
ABB MEASUREMENT & ANALYTICS

Refinery flare monitor

Analytical solutions for
40CFR60 subpart Ja



Measurement made easy

ABB offers a proven analytical solution to completely meet your refinery flare monitoring requirements based on our large breadth of application and product expertise within the hydrocarbon processing industry.

- Careful attention to design for operational safety
- Measurement accuracy and reliability to avoid regulatory fines
- Low total cost of ownership

Measure requirements

40CFR60 subpart Ja and 40CFR60.18

The Environmental Protection Agency has issued the final amendments to the source performance standards (NSPS) for process heaters and flares at petroleum refineries and ABB has your solution.

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01 Solutions for environmental regulation compliance for process heaters and flares.

40CFR60 subpart Ja – Total sulfur measurements

- Determine sulfur dioxide (SO₂) emissions from the flare
- Measurement ranges of 1.1 to 1.3 times the Maximum anticipated sulfur concentration

40CFR60 subpart Ja – Hydrogen sulfide (H₂S) measurements

- Determine the hydrogen sulfide (H₂S) in the fuel gas to the flare
- Short-term limit of 162 ppmv as a feed to the flares
- Span value for this measurement is 300 ppmv H₂S

40CFR60.18 – Net heating value

- Maintain a minimum BTU content and measure net heating value to the flare
- 300 Btu/scf or greater if the flare is steam-assisted or air-assisted
- 200 Btu/scf or greater if the flare is non-assisted

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Total sulfur

40CFR60 subpart Ja

The PGC5000 Series of analyzers provides a versatile platform to combine these three measurement requirements in the optimal oven and controller configurations to minimize capital cost, and focus on maximum measurement availability, ease of maintenance, and regulation compliance.

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Satisfy measurement ranges of 1.1 to 1.3 times -- the maximum anticipated sulfur concentration.

Total sulfur measurements – 40CFR60 subpart Ja

ABB's Total Sulfur analyzer, the PGC5007B, employs a field proven combination of hardware and application experience to provide a simple and robust measurement result.

Sample Injection ▶ Oxidation ▶ Separation
▶ Measurement

Application features and benefits

- As simple as a GC can be; one injection valve, one set of columns, one detector, without complex backflush or heart-cut techniques
 - Guaranteed, interference free measurement without matrix, or stream composition, dependencies
 - Sulfur specific detection
- Wide analytical measurement range from 0-100%, to satisfy measurement ranges of 1.1 to 1.3 times the maximum anticipated sulfur concentration.

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Hydrogen sulfide (H₂S) measurements

40CFR60 subpart Ja

PGC5007B oven interior Analyzer model

The PGC5007B is based and built according to ASTM method **D7041-04(2010), Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels, and Oils by Online Gas Chromatography with Flame Photometric Detection**. With hundreds in service around the world, this analyzer method continues to provide the HPI industry the only approved, online analytical method with precision and bias data 2 to 5 times better than any analytical technique for total sulfur measurements. Taking full advantage of this method's years of hardware and method validation, for flares, ABB adjusted only the injection valve type, from a liquid injection to a vapor injection.

Hydrogen sulfide (H₂S) measurements – 40CFR60 subpart Ja

Option 1: PGC5007B (H₂S measurement)

- This is a direct measurement of H₂S in fuel gas with a measurement range of 0-300 ppm
- This analytical method uses a sample injection with back flush and selector to eliminate interference with a flame photometric detector for H₂S.
- Sulfinert treated hardware for chemical inertness and measurement accuracy
- Fuel gas stream isolation from flare gas sulfur excursions
- Zero potential of cross contamination when flare gas sulfur exceeds 300 ppm
- Separate and independent daily validation and CGA audit analyses

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Option 2: PGC5007B Total sulfur analyzer

The EPA has approved the use of a total sulfur analyzer for the H₂S measurement provided it can meet a 0 to 300 ppm measurement range. Since the H₂S content in fuel gas will always be less than the total sulfur reported from the flare gas, this analyzer can also be used to confirm the H₂S measurement.

Measurement can be made using the total sulfur analyzer System designed for the flare gas stream. Due to the broad range of measurement, the Total Sulfur Analyzer above can be used to assess compliance with the short-term 162 ppmv H₂S concentration in the fuel gas.

Both sulfur measurements can be made on a single analyzer. One PGC5007B can satisfy the 0-300 ppm H₂S, and the 1.1 to 1.3 X the maximum anticipated total sulfur requirements.

- Lower overall cost of ownership

Net heating value

40CFR60.18

Analyzer model

PGC5000B (BTU measurement)

There are direct measurements of the hydrocarbons in the fuel gas and a net heating value is calculated from the results.

- Sample injection, hydrocarbon separation and measurement using a multiport TCD
- The measurements are used to calculate the net heating value of the fuel gas stream
- Chromatography designed to eliminate any potential water interferences on the BTU value

- Multiple ASTM methods and GPA calculation packages available
- Common analytical technology and hardware to the PGC5007B total sulfur analyzer
- Complete analytical solution for the entire flare monitoring package
- Parallel method of analysis to the TS application

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Application option	Total sulfur application method	H ₂ S application method	BTU	Ovens
1	Two internally switched ranges) Total sulfur = TS (0 ppm to 5000 ppm) Total sulfur = TS (5000 ppm to 50%) (Other ranges possible to satisfy the 1.1 to 1.3 X requirement)	Directly measured component: H ₂ S (0 to 300 ppm)	Yes	Three B ovens
2	Two Internally switched ranges Total sulfur = TS (0 ppm to 5000 ppm) Total sulfur = TS (5000 ppm to 50%) (Other ranges possible to satisfy the 1.1 to 1.3 X requirement)	Directly measured component: H ₂ S (0 to 300 ppm)	Yes	Dual One C and one B oven
3	Three Internally switched ranges H ₂ S measured as TS (0 ppm to 300 ppm) Total sulfur = TS (300 ppm to 5000 ppm) Total sulfur = TS (5000 ppm to 50%) (Other ranges possible to satisfy the 1.1 to 1.3 X requirement)	Measured as total sulfur Reported H ₂ S (0 to 300 ppm)	Yes	Dual Two B ovens

ABB's Measurement & Analytics Business Unit is part of the Industrial Automation Division. Comprising 16 factories and 34 service support centers located around the world, it employs approximately 4,000 people including over 600 service personnel.

ABB Measurement & Analytics offers a world leading, full scope, digitally enabled portfolio of measurement and analytics products and systems.

Through highly accurate and reliable solutions, ABB Measurement & Analytics optimizes measurement to deliver improved operational efficiency across a broad range of industries including: oil & gas, power, chemicals, pharmaceuticals, pulp & paper, food & beverage, metals & minerals, marine, water & wastewater and satellite-based remote sensing systems.

ABB Measurement & Analytics makes instrumentation and analyzer technology, selection, purchasing, installation, operation, and ownership easy – so customers can focus on their business.

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