

SIEMENS
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Analytical Products and Solutions

Flare Measurement

The Perfect Combination – Calorimeter and Process GC
Continuous BTU for fast Fuel and Steam Control
Speciation for fine Control and Quantification

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The objective of the refinery sector rule or the upcoming olefin and chemical sector rule is to satisfy the regulatory requirements with high certainty, lowest cost and a simple and maintainable measurement system. Flare monitoring needs the speed to control the heat value for maximum combustion efficiency and to control auxiliary steam to minimize flare visibility. A combustion calorimeter provides the speed but lacks the desirable component speciation. A Process Gas Chromatograph (GC) provides the speciation to fine tune waste gas composition dependent steam addition, prevents over steaming, locates waste gas source and quantifies emission.

Either technology alone could satisfy the regulatory requirements but does not provide the most reliable and best control scheme. The winning combination are both together. Over many years and hundreds of analyzers installed on flares, the relatively simple, long-term repeatable and reliable measurement systems have been proven successfully. By backing up each other, uninterrupted control and data availability is provided. Known technologies, often with on-site know-how available ensures independent and quick maintainability. A winning combination!



MAXUM II Process GC for Speciated Measurement and CWD2005 Calorimeter for continuous and fast on-line Heat Value Measurement

Continuous Speciated Measurement On-line Process Gas Chromatograph MAXUM II®

Measurement:	H ₂ (<1 min) N ₂ (<1.5min) Air, C1-C3+ (1 min) Air, C1-C4+ (2 min) H ₂ , O ₂ , N ₂ , CO ₂ , C1-C5+ (3 min) H ₂ , O ₂ , N ₂ , CO ₂ , H ₂ S, C1-C5+ (Paraffine & Olefins) (7.5 min)
Related Measurements:	H ₂ S (0-300ppm) (3-5 min) Total Sulfur (3 min) Benzene (4 min)
Measurement Range:	up to 0-100%
Linearity:	99.9% over 5 Magnitudes
Validation:	3-point auto validation
Auxiliary Gas:	H ₂ or He, Control Air
Sample Temperature:	60° C up to 120° C
Uptime:	typical >98.5%
External Standards:	typical 3

- Known technology widely in use
- Reliable and forgiving diaphragm valve
- Robust Thermal Conductivity Detector
- Utilizing known parallel chromatography with simple backflush only simplifies maintenance
- Single Validation cylinder for Low, Mid or High point

Sample Conditioning System (Probe, Sample Transport, Blowback)

Can be common for Process GC and Calorimeter

Design:	Traditional or Smart
Temperature:	60° C up to 120° C
Auto Validation:	Typical 3 inlets

System Integration:	3-sided, Cabinet, Shelter
System Monitoring:	Analyzer System Management

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info.us@siemens.com

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Continuous Heat Value Measurement On-line Calorimeter CWD2005®

Measurement:	BTU (Wobbe Index, Specific Gravity)
Measurement Range:	0-2000 BTU
T90:	20 sec
Linearity:	> 99.5%
Validation:	Zero & Span or 3-point validation
Auxiliary Gas:	Instrument Air
Sample Temperature:	65° C
Uptime:	>99%

- Direct and accurate measurement of Heat Value
- Utilization of "Thermopile" for highest measurement accuracy
- Long term corrosion resistant
- Minimized maintenance even with corrosive refinery gases
- No measurement error due to presence of Oxygen
- No fine orifices that particulates can plug
- Known technology widely in use
- Single point or 3-point Low, Mid and High point validation

The refinery sector and the expected olefin and chemical rule provide analytical options. Calorimeter providing fast waste gas heat value measurement to control heat value in the flare combustion zone and auxiliary steam addition. However, because steam addition depends also on the waste gas composition, Process GC provides the speciation to prevent over steaming.

- The key to reliable long term measurement is simplicity and robustness. Calorimeter and Process GC designs are widely utilized and well known for that.
- Common sample system design based on long time experience together with forgiving injection valves minimizing liquids or steam condensate intrusion greatly reducing prolonged off-line time and loss of data.
- Simplicity and known design enable on-site technicians to perform quick vendor independent maintenance preventing waiting for external support and prolonged down time.
- Only 3 external reference standards minimize operational costs and possibility of erroneous validation.

With hundreds of analyzers on flares, MAXUM® and Calorimeter provide a proven, repeatable and maintainable turn-key analytical flare monitoring system to satisfy the most rigorous regulatory requirements. The simple known analytical solutions are typically maintainable by on-site technicians and utilize 3 external standards only. Complementing speed with speciation, validating and backing each other up to generate uninterrupted results for confident flare control. A winning combination!

For more information, please contact:

Siemens Industry, Inc.
5980 West Sam Houston Parkway North
Suite 500
Houston, TX 77041
Phone: 713-939-7400
Email: ProcessAnalyticsSales.industry@siemens.com
usa.siemens.com/pa-environmental