



LNG Quality Analysis

μ PGC Process Gas Chromatograph



- NMI Certified
- OIML R140
- MID 2014/32/EU
- WELMEC 7.2
- EN 16726:2025
- EN ISO 23306:2020



1 Introduction

■ Analysis

Liquefied Natural Gas (LNG) is experiencing unprecedented growth globally. According to the International Energy Agency, LNG export capacity will increase by approximately 300 billion cubic meters/year by 2030, with the United States and Qatar as the main drivers of this expansion. This boom requires advanced analytical instrumentation to ensure quality, safety, and compliance in regasification, storage, marine bunkering, and custody transfer operations.

The μ PGC from SRA Instruments is an online process gas chromatograph designed specifically for the qualitative and quantitative analysis of LNG, with international me-

trological certifications for fiscal and commercial applications.

LNG Market Outlook 2025-2030

- **Global capacity:** +54% by 2030 (IEA)
- **New projects:** 301 LNG projects (124 liquefaction, 177 regasification)
- **Growth markets:** Asia-Pacific, Europe, Southeast Asia
- **Opportunities:** Equipment for custody transfer and energy billing.



2 Technical Features

■ Analytical Configuration

- **Technology:** Modular process gas chromatograph based on **Agilent μ GC technologies**.
- **Detector:** TCD (Thermal Conductivity Detector) universal for all natural gas components.
- **Carrier Gas:** The metrologically certified version **uses helium (He) as the sole carrier gas** to ensure repeatability and stability in fiscal measurements.
- **Modularity:** Up to 4 configurable analytical channels for optimal separation of hydrocarbons, permanent gases, and impurities.

■ LNG Sampling System

- **Integrated Gasification System:** Controlled vaporization of LNG while preserving the original composition for stable and representative samples.

■ ATEX Certification

- **ATEX Zone 1:** ATEX II 2G Ex db IIB+H2 T5 certification for installation in potentially explosive atmosphere.

■ Analytical Capabilities

- **Comprehensive range:** C₁-C₆⁺ hydrocarbons, inert gases (N₂, CO₂), hydrogen (H₂) for advanced mixtures and hydrogen blending
- **Automatic calculation:** PCS/PCI, density, Wobbe index, Z-factor according to ISO 6976.



4 Applications in the LNG Sector

Regasification Terminals

Continuous monitoring of the composition, PCS, density, and quality of regasified gases according to the ARERA Code and European regulations to ensure contractual compliance and operational safety.

Naval Bunkering (Ship-to-Ship)

Certified monitoring of supplied LNG fuel before transfer, with fiscal measures valid for custody transfer and commercial documentation.



3 Metrological Compliance

■ International Compliance for Fiscal Measurements and Custody Transfer

NMi

Approval by NMI (Nederlands Meetinstituut)
Dutch metrological body recognized at European level for the certification of measuring instruments intended for fiscal and commercial transactions.

OIML R140

Compliant with OIML R140:2007
International recommendation for natural gas measuring systems used for the determination of calorific value and for fiscal transactions (custody transfer).

MID

Directive 2014/32/EU (Measuring Instruments Directive)
European directive harmonizing the requirements for measuring instruments intended for commercial and fiscal transactions in the energy sector.

WELMEC 7.2

WELMEC 7.2 Compliant software
European technical guide for software for measuring instruments subject to legal metrological control (MID 2014/32/EU), ensuring data integrity, protection, and traceability.

Storage and Boil-Off Gas

Continuous analysis of boil-off vapors to optimize recovery, recompression, or use in turbines, maximizing the plant's energy efficiency.

Production and Liquefaction

Verification of the quality of the mixture exiting the liquefaction plants to ensure contractual specifications and optimize refrigeration processes.

Custody Transfer and Energy Billing

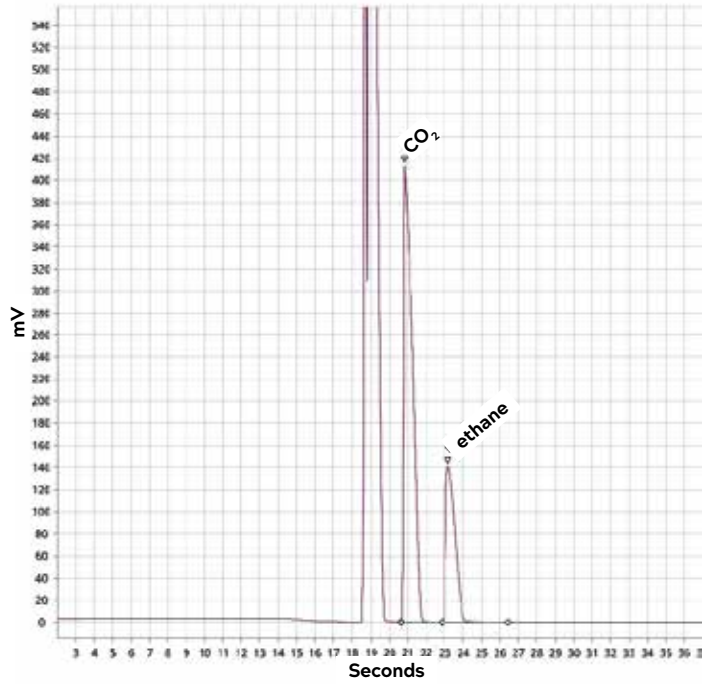
Certified determination of calorific value for commercial transactions, energy billing, and compliance with international tax regulations. ISO 6976 - Calculation of calorific value, density, and Wobbe index.



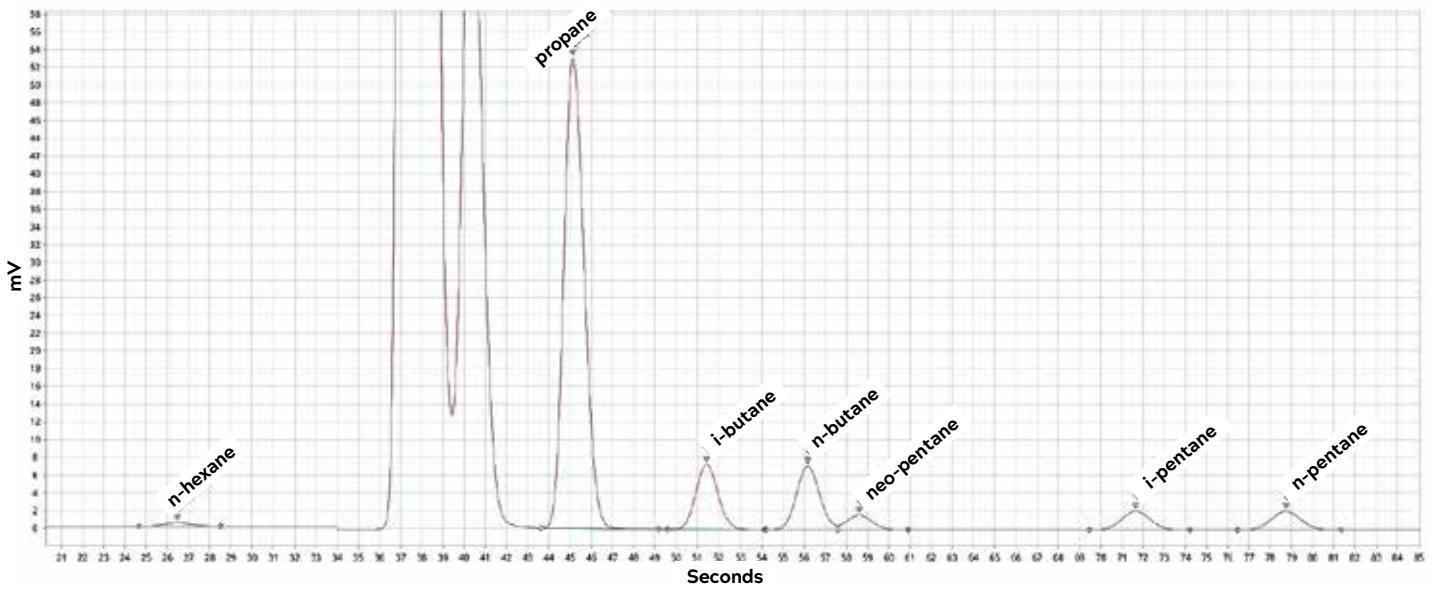
5 Analytical Ranges

Component	Range (mol%)
Methane (CH ₄)	60 - 100
Ethane (C ₂ H ₆)	0.05 - 20
Propane (C ₃ H ₈)	0.01 - 8
Butanes (n/i-C ₄ H ₁₀)	0.01 - 1
Pentanes (n/i-C ₅ H ₁₂)	0.005 - 0.6
n-Hexane (C ₆ H ₁₄)	0.003 - 0.5
Hydrogen (H ₂)	0.01 - 20
Nitrogen (N ₂)	0.05 - 20
Oxygen (O ₂)	0.02 - 0.4
Carbon Dioxide (CO ₂)	0.05 - 15

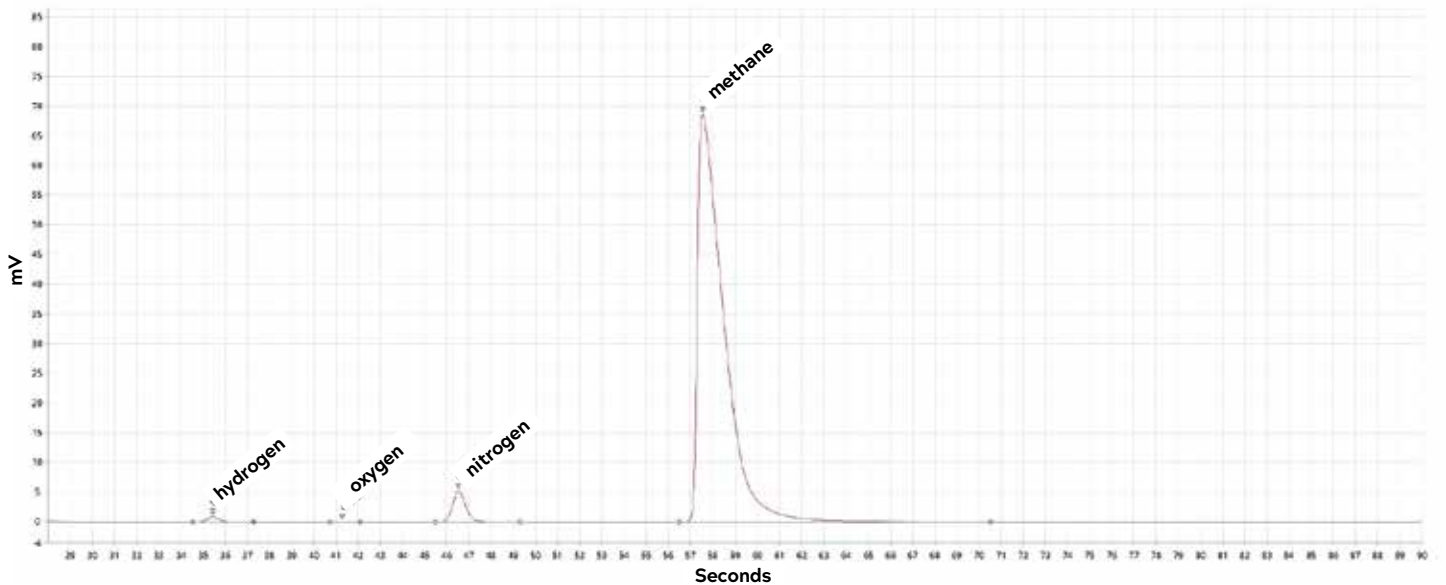
Carbon Dioxide, Light Hydrocarbons (Ethane, Propane)



Butanes (C₄), Pentanes (C₅), and Hexanes (C₆)



Permanent Gases (Hydrogen, Oxygen, Nitrogen, Methane)





6 Conclusions

In a rapidly expanding global LNG market (+54% capacity by 2030 according to the IEA), with over 300 new liquefaction and regasification projects planned, the μ PGC represents the ideal solution for ensuring quality, compliance, and profitability in LNG operations.

Competitive Advantages

Continuous Online Analysis

Real-time monitoring of LNG composition, reducing operational risks and improving the efficiency of regasification, storage, and bunkering processes.

ATEX Zone 1 Operational Safety

Can be installed directly in potentially explosive atmospheres, eliminating the need for sample transport to the laboratory and reducing HSE risks.

Maximum Analytical Versatility

Modular configuration with TCD detector for complete analysis of C₁-C₆⁺ hydrocarbons, permanent gases (O₂, N₂, CO, CO₂), hydrogen (H₂), and the option of dedicated columns for impurities (H₂S, COS, mercaptans).

Integrated Gasification

Controlled LNG vaporization system that ensures stable, representative, and repeatable samples while preserving the original composition.

Full SCADA/DCS Integration

Digital communication (Modbus), automatic reporting, configurable alerts, and full integration with process control systems.

This unique combination of technical precision, international metrological certifications, operational safety, and ease of integration makes the μ PGC the reference instrument for regasification terminals, LNG storage, marine bunkering, production, and custody transfers in the global energy sector.

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