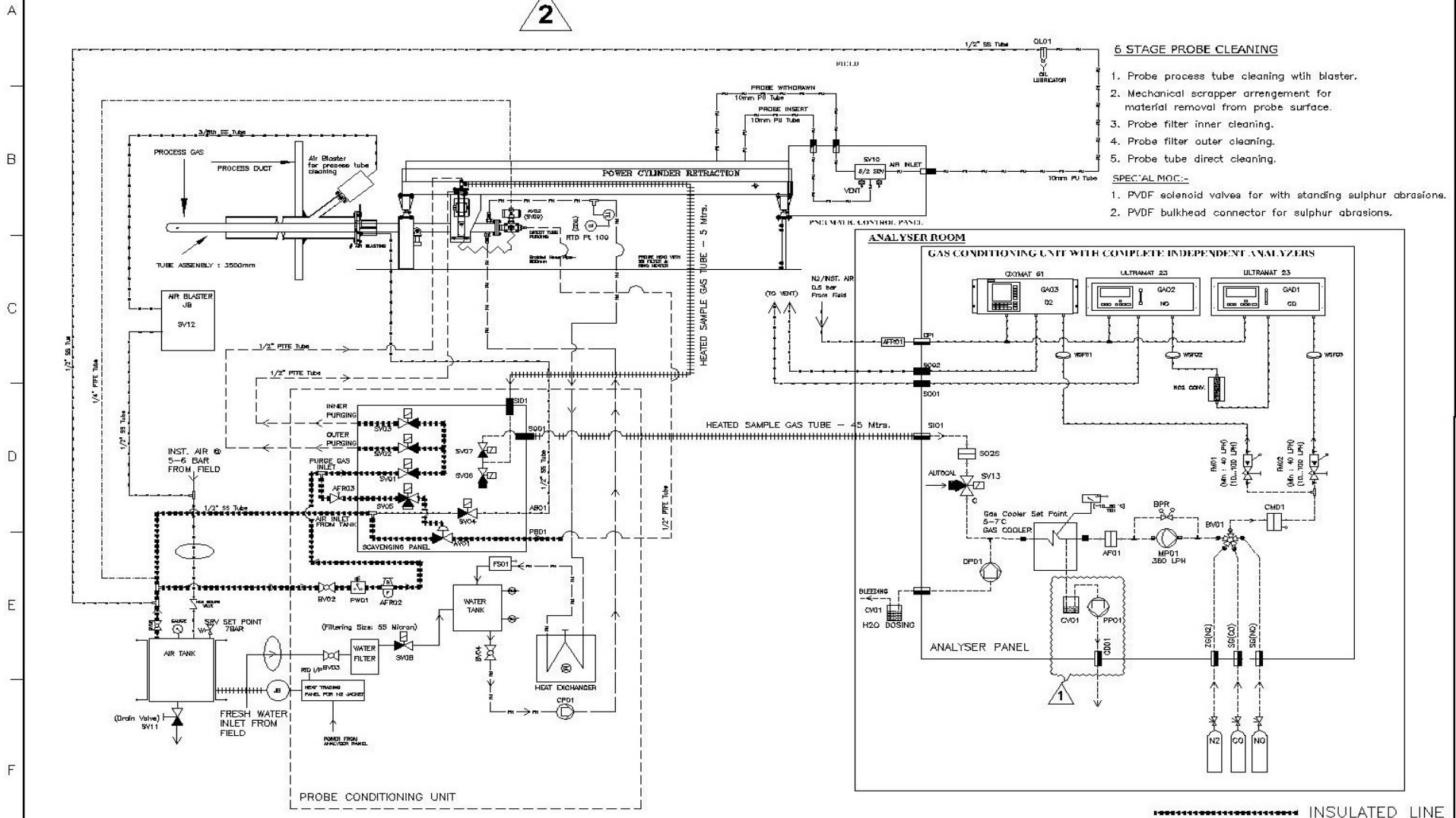
The New Improved Design makes the opening wider, with this design the welding in the construction of the Probe are easier and leakage are a thing of the past.

With the Direct purging of the Probe Tube the Dust and debris are also instantly removed. We have reduced Probe chokage.

Kiln Inlet System Design

WATER COOLED PROBE WITH POWER CYLINDER BASED RETRACTION SYSTEM

2

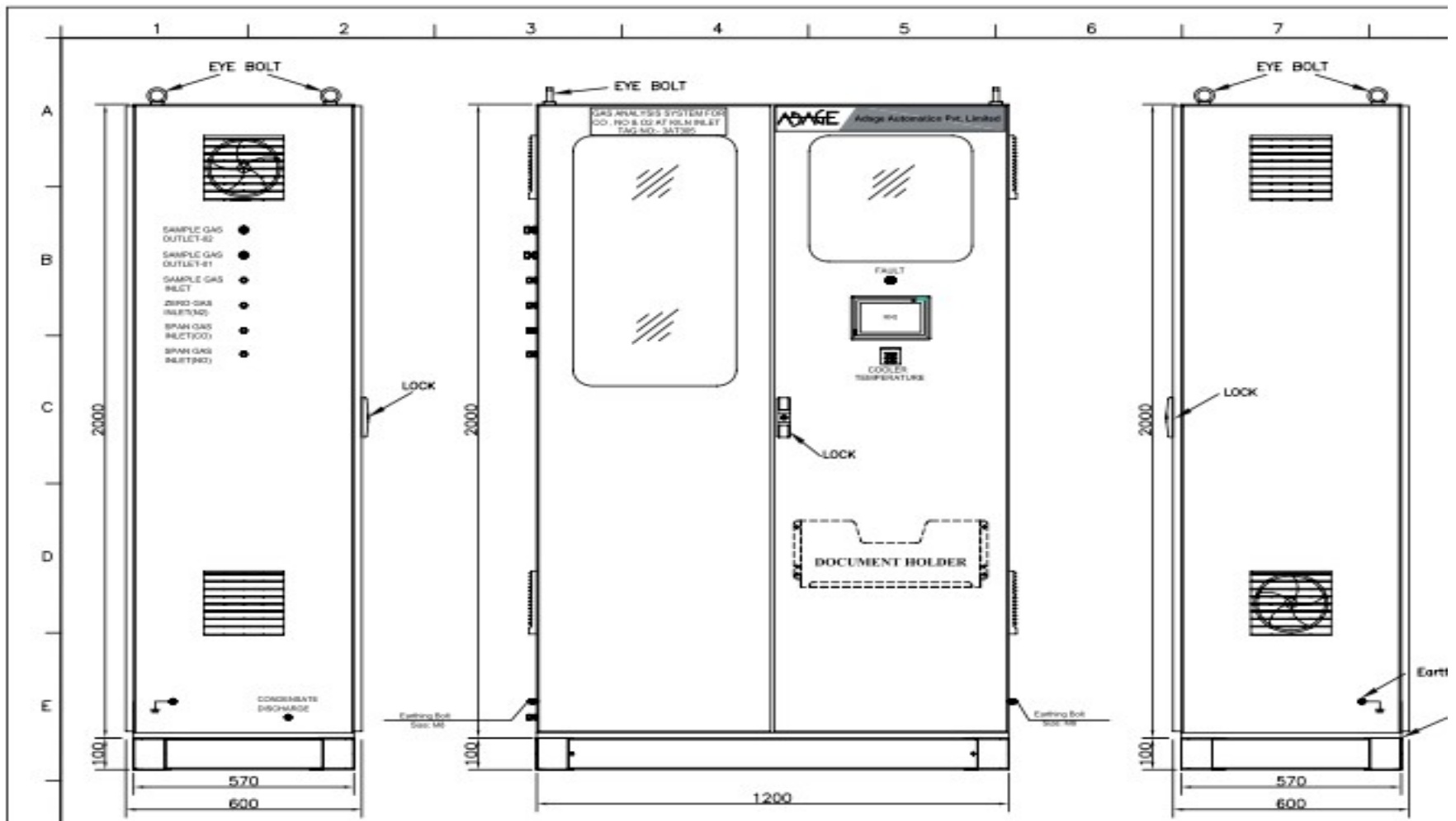


***** INSULATED LINE

Client:	-----	NAME	DATE	REV.	NAME	DATE	ADAGE AUTOMATION PVT. LTD.
End User:	-----	PRPD BY	KN	23.03.20	REV-01	KN	14.05.2020
Consultant:	-----	CHKD BY	KM	23.03.20	REV-02	SK	19.06.2020
Description:	GAS ANALYSIS SYSTEM FOR MEASUREMENT OF CO,NO&O2 AT KILN INLET	APPD BY	SP	23.03.20	REV-03	SK	02.07.2020
Details:	SCHEMATIC DRAWINGS	SHEET NO	PAGE 2 OF 5	JOB No.-	WC20/4968	DRAWING No. :	WC20/4968/02/SD

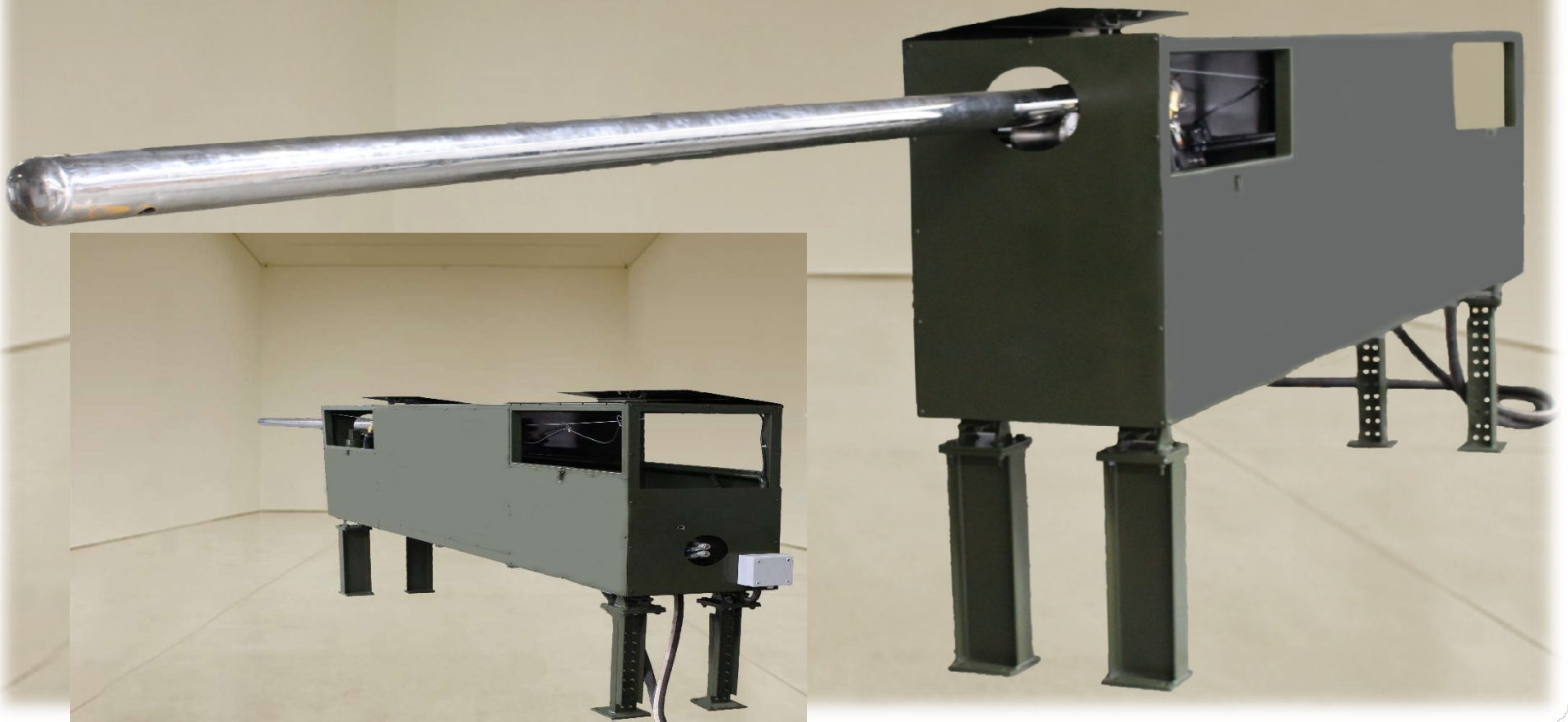
ADAGE SIEMENS
SOLUTION PARTNER ANALYTICAL

Kiln Inlet System Panel GA Drawing



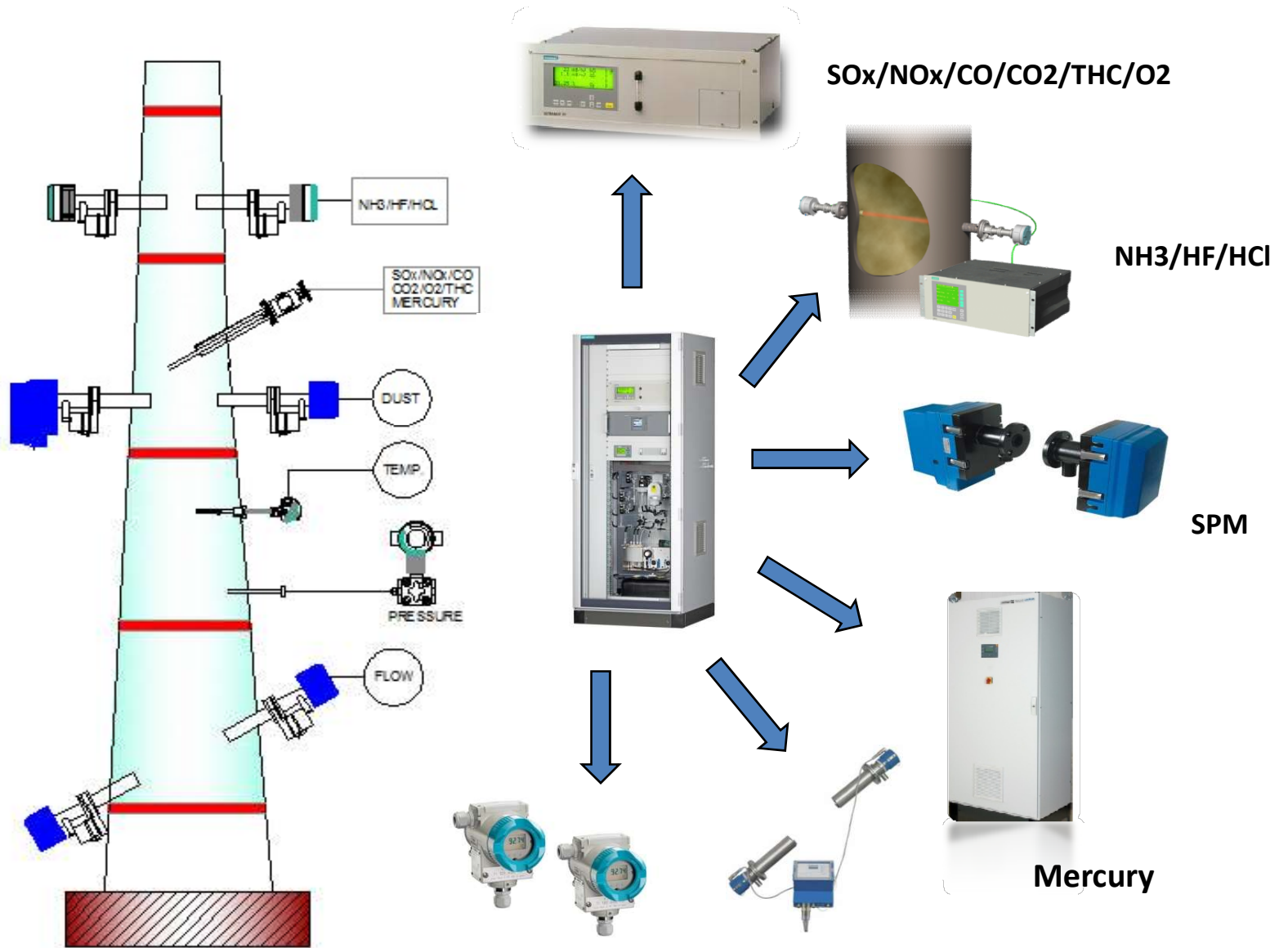
Kiln Inlet Retraction System

Retraction with Protective Cover for Safe operation and ease of maintenance.





CEMS...Emission Monitoring



Thank you for your attention



Angshuman Paul

Executive Director

ADAGE Automation Pvt Limited , Goa - INDIA

Mobile: +91 9920217222

E-mail: paul@adage-automation.com

visit us at : www.adage-automation.com