

AKAI

AKIC

Total Environmental Solution Provider
CEMS , AAQMS , Effluent Monitoring

ENVIRONMENTAL SOLUTIONS

ANALYSER SHELTER

HOT EXTRACTION CEMS

DILUTION EXTRACTION CEMS

DRY EXTRACTION CEMS

HOT WET CEMS

INSITU LASER BASED CEMS

AAQMS – CONVENTIONAL

AAQMS – COMPACT

MERCURY ANALYSERS

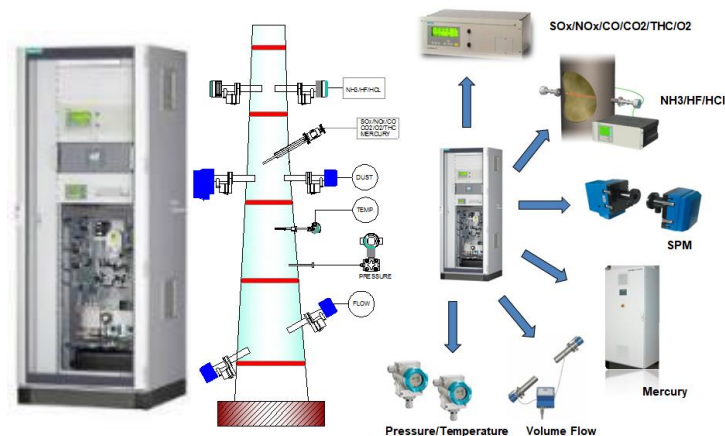
DUST & SPM MONITORS

STACK FLOW METERS

EFFLUENTS MEASUREMENTS



A COMPLETE CEMS Solution



MONITORING SYSTEM OPERATED BY INDUSTRY

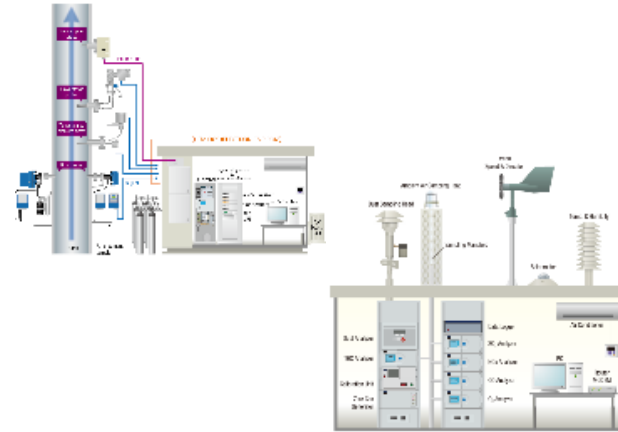
Air Pollution
Monitoring
System

Continuous Emission
Monitoring System

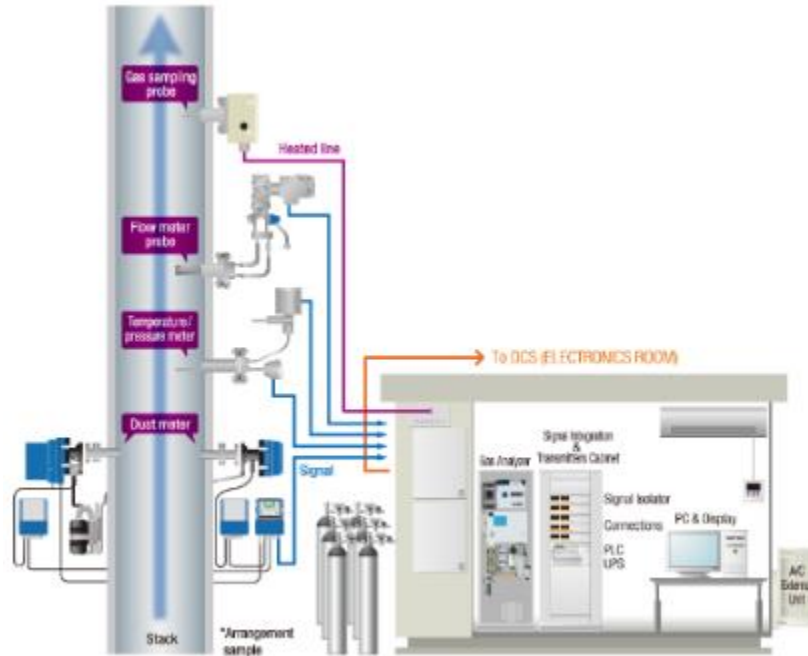
Ambient Air Quality
Monitoring System

Water
Pollution
Monitoring
System

Effluent Monitoring
System

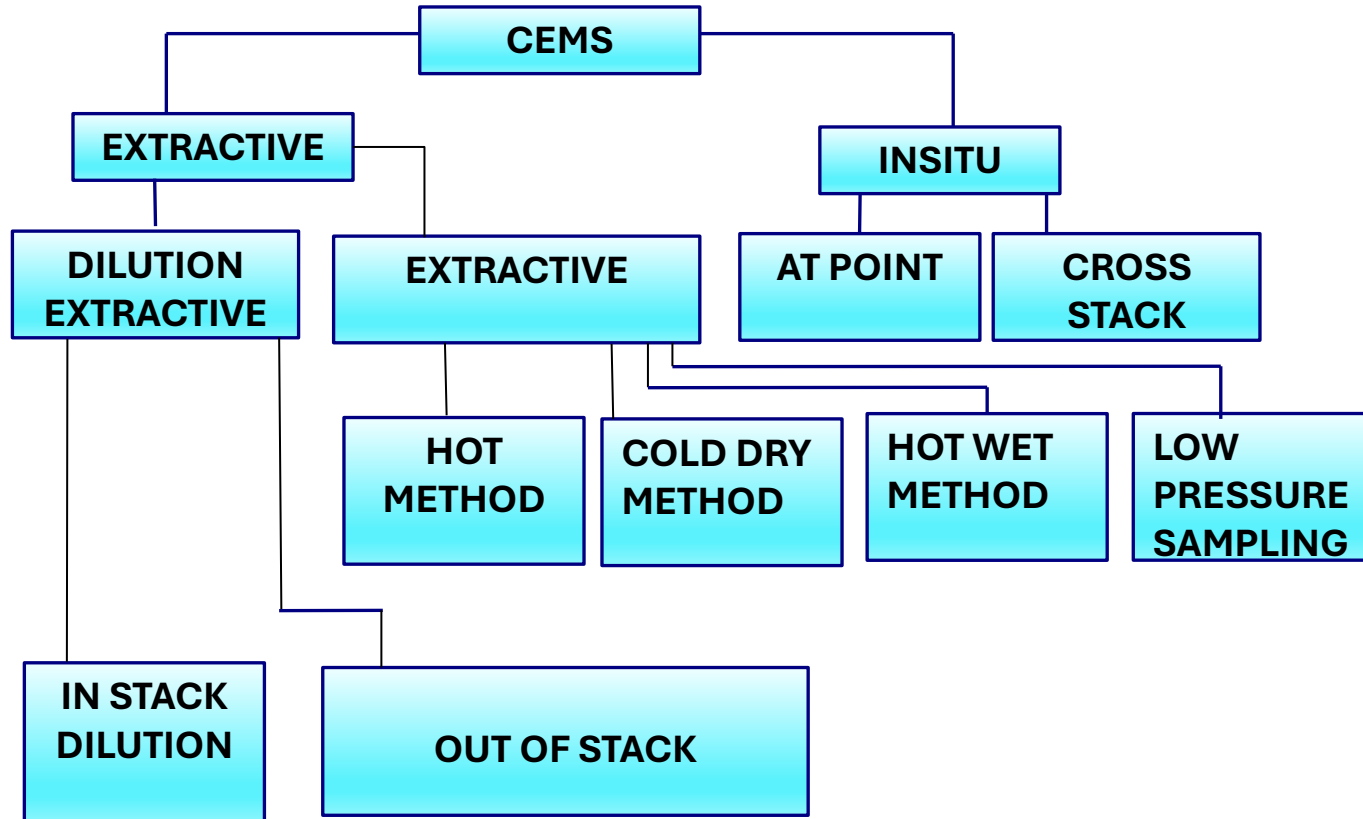


WHAT IS CEMS ?



A continuous emission monitoring system (CEMS) is the total equipment necessary for the determination of a gas or particulate matter concentration or emission rate using pollutant analyser measurements and a conversion equation, graph, or computer program to produce results in units of the applicable emission limitation or standard

TYPE OF CEMS TECHNIQUE



Plenty of pollutants need to be measured:

- **Particulates:**
 - Total Dust or Opacity, Heavy Metals
- **Inorganic Compounds:**
 - CO, CO₂, SO₂, NO/NO₂/NO_x, NH₃, HCl, HF, Total Hg
- **Organic Compounds:**
 - THC, Dioxins & Furans
- **Reference Values:**
 - O₂, H₂O, Temperature, Pressure, Gas Velocity / Flow

What Are The Requirements?

- All Analysers are provided as individual units and/or Multi-Component Analysers
- CEMS Gas Analysers require suitable Sample Handling & Conditioning units
- Data Acquisition, Handling & Transmission is required

Reliable and Accurate Data

How to get that?

- ✓ Application-optimized Sample Handling & Conditioning Units
- ✓ Reliable Analysers
- ✓ Accurate Integration into the Monitoring System (CEMS)
- ✓ Availability of Support, Service, Maintenance, AMCs

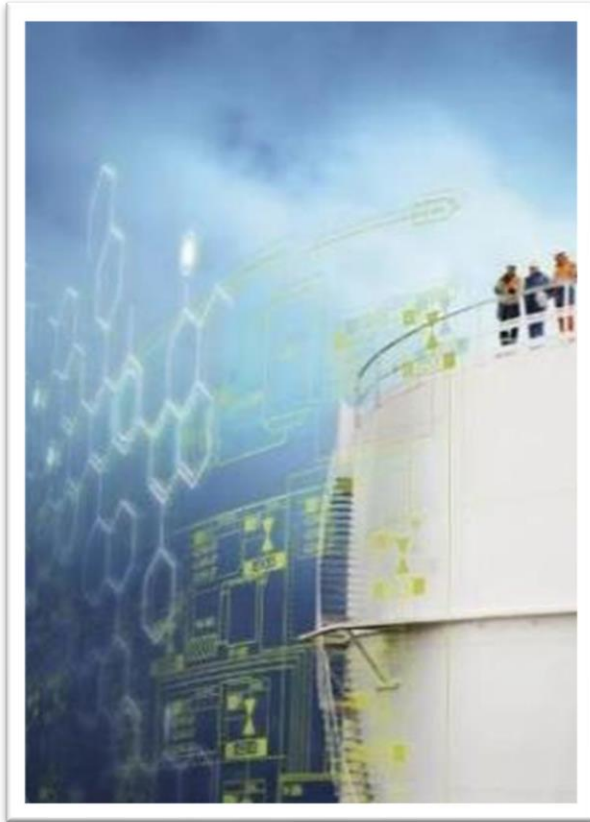
What Are the Common Stack Pollutants?

- SO_2 SULPHUR DI OXIDE
- NO_x OXIDES OF NITROGEN
- CO CARBON MONO OXIDE
- PM PARTICULATE MATTER
- HCL HYDROGEN CHLORIDE
- NH_3 AMMONIA
- HF HYDROGEN FLUORIDE
- TOC TOTAL HYDRO CARBON
- Hg MERCURY

Overview of Technologies

Method	Technique	Technology	Gases Measured
Non-Dispersive Infrared (NDIR)	Hot Extraction Cold dry Extraction In-situ	Beer Lambert Law Filter photometer	SO2, NOx, CO, CO2
Non-Dispersive Ultraviolet	Hot Extraction Cold dry Extraction In-situ	Beer Lambert Law Filter Photometer	H2S, SO2,
UV Fluorescence	Cold Dry Extractive Dilution Extractive	Excitation (214nm) and Fluorescence (300 nm)	H2S, SO2
Chemiluminescence	Dilution Extractive	Converter	Oxides of Nitrogen
Dispersive Ultraviolet	In-Situ	Beer Lambert Dispersive	SO2, NH3, H2S
Enhanced Laser	Extractive / Insitu	OFCEAS / ICL / QCL	H2S, HF, NH3, HCl, HCN, SO2, SO3, NO,NO2,CO, CO2, O2
TDLS	Insitu	Wavelength Modulation Spectroscopy	H2S, HF, NH3, HCl, O2, CO,CO2, H2O
Flame Ionization Detector (FID)	Hot Wet Extractive	Hydrogen flame and measure hydrocarbon	THC, VOC

Method	Technique	Technology	Gases Measured
Fourier Transform Infra Red (FTIR)	Hot Wet Extractive	Beer Lambert Law Filter photometer	H2S, HF, NH3, HCl, HCN, SO2, NO,NO2,CO, CO2, O2, H2O
Gas Chromatography	Hot Wet Extractive Hot Extraction Cold Dry Extraction	GC separation and FID detection	VOC, THC, H2S, HF, NH3, HCl, HCN, SO2, NO,NO2,CO, CO2, O2, H2O
Mass Spectrometry	Hot Wet Extractive Hot Extraction Cold Dry Extraction	Ionisation	VOC, THC, H2S, HF, NH3, HCl, HCN, SO2, NO,NO2,CO, CO2, O2, H2O
Atomic Absorption	Hot Wet ex-situ Cold Dry ex-situ	Resonance Mercury emission/absorption	Hg
Atomic Fluorescence	Hot Wet ex-situ	fluorescence analyzer	Hg
Paramagnetic	Hot Extraction Cold dry Extraction	Measures unique magnetic effect of oxygen	O2
Zirconium Oxide	Hot Extraction Cold dry Extraction In-Situ	Transport of oxygen ions (Nernst Eqn)	O2
Electrochemical	Hot Extraction Cold dry Extraction	Chemical reaction	O2



World's Largest ever CEMS Project in terms of count of the Number of Stacks

Large Scope

1. 150+ stacks to be measured including SRU Stacks
2. 200 + CGA & Laser
3. 77 Dust Monitors
4. 8 nos of Analyzer Shelters with 4 nos of HVAC
5. 34 nos of RAID 1 processor based SCADA stations
6. Zone 1 & Zone 2 systems with ATEX components
7. 45 km of RS 485 Cables , 15 km of heated sample line , 25 km of FO cable , 15 km of field SS tubes , 20 km of power & signal cables

**Here Are Some Of The Different
Technologies For CEMS**

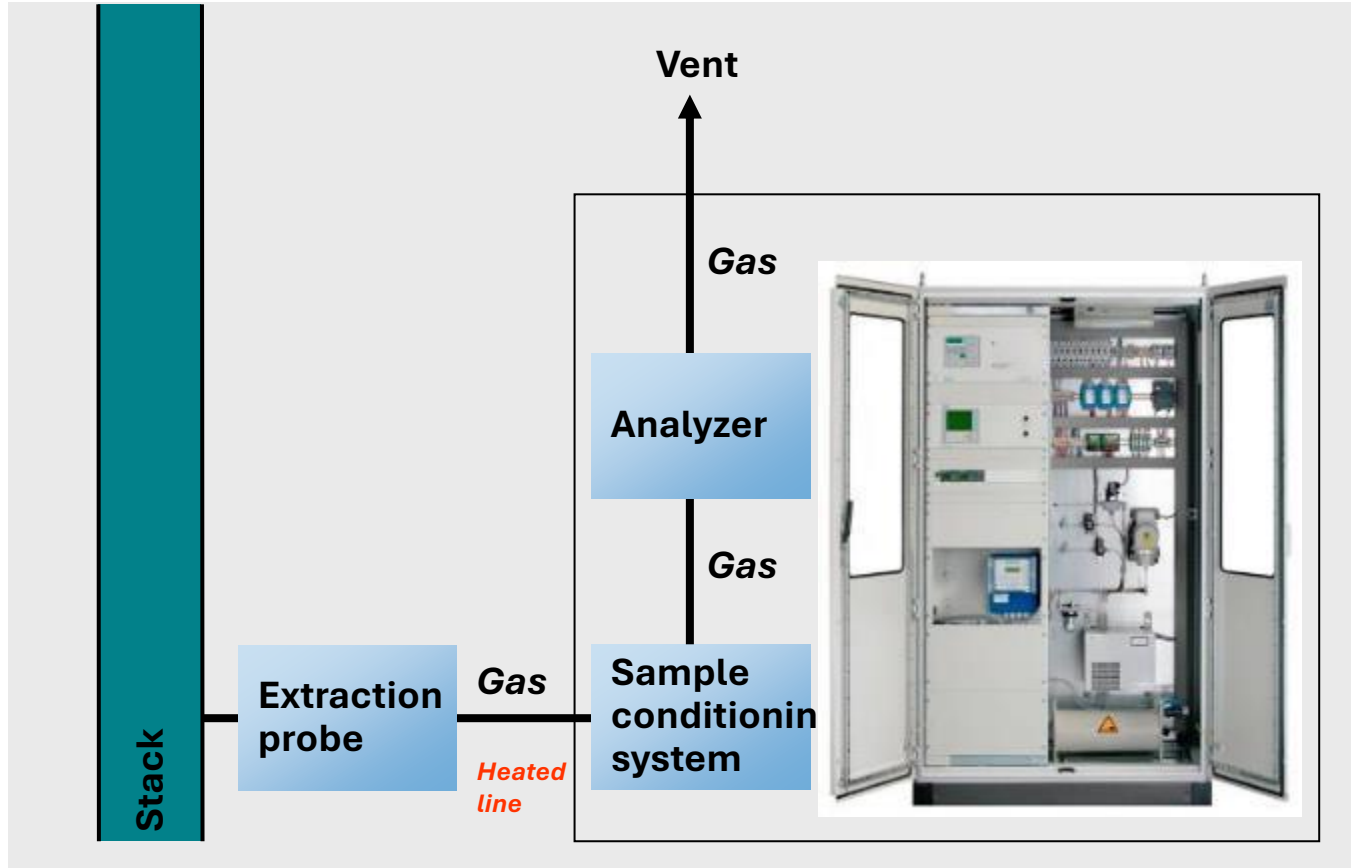
&

**Examples For Flow Diagrams Of Completed
CEMS**

Technology Option : A

**EXTRACTIVE ...HOT EXTRACTION METHOD OF
SAMPLING**

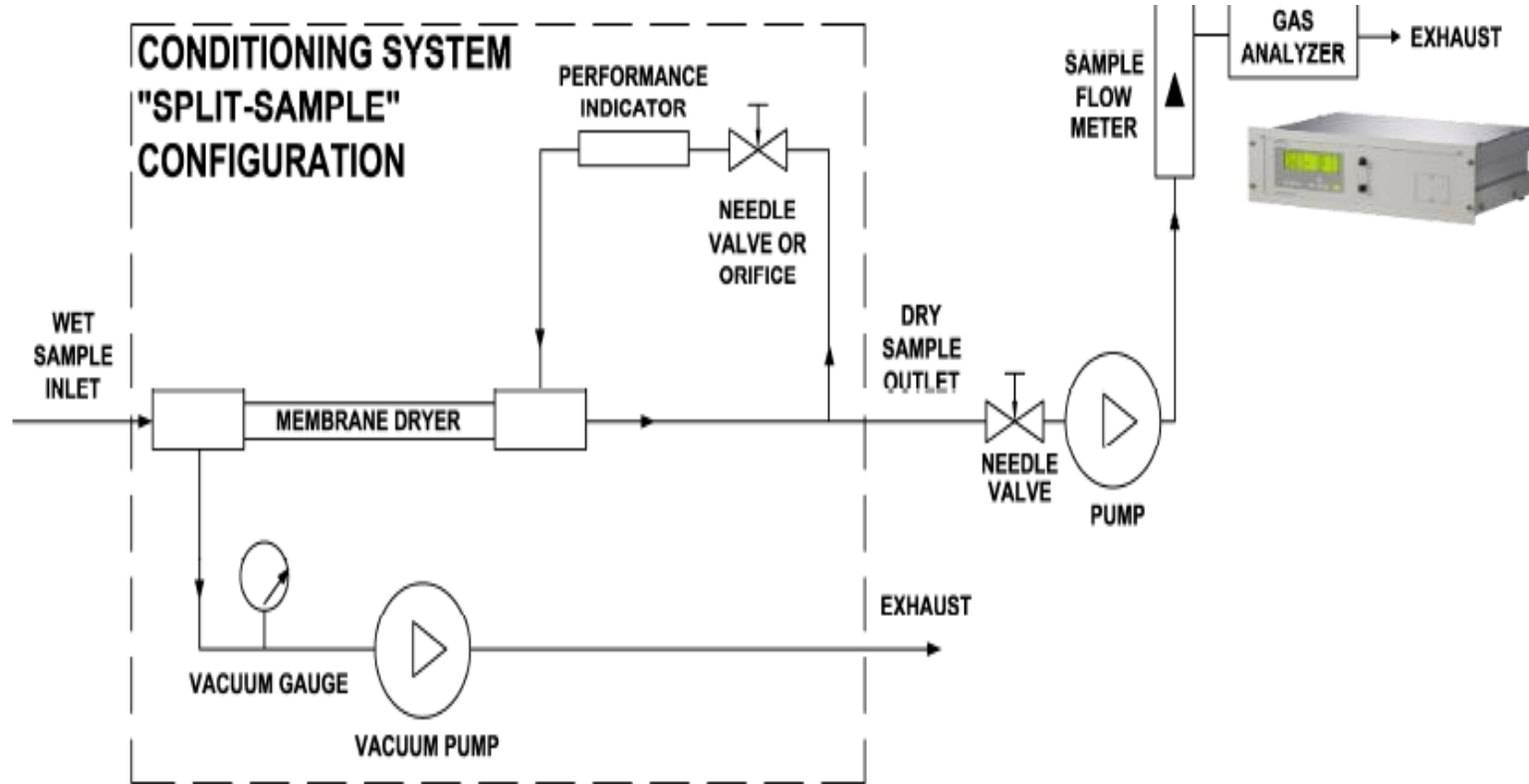
EXTRACTIVEHOT EXTRACTION METHOD OF SAMPLING



Technology Option : B

EXTRACTIVECOLD DRY METHOD OF SAMPLING

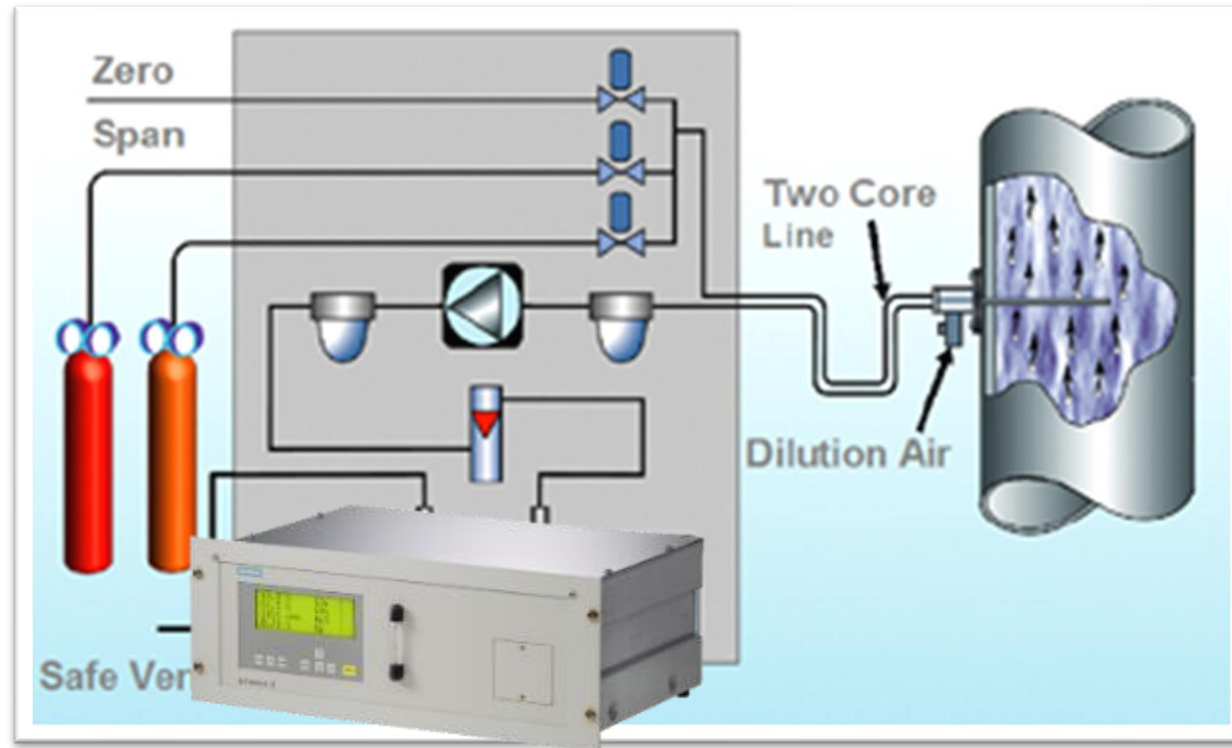
Extractive based on COLD DRY METHOD



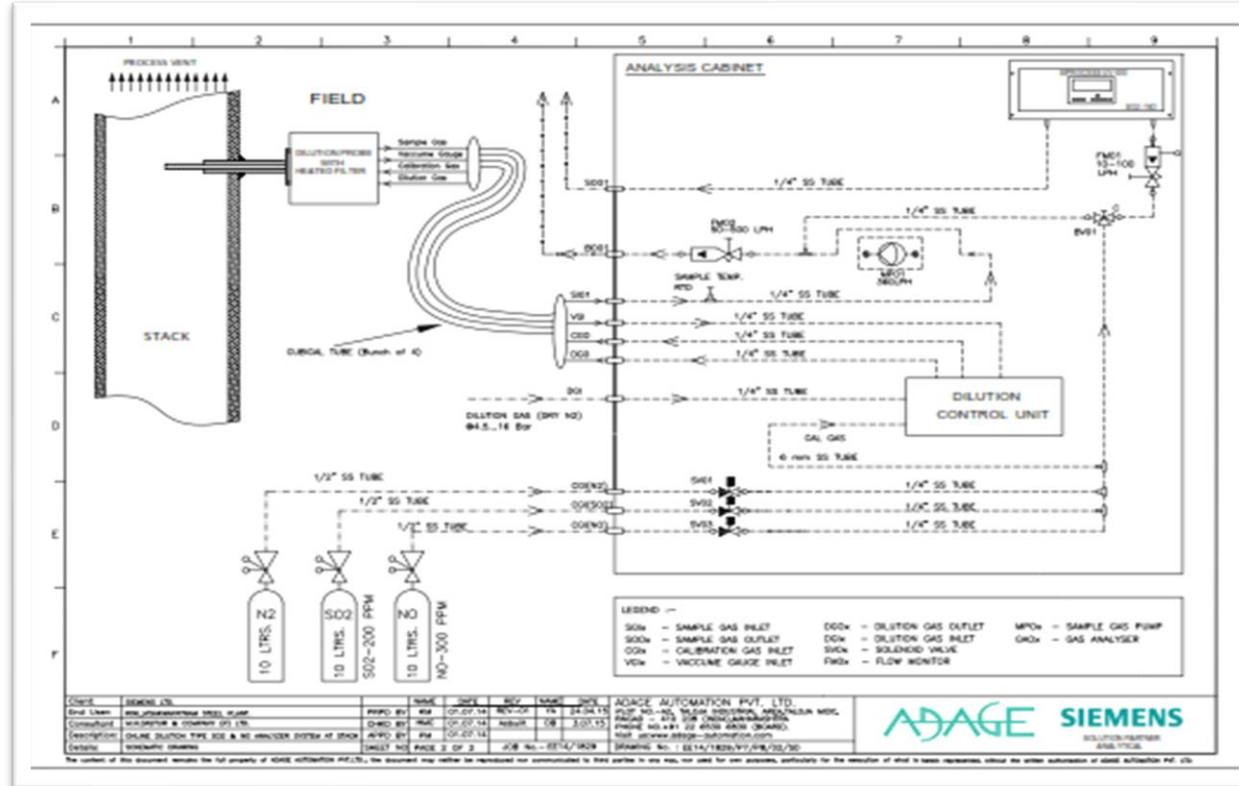
Technology Option : C

In Stack Dilution System

MEASUREMENT BASED ON DILUTION TECHNIQUE



Typical SHS Design for Dilution based CEMS



Technology Option : D

INSITU - Method Of Measurement

PATH TYPE INSITU CEMS :

TDLS System Design for SO_x,No_x,CO,O₂, H₂O, NH₃, HF, HCL

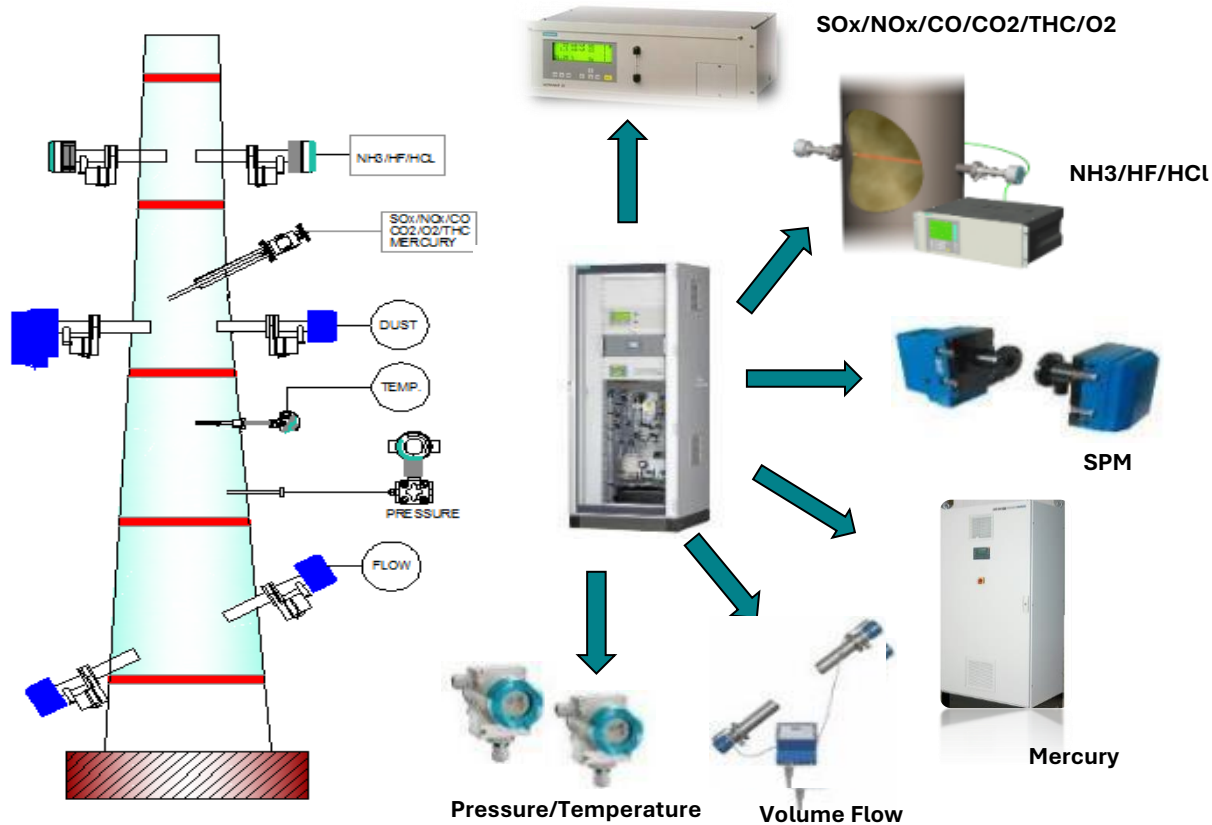
- **Insitu Single-line molecular absorption spectroscopy**
- **Absorption Technology – Wavelength Modulation Spectroscopy**
- **Fast Response time**
- **Zero Drift – No Calibration**



**ADAGE KANOO offers a comprehensive CEMS
portfolio with all different Sampling Techniques**

For no two applications are identical

Adage Offers Complete CEMS Solution





CERTIFIED ANALYZERS

- ❑ Analyzers are Certified according to EN 14181/ EN 15267 by TÜV
- ❑ Analyzers are Certified according to MCERTS, UK
- ❑ Analyzers are compliant to US EPA



CERTIFICATE
of product conformity (DIN EN 14181)
Certificate number: 1704022 10-6

Product: LDS 6 Ammonia Analyser

Manufacturer: Sirona SAE
Garten-Produktion Sirona SAE Dienstleistungen
Ulrich-Str. 10
51109 Köln-Sülz
Germany

Manufacturer's Declaration: This is to certify that the manufacturer is responsible for the correct design, construction, testing and conformity with the requirements of the standard.

Product Name: LDS 6 Ammonia Analyser

Product Model: LDS 6 Ammonia Analyser

Product Serial Number: 1704022 10-6

Product Date: 27 March 2018

Product Location: TÜV SUD Industrie Service GmbH
Tübingen, Germany

Product Location: TÜV SUD Industrie Service GmbH
Tübingen, Germany

Product Location: TÜV SUD Industrie Service GmbH
Tübingen, Germany

Product Location: TÜV SUD Industrie Service GmbH
Tübingen, Germany

PRODUCT CONFORMITY CERTIFICATE
This is to certify that the
LDS 6 Ammonia Analyser
Manufactured by:
Sirona SAE
Garten-Produktion Sirona SAE Dienstleistungen
Ulrich-Str. 10
51109 Köln-Sülz
Germany

This has been assessed by The Certification Service
and the certificate issued on the conditions stipulated within
**MCERTS Performance Standards for Conformity Assessment
Marketing Schemes, version 1.4 dated July 2012
EN ISO 9001**
© 2012 The Certification Service

Certificate Range:

NO _x	0 to 10 mg/m ³	0 to 20 mg/m ³
CO	0 to 10 mg/m ³	0 to 30 mg/m ³
SO ₂	0 to 10 mg/m ³	0 to 20 mg/m ³
PM ₁₀	0 to 10 mg/m ³	0 to 20 mg/m ³

Product Name: LDS 6 Ammonia Analyser

Product Model: LDS 6 Ammonia Analyser

Product Serial Number: 1704022 10-6

Product Date: 27 March 2018

Product Location: TÜV SUD Industrie Service GmbH
Tübingen, Germany

Product Location: TÜV SUD Industrie Service GmbH
Tübingen, Germany

Product Location: TÜV SUD Industrie Service GmbH
Tübingen, Germany

Product Location: TÜV SUD Industrie Service GmbH
Tübingen, Germany

- **Analysers**



- **Standardized CEMS**



- **Experience & Compliance**



SIEMENS

Set CEM 1 - Certificate some details...

Set CEM 1

Standard system for continuous emission measuring
Report No. 1204119 (July 2008)

Manufacturer:

Siemens AG Industry Sector Industry Automation, Karlsruhe

TÜV Süd Industrie Service GmbH is herewith certifying that the analysing system Set CEM 1 is in accordance with EN ISO 14956, Jan. 2003 and fulfils QAL1 of EN 14181 for the following measurement ranges:

Analyser Type	Smallest tested measurement range	Licensed for measurements at plants according regulations for:	Published at:
Ultramat 23-7MB 233 (SO ₂ , NO, CO and O ₂)	0-400 mg/m ³ SO ₂ 0-250 mg/m ³ NO 0-150 mg/m ³ CO 0-10/25 Vol.% O ₂	13. BImSchV, TALuft (2001/80/EG, TI Air)	GMBI Nr. 1/98 and GMBI Nr. 22/99
Ultramat 23-7MB 2335/ 2337 (NO, CO, O ₂)	0-100 mg/ m ³ NO 0-150 mg/m ³ CO 0-10/25 Vol.% O ₂	13./ 27. BImSchV, TALuft (2001/80/EG, TI Air)	BAZ 81/ 2005 and BAZ 38/ 2008

For internal use only / © Siemens AG 2011. All Rights Reserved.
Industry Sector

**And these are examples, when they were
completed for
Indoors installation
or
Outdoors installation**

**Completely Integrated Free Standing CEMS Cabinets for Hazardous areas
integrated with Certified Hazardous Area Air Conditioners**



Free Standing Analyzer Cabinets



Hazardous Area CEMS Shelter



THANK YOU

AKAI

Adage Kanoo Analytical Industry LLC

D 64 & 65 / KLP 3

KEZAD, Abu Dhabi

United Arab Emirates

AKIC

Adage Kanoo Industrial Company

Building NO: 2947, Additional NO: 6829

Jubail, Kingdom of Saudi Arabia

Postal code: 35717