

Liquified Petroleum Gas Analysis

HPI

SIMPLY SMART SOLUTIONS

jas Analyzer

JAS Liquified Gas Analysis

LPG Analyzer according to ASTM D2163, EN27491, ISO7941 & UOP373

Introduction

LPG is synthesised by refining petroleum or "wet" natural gas, and is usually derived from fossil fuel sources, being manufactured during the refining of crude oil, or extracted from oil or gas streams as they emerge from the ground. It was first produced in 1910 by Dr. Walter Snelling, and the first commercial products appeared in 1912.

It currently provides about 3% of the energy consumed, and burns cleanly with no soot and very few sulfur emissions, posing no ground or water pollution hazards. LPG has a typical specific calorific value of 46.1 MJ/kg compared with 42.5 MJ/kg for fuel-oil and 43.5 MJ/kg for premium grade petrol (gasoline). However, its energy density per volume unit of 26 MJ/l is lower than either that of petrol or fuel-oil.

Fast and accurate measurement of the composition of LPG and calculated physical properties is demonstrated using a JAS LPG Analyzer.

The JAS Liquified Gas Analyzer measures the individual components and calculates physical properties such as specific gravity and heating value in approximately 6 minutes independent of type of LPG. The system can be equipped with an LSV with a pressure station for repeatable results and with GSV and a Vaporizer for the LPG in gas phase. A heated transfer line is part of the vaporizer to prevent condensation of heavier hydrocarbons.



JAS LPG Analyzer based on Agilent Platform

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JAS Vaporizer

JAS LPG vaporizer can be easily connected to the LPG analyzer and to any Gas Analyzer.

General specifications :

- Vaporizer temperature: 55 – 155 °C
- Heated transfer line temperature: 70 °C
- Heated transfer line length: 1.5 m
- Max inlet pressure: 413 bar (6000 Psig)
- Max outlet pressure: 25 bar (360 Psig)
- Connectors: Swagelok quick connector
- Power supply: 110 V / 220 V
- Size: L x W x H (mm): 360 x 225 x 260

Components of interest

- Methane
- Ethane
- Ethylene
- Acetylene
- Propane
- Propylene
- Cyclopropane
- Propadiene
- Isobutane (2-methyl Propane)
- n-Butane
- 1-Butene
- Iso-Butylene (2-methyl Propene)
- Trans-2-Butene
- Neopentane (2,2-Dimethylpropane)
- Cis-2-Butene
- Cyclo pentane
- 1,3-Butadiene
- Isopentane
- n-Pentane
- 1-Pentene *
- Propyne (methyl acetylene)
- Cis-2-Pentene *
- Trans-2-Pentene *
- 2-methyl-2-Butene *

* The components can be separated, but are reported as C5+ with a back flush valve



JAS LPG Vaporizer

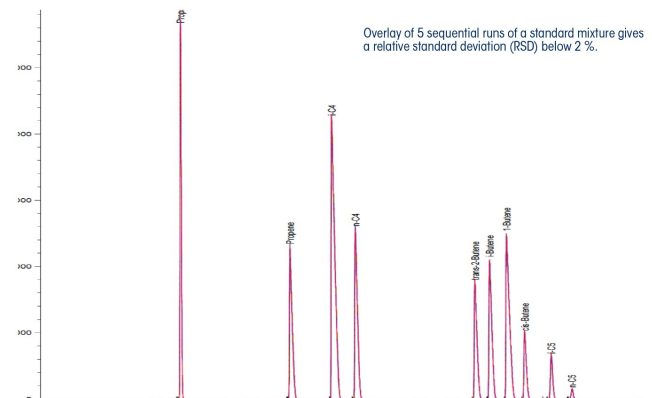


Figure 1. Example chromatogram

JAS GAS Report Generator is an ease to use software with capability to customize calculations add and change physical property calculation metering constants: Temperature, pressure and other parameters.

| Calc# | Compound | Molecular Weight | Summation Factor | Gross Calorific Value MJ/kg | Gross Calorific Value MJ/kg | Gross Calorific Value MJ/kg | Lower Specific Gravity @15°C | Pres |
|-------|------------------|------------------|------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|---------|
| 01 | Hydrogen | 2.0159 | 0.0048 | 12.1020 | 286.15 | 141.9500 | 0.00000 | 0.00000 |
| 04 | Carbon Monoxide | 28.0104 | 0.0224 | 11.9620 | 282.31 | 10.1000 | 0.00000 | 0.00000 |
| 05 | Carbon Dioxide | 44.0098 | 0.0168 | 0.0000 | 0.00 | 0.0000 | 0.01000 | 0.01000 |
| 06 | Oxygen | 31.9988 | 0.0263 | 0.0000 | 0.00 | 0.0000 | 0.00000 | 0.00000 |
| 07 | Nitrogen | 28.0135 | 0.0173 | 0.0000 | 0.00 | 0.0000 | 0.00040 | 0.00040 |
| 08 | Hydrogen Sulfide | 34.0819 | 0.1000 | 23.7000 | 562.39 | 16.5000 | 0.00140 | 0.00140 |
| 09 | Ethane | 30.0690 | 0.0080 | 59.7000 | 1432.11 | 92.3000 | 0.25600 | 0.25600 |
| 10 | Methane | 16.0428 | 0.0447 | 37.7000 | 891.58 | 55.5140 | 0.30000 | 0.30000 |
| 11 | Acetylene | 26.0390 | 0.0027 | 95.0400 | 1301.37 | 49.9000 | 0.41900 | 0.41900 |
| 12 | Propylene | 42.0780 | 0.1260 | 57.0000 | 2093.43 | 40.9400 | 0.52240 | 0.52240 |
| 13 | Propadiene | 40.0648 | 0.1304 | 62.2000 | 1943.96 | 46.5300 | 0.60000 | 0.60000 |
| 14 | Methylacetylene | 40.0648 | 0.1304 | 62.2000 | 1943.96 | 46.5300 | 0.62000 | 0.62000 |
| 17 | n-Butane | 58.1206 | 0.1769 | 114.9400 | 2768.20 | 40.2700 | 0.61190 | 0.61190 |
| 18 | i-2-Butene | 56.1080 | 0.1671 | 114.9600 | 2771.90 | 40.3300 | 0.62900 | 0.62900 |
| 19 | 1-Butene | 56.1080 | 0.1732 | 114.9600 | 2778.70 | 40.4000 | 0.60200 | 0.60200 |
| 20 | Ethane | 30.0690 | 0.0802 | 66.0700 | 1562.14 | 51.9000 | 0.29200 | 0.29200 |
| 21 | 1,3-Butadiene | 54.0900 | 0.1703 | 107.9000 | 2542.10 | 41.9000 | 0.62720 | 0.62720 |
| 30 | Propane | 44.0970 | 0.1338 | 93.9400 | 2221.10 | 50.3700 | 0.50700 | 0.50700 |
| 40 | n-Butane | 58.1204 | 0.1671 | 121.7900 | 2879.76 | 49.9500 | 0.58807 | 0.58807 |
| 42 | i-Butane | 56.1080 | 0.1703 | 114.8900 | 2760.00 | 49.1000 | 0.60100 | 0.60100 |
| 43 | i-Butane | 58.1204 | 0.1789 | 121.3778 | 2870.58 | 49.3900 | 0.56200 | 0.56200 |
| 50 | n-Pentane | 72.1500 | 0.2010 | 149.8800 | 3536.60 | 49.6800 | 0.62010 | 0.62010 |
| 51 | i-Pentane | 72.1500 | 0.2080 | 149.2311 | 3521.70 | 49.0300 | 0.62490 | 0.62490 |
| 52 | Neopentane | 72.1500 | 0.2121 | 148.7385 | 3517.40 | 48.7600 | 0.59600 | 0.59600 |
| 60 | C5+ C5n | 72.1500 | 0.2010 | 148.8229 | 3538.60 | 48.7200 | 0.00000 | 0.00000 |

Additional LPG calculations can be implemented like:

- ASTM D2598 MON, Relative Density and Vapor pressure
- ISO 8973 Density, Vapor pressure at different temperatures
- Shilling Density

Features and Benefits

- Available on 8860 and 8890 Agilent GC
- JAS Report Generator software Compatible with Agilent OpenLab Chemstation
- Sampling Valve for repeatable sample introduction
- Application delivered factory-tuned for the methods specified by the customer
- Complete range of Sample Introduction Systems: GSV, LSV, Vaporizer
- Certified calibration gases included to assure precision and repeatable results
- Cost-effective design allows combining two analyzers in one GC
- Fully integrated with proven Agilent technologies
- Cover complete range of petroleum products and standardization methods
- Expertise: JAS is 25 years Agilent Value Added Reseller
- Fast Delivery
- Applications meet and exceed the reproducibility of the ASTM specifications
- One year Application and hardware guarantee
- Installation and familiarization on-site by a qualified support engineer
- Dedicated turnkey analyzers for chemical and petrochemical applications available



UNIS S/SL Inlet, low body mass and homogenous heated inlet for sharp, gaussian peaks