Natural Gas Analysis with Scion 436 Gas Chromatogram

One of the most common analysis in gas chromatography has been the measurement of saturated hydrocarbons in natural gas. Analytical results are turned into properties of the gas, including British Thermal Units (BTU), specific gravity, gallons of gasoline per 1000 cubic feet (GPM), and compressibility (Z). A usual protocol often employed for this analysis is GPA Standard 2261-00[1], with fixed gas loop injection, separation by packed columns, and detection with thermal conductivity detector. Calculations follow procedures listed in GPA Standard 2172-09.

The Scion 436 Gas Chromatograph is the perfect instrument for this measurement. It is small and compact, possesses high performance, and can be fully controlled from a remote location. Hardware includes required valving, required columns (configured per method mandates), and thermal conductivity detector. Workstation provides single method for full control of all operating parameters of gas chromatograph, data collection, and report generation of analytical report. Gas chromatograph can be remotely located away from workstation with TCP/IP Ethernet protocol communications.

[1] Gas Processor Association, 6525 East 60th Street, Tulsa, Oklahoma 74145, http://ihsmarkit.com/products/gpa-standards.html

Representative Report:

Date Analyzed:	**8/25/2018**
Lab Run No.:	H63524

LOCATION:	Well 3	**DATE SAMPLED:**	8/22/2018
REQUESTOR:	**GT**	**DATE RECEIVED:**	8/24/2018
METER NO.:	4251	**GAS TEMP. (°F):**	60
FORMATION:	----------	**GAS PRESSURE (psig):**	42
SAMPLE PT.:	Produced Gas	**SAMPLED BY:**	HT

ANALYTICAL RESULTS

GAS ANALYSIS

	MOL %
Air	3.11
Methane	80.77
Carbon Dioxide	1.97
Ethane	7.25
Propane	4.27
I-Butane	0.81
N-Butane	1.05
Neo-Pentane	0.20
I-Pentane	0.30
N-Pentane	0.24
C6+	0.30
TOTAL:	**100.00**

GROSS HEATING VALUE (BTU/SCF)

	14.65 DRY	14.73 DRY
Calculated (Real)	1160.7	1180.8

SPECIFIC GRAVITY

Calculated (Real)	0.6998

OTHER

GPM at 14.65	18.34
Z (dry gas)	0.9968

REMARKS:

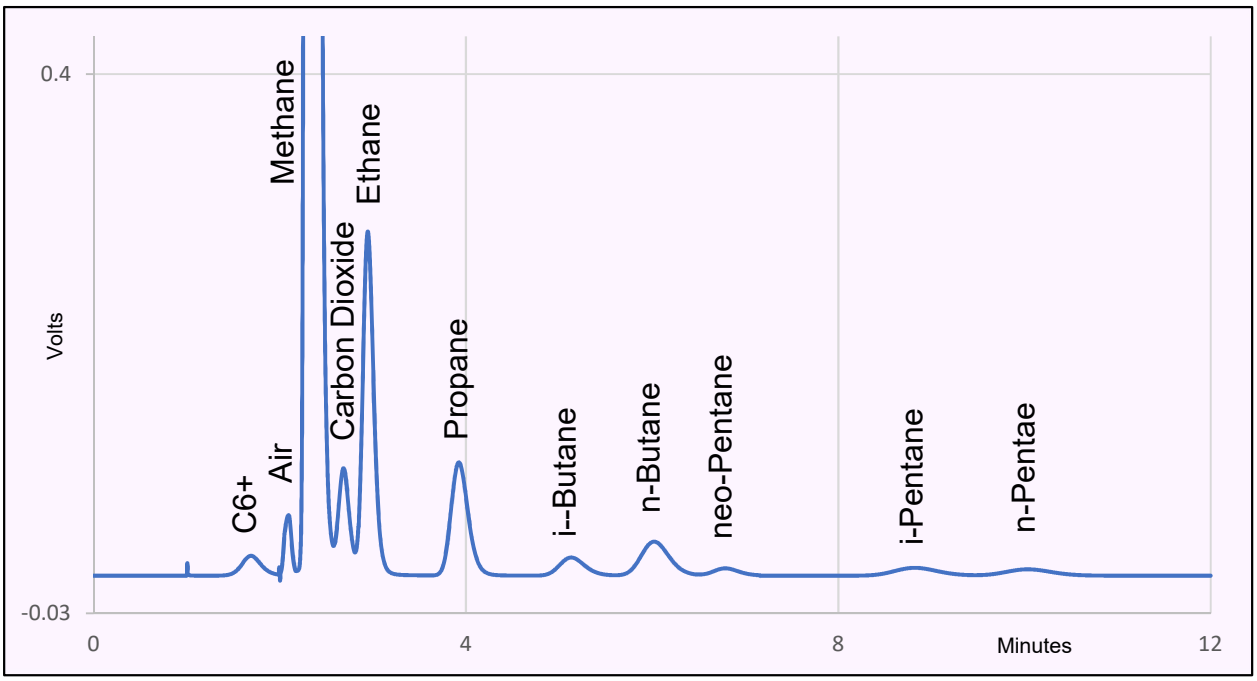
Gas Sampling Method: GPA 2166 / API 14.1 Section 1

Gas Analysis Method: GPA 2261-00

ANALYZED BY:

APPROVED BY: Randall Blanchard

Supervisor, Laboratory Services



Typical chromatogram for Natural Gas, following GPA Standard 2261-00.

Chromatographic Conditions:

Column: Silicone DC 200/500, 30 wt %, 10 m x 1/8 in. OD,
plus 0.5 m x 1/8 in. OD plumbed as foreflush and backflush to detector
Column temperature: 80.0 ºC
Flow: 20 ml/min Helium
Sample Size: 0.25 ml
Detector: TCD
Range 0.5
Block Temperature 150.0 ºC
Filament Temperature: 220.0 ºC

Specifications

Scion 436 Gas Chromatograph

Size: Height 57 cm, Width: 32 cm, Depth: 61 cm, Weight: 26.8 kg
Environmental Conditions:
- Operating temperatures: 10 °C to 40 °C
- Operating humidity (relative): 5% to 95%
- Line voltage requirements: 230 V ± 10% nominal

Column Oven:
- Dimensions: 23 cm (w) x 11 cm (d) x 28 cm (h)
- Temperature range: ambient + 4 °C to 450 °C

Local Display:
- TFT full color screen
- WVGA resolution (800 x 480)
- Size 23 cm

Certifications
- CSA: C22.2 61010-1
- UL 61010-1
- IEC: 61010-1
- EMC: 47 CFR part 15
- ANSI C63.4
- EN 61326

TCD Thermal Conductivity Detector
- Maximum temperature: 450 °C
- Detectivity: 300 pg/mL (Butane)
- Linear dynamic range: 10^6
- Operating Mode: constant mean temperature
- Display of %Balance for troubleshooting
- Range Selection: 0.05, 0.5 and 5

Valving: Valco valves, actuated with universal electric actuators time-programmed through master method, includes operator selection of sample or standard without hardware changes, and sample loop vent to stabilize injection loop pressure.

Data Collection, System Control and Communication
- Ethernet: Protocol: TCP/IP
- Data rate: 100 Mbps
- Control: GC control and method parameters
- Data Processor: Windows 10/32 bit, Intel Core i5 7400 3 GHz, 4 gB memory, 1 tB solid state drive, DVDRW, keyboard, mouse, 27” LCD monitor.
- Natural Gas Report: Mol%, BTU, Specific Gravity, GPM, Compressibility Factor

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