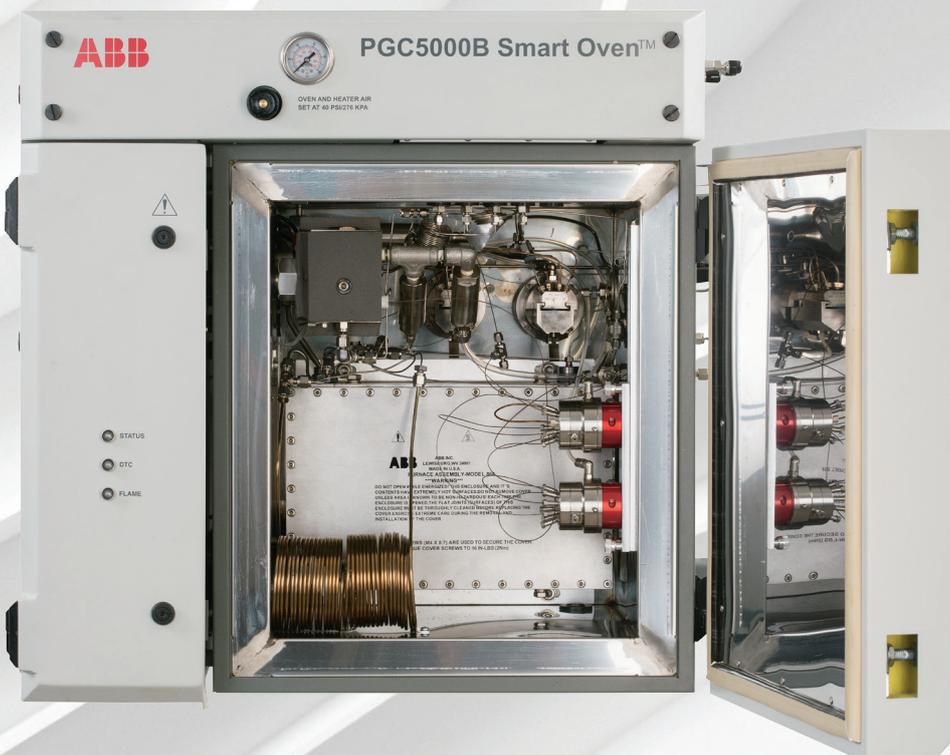


ABB MEASUREMENT & ANALYTICS | DATA SHEET

PGC5007

Total sulfur analyzer



Measurement made easy

Online ASTM method D7041-04

ASTM method approval

- The first and only Total Sulfur Process Analyzer with an online ASTM method
- ASTM D7041-04(2010)

Wide range of streams and measurement levels

- Vapor and liquid samples
- Percent to ppb level measurements

Data and communication

- Designed for the process analytical network
- Industry standards available for Distributed Control Systems (DCS)

Flexible analyzer system configuration options

- PGC5000 Series multiple oven platform
- Extensive I/O options
- Standard modular SHS (vapor and liquid)
- Optional Smart SHS compatibility (vapor and liquid)
- Added to existing PGC5000 series applications

Simplest Total Sulfur application method

- Sample Injection → Oxidation → Separation → Detection

Latest analyzer designs

LSV and vaporizer assembly

- Thermal isolation for sample lines from oxidation furnace temperature
- Prevents unwanted vaporization of liquids with highly volatile components, i.e. gasoline
- Provides improved analysis accuracy

Direct injection for liquid samples

- Provides complete vaporization of heavy samples and ensures complete oxidation in furnace
- Improves analysis on heavy samples
- Improves detection limits and performance for sub-ppm levels
- Eliminates contamination from partially vaporized samples

Oxidation furnace

- Lower furnace temperature requirement
 - 900 °C for complete conversion and longer life expectancy of quartz
- Reliability
- Easier to maintain and more accessible furnace assembly

Flame photometric detector (FPD) with latest photomultiplier tube (PMT) technology

- Smaller compact design saves space for use in the PGC5000B Smart Oven™
- Overall smaller design enhances sensitivity for ppm and ppb sulfur measurements
- Thermo electrically cooled PMT provides superior life expectancy



Fig. 1

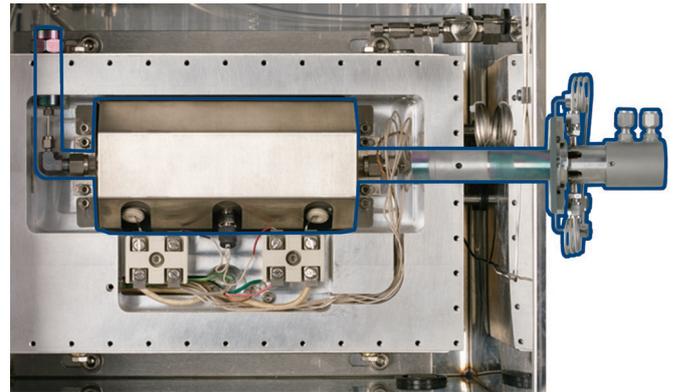


Fig. 2

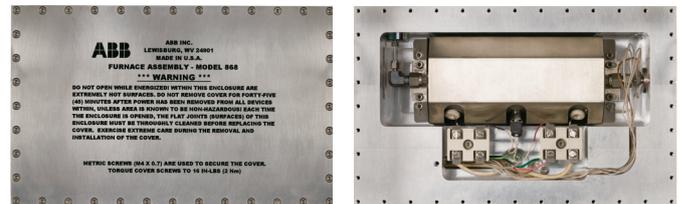


Fig. 3



Fig. 4

ASTM D7041-04(2010)

Precision and bias data

Repeatability and Reproducibility

X mgS/ kg	Gasoline		Diesel	
	Repeatability	Reproducibility	Repeatability	Reproducibility
3	0.53	2.08	0.28	2.63
6	0.53	2.28	0.33	3.15
9	0.53	2.47	0.37	3.5
15	0.53	2.87	0.42	3.99
30	0.53	3.85	0.5	4.78
50	0.53	5.17	0.57	5.45
80	0.53	7.14	0.65	6.16

Application

Description

A fixed volume of sample from the process stream is injected via a sample inject valve. Air transports the sample into the furnace, where it oxidizes the sample to carbon dioxide, water, and sulfur dioxide. These components are separated using packed columns and pass into the FPD, where the trace levels of Total Sulfur are measured.

Method highlights

Sample sweep

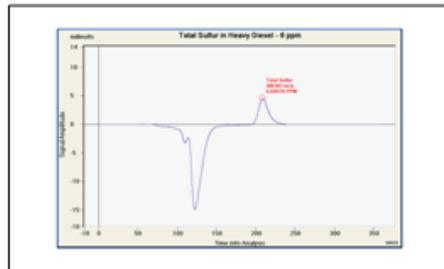
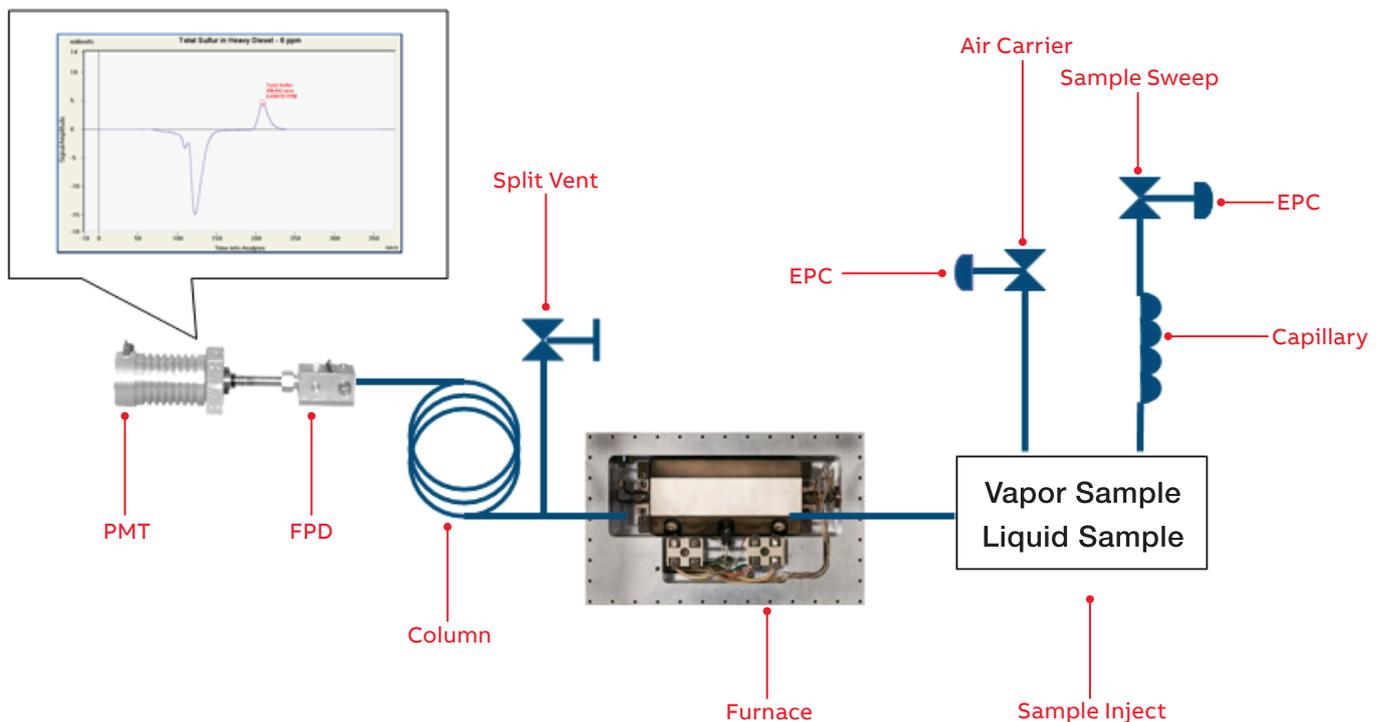
- Results are a matrix independent measurement at the detector
- Guaranteeing interference free measurements
- Insures complete oxidation of the injected sample

Lower oxidation furnace temperature

- Leads to a long life span of the oxidation chamber and heating element

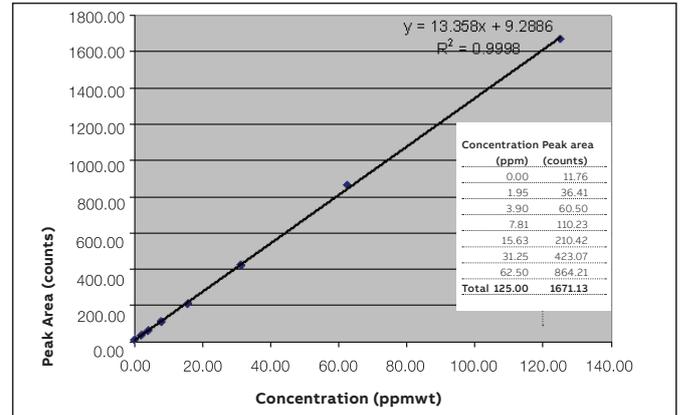
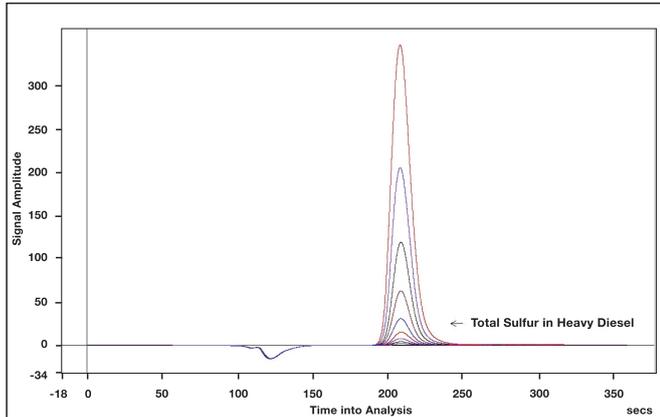
Usage

The PGC5007 performs a Total Sulfur analysis for a range of streams, liquid and vapor, from natural gas to gasoline and diesel. The reaction below demonstrates the conversion of the sample to Total Sulfur for measurement.



Application:

Chromatograms and detector linearity



PGC5007 Oven

Specification

Environmental (enclosure)

Protected from weather: IP 54, (NEMA 3 equivalent)

Ambient temperature range

0 to +50° C (32 to 122° F)

Humidity

95% relative humidity, non-condensing

Dimensions (W x D x H)

596.5 mm x 419.1 mm x 609.6 mm
(23.5 in. x 16.5 in. x 24 in.)

Weight

54.4 kg (120 lb) (minimum, configuration dependent)

Wall

32 mm (1.3 in.) from wall with brackets

Floor

Optional dolly with casters

EMI/RFI considerations:

Conforms to Class A industrial environment

Electrical entries

Left side

Pneumatic entries

Right side

Sample entries

Vapor: right side, 1 each model M2CP

Liquid: right side, 1 each model 791 LSV

Vents

Right side

Safety area classification

CSA / NRTL

Class I, Division 1; Gas groups B, C, D with type Y-Purge

Class I, Division 2; Gas groups B, C, D

Temperature code T3 – T2

ATEX / IEC

Zone 1: CE 0344; II2G, Ex py de IIB+H2 T3 – T2

Zone 2: CE; II3G Ex nA nL de IIB+H2 T3 – T2

CN / KO / RU

Ex px de IIB+H2 T3 – T2

With X-purge power interlock

(Purge wait time)

18 minutes (Class I, Division 1 / Zone 1 area)

Power (hot, neutral, ground)

Voltage

100 to 240 Vac

Frequency

50 to 60 Hz

Power consumption

1,200 Watts startup, 900 Watts steady-state operation
Typical, varies with installed options

Sales



Service



Software



Instrument air

Supply connection

3/8 inch tube, minimum

Supply pressure

414 kPa (60 psig)

Quality

Instrument grade: Clean, oil free and -34° C, (-30° F) dewpoint

Flow rates

Steady state: 127 to 147 l / min (4.5-5.2 ft³ / min) at 20° C
Y-purge types

Analytical detectors

Standard detector

Photomultiplier tube with flame photometric burner block

Isothermal analytical oven

Oven liner

Stainless Steel

Internal dimensions (W x D x H)

327.7 mm x 391.16 mm x 287 mm
(12.9 in. x 15.4 in. x 11.3 in.)

Number of valves

Vapor application: 1 internal vapor sample valve
Liquid application: 1 external liquid sample valve

Columns

Packed

Heat

Forced air

Temperature control method

Closed loop PID

Oven temperature

Ambient +30°C to 180°C
Set to ~ 112° C for total sulfur applications

Setpoint resolution

1°C

Temperature stability

Steady ambient: ±0.1°C
Ambient range: ±1.0°C

Oxidation furnace

Furnace material

Stainless Steel shell over a ceramic core, all enclosed in a flameproof housing

Internal dimensions (W x D x H)

305 mm x 153 mm x 102 mm
(12 in. x 6 in. x 4 in.)

Ceramic core heat

Electric

Temperature control method

Closed loop PID

Furnace temperature

900°C

Gas control

Electronic control method

Closed loop PID; temperature stabilized

Number of zones

1 for air, 1 for burner fuel and 1 for sweep gas

Filtration

2µm at inlet, provided

Inlet pressure

Minimum: Setpoint + 69 kPa (10 psig)
Maximum: 1034 kPa (150 psig)

Range

0 to 100 psig, bubble tight, non-venting

Gauges

Electronic readout: 0.01 psig resolution

Setpoint resolution

0.01 psig

Accuracy

0 to 50 psig: 1.7%
50 to 100 psig: 2.7%

Repeatability:

±0.1 psig

Allowable gasses:

Zero grade air - carrier
Zero grade air - burner air
GC grade H₂ - burner fuel

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