

Staying ahead in a fast changing world.



Environmental emission monitoring systems

Answers for industry.

SIEMENS



As environmental regulations become more stringent, companies and municipalities are facing immense investment and development challenges. For both new assets and existing plants, getting environmental monitoring right is essential for unlocking value, enhancing reliability and boosting profitability.

Siemens understands that customers are searching for economical solutions for meeting these environmental objectives. Monitoring is required, and preventing fines and reducing product loss are the primary drivers. Compliance, uptime, cost of ownership, demonstration of emission and operational and analysis accuracy are also absolute requirements.

Partnering with Siemens enables you to team with a technology leader in the environmental sector and better track the best technological solutions. Decades of strategic acquisition and successful integration have allowed us to deliver unparalleled offerings for environmental solutions. Innovative design, excellent engineering and maximum lifetime value are common denominators for all our components, products, services and solutions.

Connecting our experience, competence and strengths, we can together achieve the winning performance to get ahead – and stay there.

Single source supplier for environmental monitoring solutions

Siemens has an industry-leading reputation for delivering highly innovative and adaptable solutions. For environmental monitoring, we offer Standard Solutions, which consist of preconfigured base systems with standard installation and operation options.

When required, we develop Custom Systems designed to meet customer specifications and special requirements. We understand that optimal resource efficiency (through innovative platform concepts, fast commissioning, short ramp-up times and product safety) and greater availability (through innovative service and support concepts) is critical. Siemens, along with the former Applied Automation, draws on 8 decades of combined experience in process analyzers and worldwide market leadership in online Process Gas Chromatography to address these requirements.

We don't just provide products, but we use our leading-edge portfolio to create comprehensive measurement solutions with affordable life-cycle cost, reliable long-term performance and simplicity.

Total Cost of Ownership

Siemens reduces total cost of ownership (TCO) by addressing the two-thirds of longer-term monitoring costs that arise from utilities and maintenance. Our designs account for the need for multiple stream sample conditioning systems and efficient use of analyzer utilities (air, power) and analyzer measurement density per footprint.

TCO is also affected by factors such as system installation expertise, project execution skill, project costs, single-point responsibility, Factory Acceptance Test (FAT) inspection and requirements for a minimum of 95% uptime (which equates to 18 days per year of allowable downtime, cumulative).

Optimizing TCO can only be achieved through well designed sample conditioning systems, stable application with proven analyzers and proven hardware, minimization of significant analytical hardware or application adjustments from analysis drift, automated calibration and validation when appropriate, failure predictability utilizing analyzer capabilities such as monitoring parameters, and standardized GC separation systems for easy and quick maintenance.

Siemens Environmental Solutions Experience

Texas Title 30; Part 1; Chapter 115 Control of air pollution from VOCs

Part of the requirement to achieve federally mandated ozone attainment compliance in the Houston-Galveston area is reducing and monitoring highly reactive volatile organic compound (HRVOC) emissions. Aimed specifically at flares and cooling towers, it mandates continuous and online monitoring. Based on reviews of the published regulations, discussions with TCEQ and discussions with customers who are required to implement these regulations, Siemens has developed Total Solutions targeted towards satisfying the regulatory requirements and providing the best possible analytical solution.

Flare monitoring targets online monitoring of selected HRVOCs, as well as BTU contents. For flares, our analytical solution consists of a single MAXUM edition II Process Gas Chromatograph measuring the required HRVOC as well as the BTU value with a total cycle time of 7.5 minutes.

Cooling tower monitoring relies on continuous online measurement of the total VOC content in the water, with laboratory speciation, or the continuous online measurement of the speciated HRVOCs in the water. Using a Siemens FIDAMAT continuous Flame Ionization Detector that measures total VOC as methane-plus or ethane-plus satisfies the regulatory requirements.

Using an online Process Gas Chromatography solution to measure the specified HRVOC components selectively is also permitted. This approach has the advantage of greatly reducing the laboratory burden. Using a single MAXUM edition II Process Gas Chromatograph for the individual measurement of the targeted HRVOC components allows you to use of the same analytical platform as for flare monitoring.

With these solutions, Siemens has installed more than 70% of the TCEQ Chapter 115 HRVOC monitoring systems in the Houston-Galveston area.



Siemens HRVOC water sparging vessel

EPA 40CFR60.18 SCAQMD Rule 1118 Control of emissions from refinery flare

The Air Quality Monitoring District (AQMD) has been working on the requirements of the Rule 1118 since 1998. At present, the rule has been implemented in Southern California. It is initially intended to quantify NO_x (ozone formation) and sulfur (acid rain) emissions. Later, it will be used to reduce emissions progressively to zero by implementing flare recovery systems.

Rule 1118 applies to all flares used at petroleum refineries, sulfur recovery plants and hydrogen production plants located in the SCAQMD. It requires continuous monitoring of flare emission by measuring hydrocarbon and sulfur components flowing into flare. The objective is to monitor and record data on refinery and related flaring operations and to quantify, control and subsequently minimize flaring and flare related emissions.

Based on reviews of the published regulations, discussions with SCAQMD and discussions with customers who are required to implement these regulations, Siemens has defined analytical systems for online and automatic measurement of the waste gas to flares. A single MAXUM edition II measures the individual hydrocarbons for heat value (BTU) and the higher heating value (HHV) contents exceeding 3,000 BTU. A separate MAXUM edition II PGC is measuring the total sulfur concentration from low ppm to more than 50%.

The challenging part of the measurement is remaining quantitative under upset plant conditions. To achieve this, the sample transport system must remain above 230°F to the analyzer. The Siemens turnkey solution consists of the front-end engineering, measurement system (consisting of two MAXUM edition II Process GCs and data acquisition system), shelter, sample system and field support services.

40CFR60 J; Flare emission monitoring

Monitoring emission components in flue gases is one of the most important topics for continuous gas analysis. This is a result of legislation for monitoring emissions for large combustion plants, as one example. It is also due to the requirements of companies operating process plants that can draw conclusions on the process efficiency from the gas analyses, such as boiler control, de-NO_x and de-SOX plants.

The measurements require a reliable, complete system that is especially designed for the application. The continuous emission monitoring system solutions from Siemens reliably cover all requirements associated with sampling, sample preparation and gas analysis. Gaseous components for measurement can consist of CO, CO₂, NO, NO_x, SO₂, O₂, HCl, HF, NH₃ and H₂O. The Siemens ULTRAMAT 23, LDS 6 and OXYMAT 6 are ideal for the extractive, continuous gas analysis. Different versions allow you to adapt the system to meet specific requirements. Various measuring ranges can be selected.

40CFR60 Portland cement monitoring

Continuous analysis of flue gas in the rotary kilns of cement factories is essential for ensuring the quality of the generated clinker, using fuel efficiently and protecting the environment from toxic emissions. Analysis permits assessing the combustion processes in detail, and it is therefore a prerequisite for optimizing burner control, fuel requirements and product quality. Furthermore, malfunctions can be detected early or even prevented using appropriate countermeasures. Stable control of the kiln also prevents toxic emissions and supports environmental protection.

Today, air pollutants associated with cement manufacturing (regulated and non-regulated) include particulate matter, NO_x, SO₂, CO, CO₂, hydrocarbons, HCl, HF, Hg, heavy metals and other substances. Some pollutants, however, may not be present at significant mass rates or measurable concentration levels for the respective plant. Gas analysis at the stack assures that the entire plant operation is complying with emission regulations set by government authorities.

For cement environmental monitoring, Siemens recommends the ULTRAMAT 6, OXYMAT 6, FIDAMAT 6, and LDS 6 analyzers. The difficult conditions in rotary kilns place high demands on sampling systems. High gas temperature up to 1400°C, high dust concentration of up to 2,000 g/m³ and high concentrations of alkali, sulfate and chloride in the gas circuits are significant problems. Siemens has a unique product, the FLK probe, which allows sample extraction and measurement despite these conditions.

40CFR60 Power Plant NO_x Emissions from NH₃ Slip

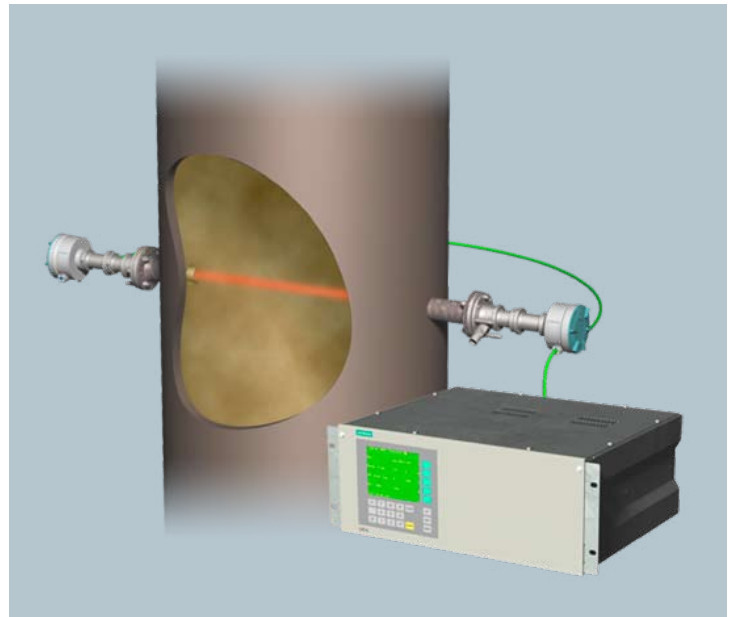
The 1990 Clean Air Act and subsequent regulations require power plants to reduce NO_x emissions. Selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR) reduce NO_x emission by injecting ammonia (NH₃) into the combustion flue gas, which ideally reacts with the NO_x to form H₂O and N₂.

The efficiency of SCR and SNCR is determined by monitoring the outlet for excess NH₃, referred to as NH₃ slip. The flue gas sample at the measurement point is hot, wet and laden with dust. (This is primarily a problem in coal-fired plants but not usually in gas-fired plants). The SNCR process usually uses NH₃ or urea (CO(NH₂)₂) introduced into, and mixed with, the flue gases in the hot combustion zone where the reduction of NO_x takes place.

Depending on the type of reducing agent and different additives, the SNCR process is usually operated between 800° and 950°C. The sample point's harsh physical conditions, coupled with the highly reactive nature of NH₃, makes reliable extractive low-level analysis very difficult. Siemens relies on the in situ Tunable Diode Laser analyzer for measuring NH₃ and water vapor in the combustion flue gas just after the SCR in a power plant. With an in situ type analysis system, the sample never leaves the process; the NH₃ concentration is not affected by sample transport; and there is no sample handling system components to fail due to heat, dust, water and everyday "wear and tear."

The tunable diode laser measures NH₃ across the duct resulting in an average, not a point source, as in extractions sampling. It has been demonstrated in coal-fired power plants that the NH₃ concentration is highly stratified in the duct. Across the duct diode laser analysis provides a true average NH₃ concentration in the duct. Measuring and controlling NH₃ slip at 2 ppm and below is necessary to optimize SCR performance to reduce NO_x emissions and increase power plant efficiency.

Historically extractive systems have been used to measure NH₃ at much higher levels. Some extractive NH₃ analysis systems are not a direct NH₃ measurement, but require multiple converters (modified NO_x analyzer) and high maintenance compared to in situ tunable diode laser NH₃ slip monitors and have not been able to reliably measure NH₃ in 1-2 ppm range in the duct just after the SCR. Extractive analyzers using ion mobility spectroscopy (IMS) technology have also been used in this application. The in situ tunable diode laser has demonstrated that this measurement can be made reliably with minimal installation and maintenance cost.



Siemens in situ LDS 6 tunable diode laser analyzer

New! 40CFR60 Subpart Ja and Amendments to J

EPA has finalized amendments to the current Standards of Performance for Petroleum Refineries 40CFR60 Subpart J. The final standards reflect demonstrated improvements in emissions control technologies and work practices that have occurred since promulgation of the current standards.

The final rule includes separate standards of performance for new, modified or reconstructed process units at petroleum refineries. Only facilities are constructed, modified or reconstructed after May 14, 2007 are affected by the proposed standards in 40CFR part 60, subpart Ja. Units that were constructed, modified or reconstructed on or before May 14, 2007 must continue to comply with the current NSPS in 40CFR part 60, subpart J, as amended.

The final standards for new process units include emissions limitations for particulate matter, NO_x, SO₂, CO, H₂S, total reduced sulfurs (TRS) as well as work practice standards for:

- Fluid catalytic cracking units
- Fluid coking units
- Fuel gas combustion devices
- Sulfur recovery plants.

The effective date of NSPS subpart Ja was stayed for 60 days until September 26, 2008 to correct errors. The amendments in NSPS subpart J were not affected and remain effective from June 24, 2008. Effective September 26, 2008, in Title 40CFR part 60, subpart Ja, Sec. 60.100a(c), the definition of "flare" in Sec. 60.101a, and Sec. 60.102a(g), 60.107a(d), and 60.107a(e) were stayed until December 25, 2008. The action also grants petitioners' requests for reconsideration and for a stay until December 25, 2008 for specific provisions in the newly promulgated standards of performance for new, modified or reconstructed process units at petroleum refineries, including the:

- Definition of "modification";
- Definition of "flare";
- Fuel gas combustion device sulfur limits
- Flow limit for flare systems
- Total reduced sulfur and flow monitoring requirements for flares
- NO_x limit for process heaters.

All other requirements promulgated in 40CFR part 60, subpart Ja became effective as of September 26, 2008. Siemens is working with customers to develop total solution packages for these new rules.

New! 40CFR59, 80, 85, 86 Benzene in gasoline

According to the EPA, this new rule contains standards that will significantly reduce benzene content in gasoline, exhaust emissions from passenger vehicles operated at cold temperatures (under 75°F) and emissions that evaporate from and permeate through portable fuel containers. The new rule was signed October 9, 2008 and became effective December 15, 2008.

By January 1, 2011, refiners must meet an annual average gasoline benzene content standard of 0.62 percent by volume (vol%) on reformulated and conventional gasoline. The national benzene content of gasoline today is about 1.0 vol%. The program also includes a nationwide averaging, banking and trading program.

In addition to the 0.62 vol% standard, refiners must also meet a maximum average benzene standard of 1.3 vol% by July 1, 2012. A refinery's or an importer's actual annual average gasoline benzene levels may not exceed this maximum average standard.

The final rule adds another specific benzene control technology, benzene alkylation, to the four operational or technological changes that the 2007 rule allows. This action also enables refiners to request EPA approval of other benzene-reducing operational changes or technologies for the purpose of generating early credits.

Measuring benzene in gasoline by gas chromatography is described in ASTM Method D3606-99. Siemens recommends a Maxum edition II Process GC for this application. Full turnkey solutions are available.

Upcoming! CARB AB32 Green House Gas Emissions; Global Warming Solutions Act 2006

As part of the California Global Warming Solutions Act of 2006, the California Air Resources Board (CARB) is working on rules that target emissions quantities in 2020 as they were in 1990. Present schedule dates include January 2009 (approve, scoping and feasibility), January 2010 (enforceable regulations) and January 2011 (emission limits established and CEMS measurement operational).

The program is voluntary during the development process. Targeted emission components are CO₂, CH₄, NO (N₂O), Fluor hydrocarbons and SF₆. Most emission can be calculated based on heat value, published factors and flow, but some emission sources will need online monitoring. A BTU measurement may be necessary for combustion using variable heat content fuel.

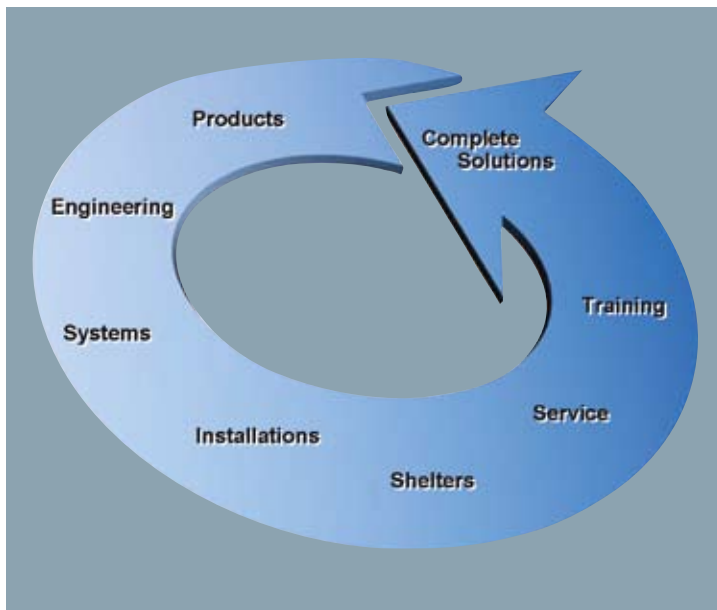
The following industries are affected by these changes:

- Cement plants
- Petroleum refineries that emit greater than or equal to 25,000 metric tonnes of CO₂ in any calendar year after 2007
- Hydrogen plants that emit greater than or equal to 25,000 metric tonnes of CO₂ in any calendar year after 2007
- Electric generating facilities that individually have a nameplate generating capacity greater than or equal to 1 megawatt (MW) that emit at least greater than or equal to 2,500 metric tonnes or more of CO₂ in the report any calendar year after 2007
- Retail providers as defined
- Marketers as defined
- Cogeneration facilities that individually have a nameplate generating capacity greater than or equal to 1 megawatt (MW) that emit at least greater than or equal to 2,500 metric tonnes or more of CO₂ in the report any calendar year after 2007
- Other facilities that emit greater than or equal to 25,000 metric tonnes per year of CO₂ from stationary combustion sources in the report any calendar year after 2007.

Siemens will provide turnkey solutions as details of monitoring requirements become clearer.

Siemens total solutions for environment emissions monitoring

Using standard, turnkey packages are two trends in environmental monitoring, as the same application is frequently required in different plant sectors and can thereby reduce associated overhead on implementation and support. Further, customers often want to purchase turnkey systems to minimize the risk of technical problems for regulation monitoring. Siemens uses its wealth of experience to offer standardized packages that are designed with a turnkey application in mind. Its range of applications cover a variety of industrial sectors, so that it is now possible to configure and order complete solutions while sharply reducing delivery time.



Siemens does not provide just products, but is utilizing leading edge products to provide comprehensive measurement solutions, addressing life-cycle cost, long term performance and simplicity.

Standard CEMS Package for LOW NO_x CEMS

The configurable Low NO_x CEMS is a low-cost, emissions-monitoring package that is designed to operate outdoors without a shelter. The targeted areas are NO_x reduction sites within the U.S. The monitoring requirements are based on the U.S. E.P.A. 1990 Clean Air Act as detailed in 40CFR Part 60 as well as local and state requirements. The system is designed to monitor predefined ranges of nitrogen oxides, carbon monoxide and oxygen in gas fired boilers and furnaces. The key feature of the system is low cost of installation.

Functional Description

The system consists of an analysis cabinet and a sample probe box. The analysis cabinet is a climate-controlled enclosure that protects the system instrumentation from potentially harsh environmental conditions. It contains the analyzers, system controller and sample conditioning system (SCS).

The probe box is mounted at the sample extraction point, usually on a stack or exhaust duct. It extracts and filters the hot wet sample from the stack or duct. The filtered sample is then transported to the analysis cabinet by heated line for water removal and quantification. The system is designed to measure predefined ranges of nitrogen oxides, carbon monoxide and oxygen.



Systems Integration

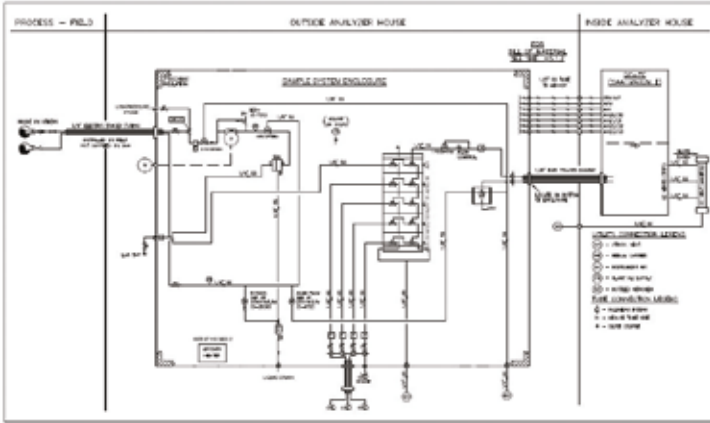
System integration combines the analyzer and sample system into a configuration that is suitable for field installation, and provides the requisite protection for long-term operation and maintenance. A suitable system must be cost-effective and include adequate environmental protection. It must provide protection for maintenance personnel, allow for remote operation when available and minimize utility and installation requirements.

Such systems usually include sun and rain protection, light and receptacle, 120 or 480 VAC power circuits and cylinder rack as standard features. Options may include ventilation fan, electric heat, exterior SCS, A/C, hazardous area classification and other features to address unique requirements



Sample Conditioning Systems (SCS)

The SCS adapts the sample conditions to the needs of the analyzer. Siemens has vast experience in designs of both standard and custom sample conditioning systems for environmental monitoring. Detailed drawings are provided to the customer.



Typical SCS features may include:

- Sample extraction and return
- Sample probe
- Sample pump or redundant sample pumps (manual or automatic changeover)
- Heated sample transport line from sampling point to analyzer
- Sample transport by aspiration
- Fast loop
- Automatic or manual sample probe blowback
- Sample conditioning
- Location (back of the analyzer, outside of shelter or closed coupled)
- Heated SCS enclosure
- Lab sample connection facility (consistent with plant design)
- Particulate filter
- Condensate trap
- Silco steel for sulfur
- Coalescing filter with automatic liquid drainer
- Rotameters for flow monitoring and control
- Sample shut-off
- Atmospheric reference valve
- Remote flow monitoring and control (bypass and GC)
- Stream selection
- Multiple inlets for sample stream, calibration blends, blank stream and validation samples
- Calibration inlet at sampling point
- Auto-calibration for multiple standards and blank
- Laboratory sample tap.

Calibration and on-line validation

Regulatory requirements for calibrating and validating an analyzer while online vary widely. In some cases, plant owners have the option of using vendor-recommended calibration techniques. Regardless of the specified approach, Siemens takes great care to understand the requirements and communicate the necessary system design and implementation process. Years of experience

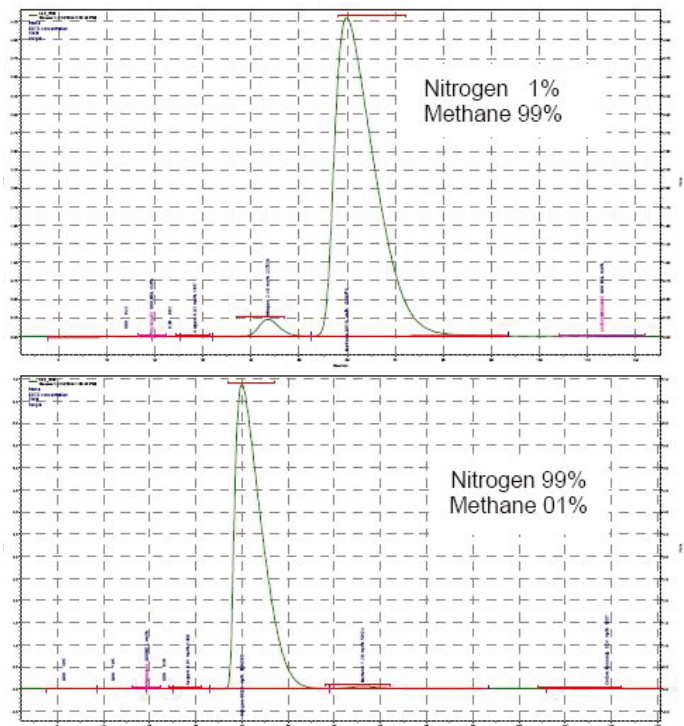
with these regulations gives us the expertise to ensure success, whether the application is for stack monitoring, cooling or wastewater monitoring, fuel gas, sulfur recovery or ammonia slip.

Siemens use of third-party devices

Where required to meet a specific regulation or requested by our customers, Siemens relies on third-party devices (such as mass flow meters) to complement our existing environmental portfolio. We work with a number of channel partners to further enhance our solutions package.

Analyzer application validation

Typically, the analyzer manufacturer provides the validation results. This is required for the quality assurance plan to be followed as part of the regulation. The process owner must be certain that the implemented measurement solution complies with regulatory requirements. Many parameters have to be validated, such as separation adequacy for both measured components and interferences, repeatability for each component over several days, linearity for each component and over the entire possible concentration range, minimum detection limits for each component and a Bounds Test (example shown below) for each pair of components that elute closely.



RATA Bounds Test for Nitrogen and Methane

RATA testing

As part of a CEMS commissioning, Siemens offers field service support during third-party RATA testing validation of the analyzer installation. RATA testing integrity is of utmost importance, and Siemens takes it seriously.

Customer service

Siemens offers field-proven approaches for process instrumentation and analytics support from a single source, providing you with development continuity and a high level of security. Siemens recognizes that plants must function reliably at all times. Efficient and effective process instrumentation and analytics are an indispensable prerequisite for this, but you also need to be certain of fast and competent service from your supplier.

Siemens is a global company that reacts locally. Siemens specialists are available whether you require consulting or quick delivery and installation of new devices. Our online support system offers rapid, comprehensive assistance around the clock and 365 days a year.

Our services include:

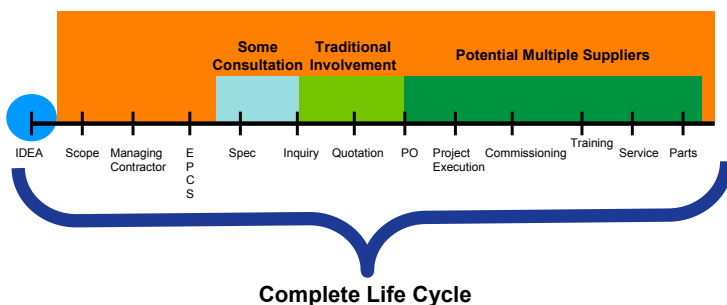
- System and schedule planning
- Complete planning and engineering of the field level
- Specialist consultation on the selection and dimensioning of process instruments and analytics
- System documentation
- Installation, testing and commissioning
- Comprehensive after-sales service around the globe.

Front End Engineering Design (FEED)

The Siemens FEED program reduces project cost and schedule times by:

- Optimizing system configuration for specific site requirements.
- Completing definition and specification of monitoring system requirements to eliminate delays.
- Assuring advantages of duplicate design for all similar systems.
- Ensuring timely delivery of information that is required for submittal of test and quality-assurance plans
- Defining complete installation requirements up front.

The diagram below depicts how the Siemens FEED approach compares to traditional approaches between the vendor and Customer interaction.



Siemens On-Line Technologies

Chemiluminescence CGA (NO_x)

The NO_xMAT analyzer uses the principle of chemiluminescence to analyze the NO or NO_x concentration within the gas sample. In the NO mode, the method is based on the chemiluminescent reaction between ozone and NO and yields nitrogen dioxide (NO₂) and oxygen. This reaction produces light with intensity proportional to the mass flow rate of NO into the reaction chamber. The light is measured by a photodiode and associated amplification electronics. In the NO_x mode, the process is the same except the sample is first routed through the internal NO₂ in the sample to NO. The resulting reaction is then directly proportional to the total concentration of NO_x.

Typical applications include stack gases (CEM), scrubber efficiency, turbine/generator feedback control, process chemical gas analysis, personnel safety, power plant stack de-nitrification, and vehicle emissions.

Flame Ionization CGA (Total Volatile Organic Carbon (VOC))

Regulatory emission monitoring rules frequently require monitoring the total volatile organic carbon (VOC) emission from process flares and vents. The total VOC (C1+) concentration is typically measured as methane and total non-methane hydrocarbons.

The Siemens FIDAMAT analyzer can be used to determine total VOC and, by using a catalyst, methane or total non-methane VOC respectively. Because such an analyzer is used at ppm concentrations and catalysts used for the methane measurement have a limited capacity, the sample from the flare with concentrations in the higher percentage range has to be diluted continuously. A more simple solution, without dilution requirements is used a FID without catalyst for the C1+ measurement and an IR analyzer, optimized for C1 measurement in a background of HCs, for the selective determination of Methane.

Thermal conductivity CGA

Siemens CALOMAT analyzer is a thermal conductivity (TC) based gas analyzer for measuring hydrogen and noble gases. It is designed for use in applications with corrosive gases such as chlorine and offers high measuring range dynamics and short response times.

Process gas chromatography (speciated components)

Siemens Maxum edition II is a modular process gas chromatograph. Its flexibility allows you to reduce costs by configuring a single unit to handle multiple tasks, including analyzing multiple components in complex vapor or liquid

mixtures such as light or heavy hydrocarbons, inert gases, sulfur compounds or raw material pollutants, even at trace levels. It is often deployed for:

- BTU
- HRVOC
- VOC speciated
- H₂S
- TRS
- Total Sulfur
- Wastewater VOC/HRVOC



MAXUM edition II Process GC

Some of the features that make the MAXUM edition II PGC so popular around the world are:

- Reliable technology through many years of experience
- Parallel chromatography for faster analysis, simple configuration and analyzing two or more streams in parallel or simultaneously.
- Airless oven for lower consumption of instrument air and power
- Multiple detector technology including sensitive detectors, such as FID, FPD, Valco's PDID which includes operating modes for HID, ECD and PID for demanding applications; three detector types in one MAXUM edition II possible; multichannel TCD with two, four or eight channels
- Valveless column switching with no moving parts wetted by sample; no maintenance required at all during entire lifetime
- Standard package with dual-EPC and Ethernet (no extra charge)
- Densification capabilities (combining two or three gas chromatographs in one MAXUM) to reduce investment costs

mixtures. For example, it is ideal for the analysis of light hydrocarbons in acetylene, fuel gas analysis, and inert gases such as hydrogen in various recycled gases.

MicroSAM provides significantly lower capital investment and operational costs (capital investment at least 40% lower compared to calorimeter). It includes no maintainable parts and serviced modules are exchanged instead field repaired.



MicroSAM Process GC based on MEMS Technology

Non-Dispersive Infrared CGA

Siemens ULTRAMAT continuous gas analyzer enables highly selective concentration determinations for NDIR-active gases and gas compounds. It measures carbon dioxide (CO₂) and carbon monoxide (CO) for up to four infrared sensitive components. As a low-cost device, it is ideal for environmental monitoring tasks.



ULTRAMAT 23

Process gas chromatograph MicroSAM

Siemens MicroSAM process gas chromatograph is our smallest explosion-proof online process gas chromatograph. Everything you need for separating and detecting a measured sample is integrated into the space of a small platter.

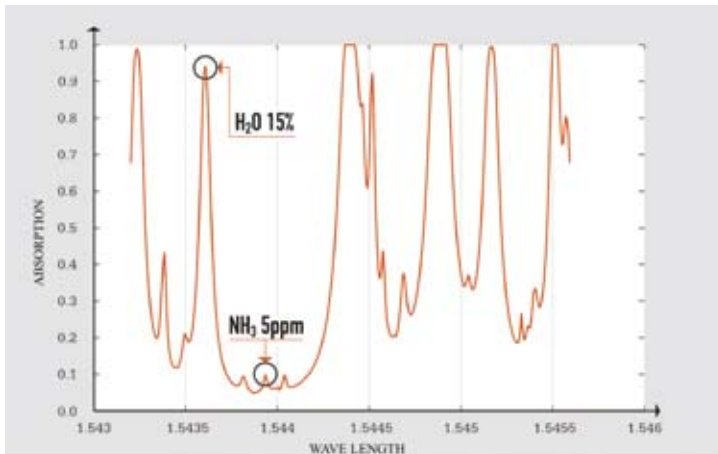
MicroSAM is so compact and sturdy that you can mount it directly at the sampling point, even in the harshest ambient conditions. It analyzes various components in multiple component vapor

Paramagnetic and ZrO₂ CGA (O₂)

Siemens OXYMAT continuous gas analyzer provides paramagnetic oxygen measuring with maximum accuracy. The corrosion-proof design allows analysis of highly corrosive gases, and the absence of moving components affords maximum cost efficiency by minimizing maintenance requirements and maximizing device service life. The optional OXYMAT 64 uses zirconium oxide (ZrO₂) technology to measure the smallest oxygen concentrations in pure gas applications

In-situ Laser diode spectrometer CGA

Siemens LDS 6 is a diode laser gas analyzer with a measuring principle based on the specific light absorption of different gas components. Unlike extractive analyzers, it is able to measure gas temperatures and concentrations directly in a process. Since the bandwidth of the laser light is extraordinarily small, other influences, such as dust and temperature, are easily eliminated using the inherent compensation capabilities of this technique.



LDS 6 is suitable for measuring fast and non-contact gas concentrations or temperatures in process or flue gases (up to 1500°C). Other applications include O₂/temperature, NH₃/H₂O, HF/H₂O, HCl/H₂O, CO/CO₂, low ppm H₂O in process control, De-NO_x optimization, combustion control, emission monitoring and filter optimization.

Some of the CGA's key features include:

- High levels of dust load (up to 100 g/Nm³)
- Streams which are hot, humid, corrosive, explosive or toxic gases
- Harsh environmental conditions at the measuring point
- Applications with widely varying gas compositions
- Measurements carried out in real-time
- Laser light allows single-line spectroscopy free of interferences
- In-situ measurements (no gas sampling required)
- Built-in auto-calibration
- Dynamic dust load compensation
- Selectable range
- Three measuring points simultaneously
- High gas temperatures up to 1500°C.

Flow Meters

The complete flow meter program from Siemens includes Coriolis, electromagnetic, differential pressure-based, positive displacement and inline, as well as clamp-on ultrasonic flow meters for very large to very small pipe diameters. This versatility assures reliability by providing the right measurement method for liquid, steam or gas flow measurement.

Special solutions (for example, in deep sea areas, offshore platforms, pipelines, storage facilities and in custody transfer applications) can be offered as well as a number of more standardized applications.

Level radar technology

Radar technology offers important advantages for level measurement. Non-contacting technology is low maintenance, making radar a cost-effective choice. Because microwaves require no carrier medium, they are unaffected by the process atmosphere (vapor, pressure, dust or temperature extremes).

Siemens offers you a choice of models to meet the specific needs of your application. SITRANS LR level transmitters (200/250/300/400) offer the unique advantage of Process Intelligence, our advanced echo processing technology. Process Intelligence makes our radar instruments faster to install, program and operate. The signal processing provides exceptional accuracy and the ability to automatically ignore obstructions.

Temperature and pressure

The Siemens SITRANS TH100 temperature measurement offers the following features:

- Measures temperature with a linear output signal
- High accuracy across entire ambient temperature range
- Reduces electromagnetic influence (EMI)
- Alarm signal for sensor break or short circuit in accordance with NAMUR 43
- Explosion-protected executions for US, Canada and Europe
- Slim design, ideal for upgrade of installed PT100 probes with a 4 to 20 mA signal
- Rugged design, fully potted electronics.

SITRANS P Series DS III pressure measurement offers these features:

- Extensive diagnostics and simulation functions
- Accuracy $\leq 0.075\%$
- Long-term stability $\leq 0.25\%$ / 60 months
- Wetted parts in stainless steel 1.4571, hastelloy, monel, tantalum, gold
- Measuring range 1 mbar to 400 bar (0.0145 to 5801 psi)
- Wide range of certification and approval, for example, ATEX EEx ia, EEx ib, dust protection, FM, CS
- Settings can be made on-site with an LCD display through the HART® protocol or PROFIBUS PA, Profile 3.0 or Fieldbus Foundation.

SIMATIC NET - Networking for industry

Industrial communication is key to realizing a demand-driven supply chain, increased efficiency and optimized time-to-market. Because Siemens bundles different solutions with SIMATIC NET Networking for Industry, your requirements are always met in an optimal fashion. All the machines in your plant must work as an integrated system for you to meet these objectives. True integration requires open communication linking your automation throughout the company and beyond.

Siemens technology helps you to eliminate isolated applications in automation and in information technology through:

- A seamless flow of information from the sensor/actuator level to the company management level
- Availability of information in any place
- Fast data exchange between plant sections
- Simple, consistent configuration and efficient diagnostics
- Integrated security functions that prevent unauthorized access
- Fail-safe communication and standard communication using the same cable

A Modular Approach

SIMATIC NET represents a versatile portfolio of modules designed for solving tasks efficiently. By configuring appropriate modules, you are able to communicate in different automation areas, across the whole workflow and across the entire life cycle of the plant.

A distributed plant configuration reduces installation overhead, maintenance and diagnostics. Such a configuration makes use of intelligent devices at the local level that interface with one another over networks. Openness and flexibility enable you to easily link different systems and implement expansions.

SIMATIC NET offers many different solutions for industrial communication, including:

- PROFIBUS, the international standard for the field level networking
- Industrial Ethernet, the international standard for area networking
- PROFINET, the international standard based on Industrial Ethernet, which permits real-time communication all the way down to the field level and can even cover the enterprise level
- Industrial Mobile Communication, the flexible use of industrial communications products
- SINAUT, which enables recorded values to be transmitted anywhere within a Wide Area Network
- SCALANCE, this reliable, rugged and secure product range is especially designed to protect the security, flexibility and performance of your industrial communications networks. And most of its modules are ATEX category 3 certified.

Because it is based on international standards such as IEEE 802.11, GSM, GPRS and possibly UMTS in the future, high-speed wireless radio networks can be used. All these features allow companies to make their processes much more efficient.

Totally Integrated Automation

SIMATIC NET is a component of Totally Integrated Automation (TIA), the integrated range of Siemens products and systems for automation. It provides you with comprehensive coverage: horizontally, from inbound to outbound; and vertically, from the field level to the production management level and the ERP level.

Our products are based on market standards, combining user friendliness and reliability with a high degree of future orientation. Employees with outstanding skills, knowledge and professionalism support these high quality components.

With TIA, Siemens is the only supplier to offer an integrated portfolio of products and systems for implementing automation solutions. TIA combines Siemens technology and products with an impressive and unique level of integration into an automation system. This not only reduces the number of interfaces but also ensures maximum data transparency across all levels – from the field, through the production level to the management level. From upstream to midstream and downstream.

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