

Industrial

Thermo Scientific Gas Chromatograph Analyzers

Refinery Gas Analyzer (RGA)

Overview

Refinery Gas Chromatography Analyzers (RGA) are essential in the petrochemical industry for analyzing the composition of refinery gases—as by-products of crude oil refining processes—including a mixture of light hydrocarbons, permanent gases, and sulfur compounds. Accurate analysis of these components is crucial for quality control, process optimization, and compliance with environmental regulations.

Based on a three-channel configuration, the Thermo Scientific™ TRACE™ 1610 RGA Analyzers offer different solutions for quantitative determination of individual components in refinery process gases, liquefied petroleum (LP) gases, and mixtures of propane and propene, excluding high-purity propene in the range C1-C5.

- **Channel 1 (TCD-1):** Permanent gases (PG) (except for H₂, CO₂, and H₂S), with helium as carrier gas
- **Channel 2 (FID):** Hydrocarbons (C1-C5/C6+), with helium as carrier gas
- **Channel 3 (TCD-2):** Hydrogen/helium (H₂/He), with nitrogen as carrier gas

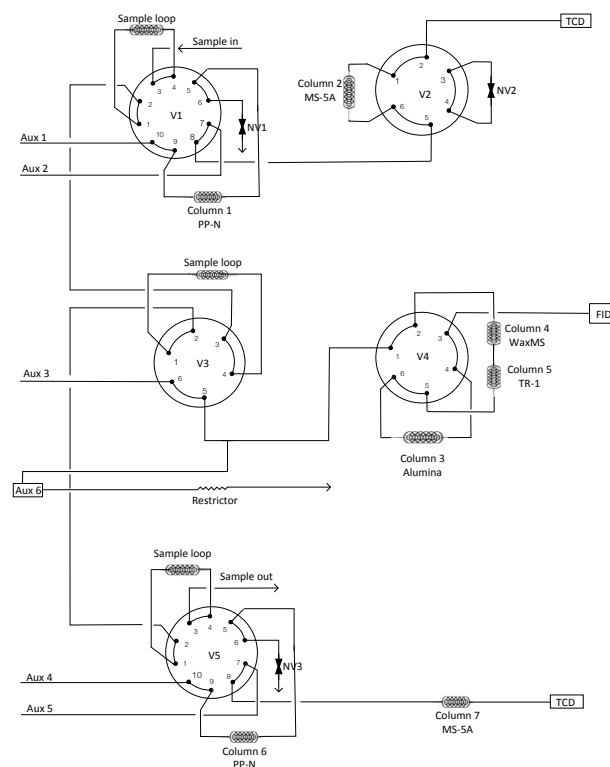


Figure 1. Schematic plumbing of the 3-channel RGA configuration, for C1-C5/C6+, permanent gases, H₂/He, CO₂, H₂S.

Key features and benefits

- **Enhanced efficiency and throughput:** The TRACE 1610 RGA analyzers can provide Fast RGA analysis (run time <9 min), reducing turnaround times and increasing productivity. Operations are simplified through the full control with the Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS).
- **Comprehensive analytical capabilities:** With configurations that meet various industry standards (ASTM, UOP, ISO), these analyzers provide detailed compositional data, fitting different needs and requirements and ensuring comprehensive monitoring of refinery processes.
- **Ease of maintenance and reliability:** The innovative Thermo Scientific™ iConnect™ modularity of the GC, along with the spacious and easily accessible auxiliary oven, minimize downtime and maintenance efforts. The robust design ensures reliable performance, reducing the need for frequent interventions.
- **Inertness and robustness:** Dedicated configuration with inert plumbing and valves allows reliable detection and quantitation of sulfur compounds at lower levels.

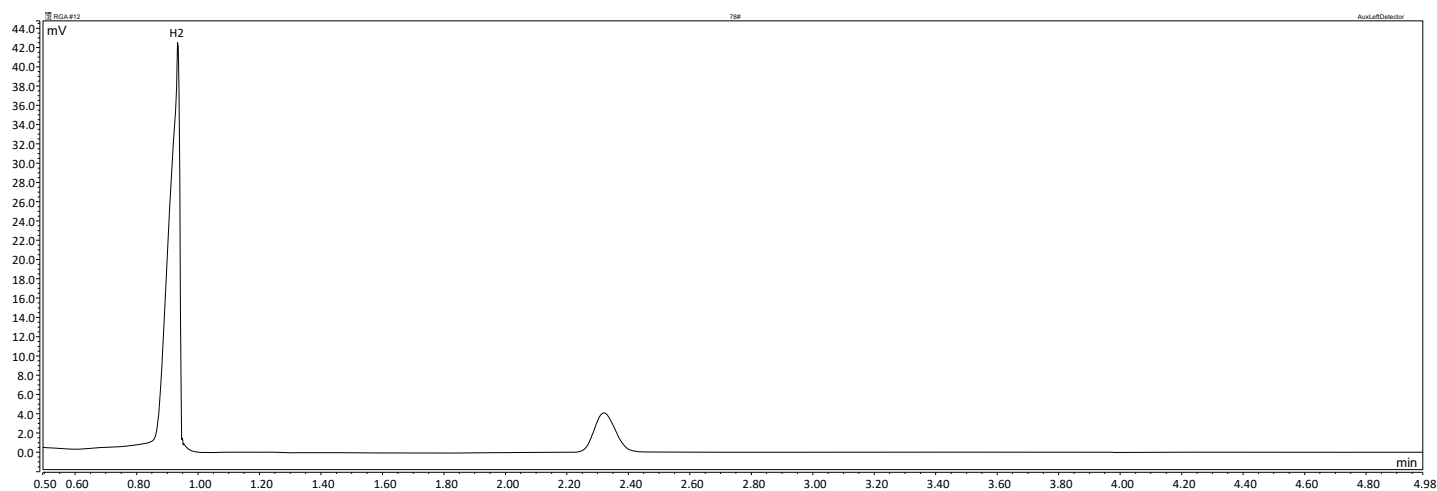


Figure 2. Channel 1 (TCD) chromatogram: H₂ analysis.

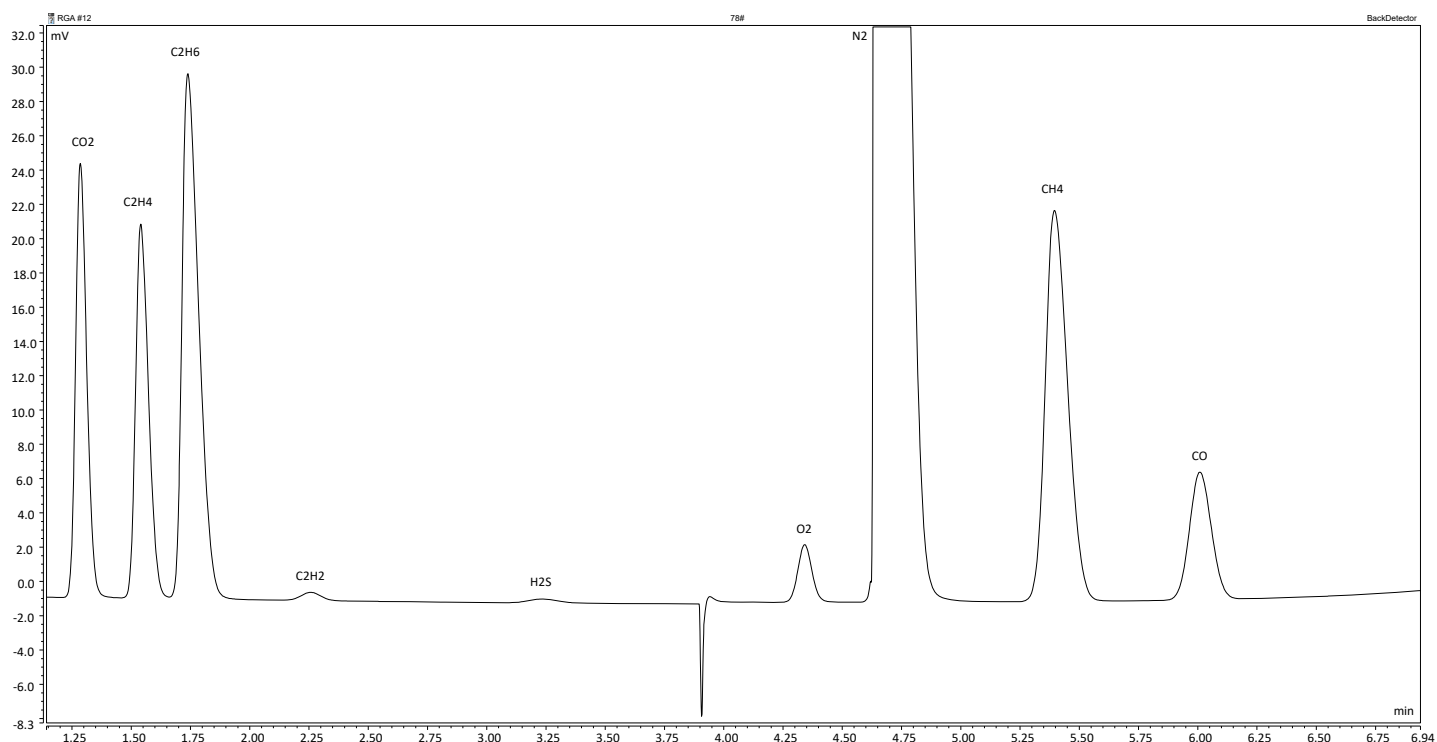


Figure 3. Channel 2 (TCD) chromatogram: Permanent gases, CO₂, and H₂S.

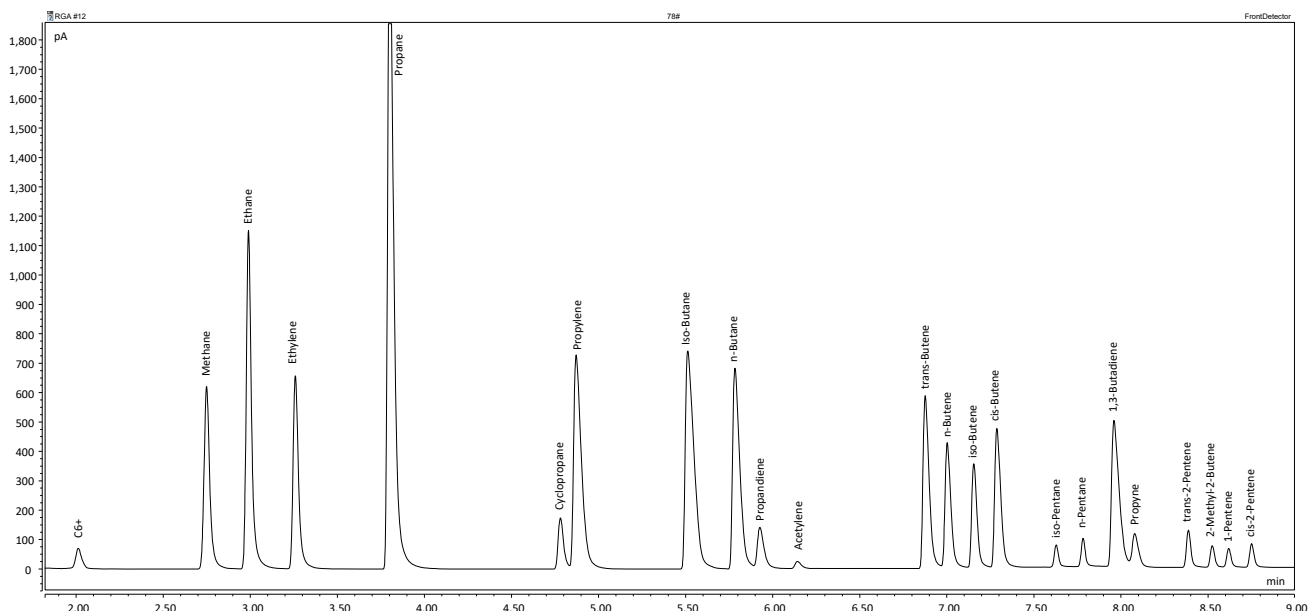


Figure 4. Channel 3 (FID) chromatogram: Hydrocarbons C1-C5/C6+.

The TRACE 1610 RGA analyzers are designed to meet the diverse needs of refinery gas analysis with multiple configurations. The analyzers feature a two-oven design, with a temperature-programmable GC oven and an independent isothermal valve oven, optimizing column management and sample turnaround times. The analyzers are equipped with multiple detector options, offering flexibility to handle a wide range of analytical requirements with accurate and reliable data for refinery gas analysis.

Extended configurations with four-channel setup are available to include additional analytical requirements.

An optional SSL injector module is also available in the configuration, ensuring high performance for liquid samples handling.

Each system is pre-configured and factory-tested to ensure it meets industry standards and is ready for immediate use.

Refer to Table 1 for a comprehensive list of available RGA analyzer configurations.

In summary, the Thermo Scientific TRACE 1610 RGA analyzers offer a robust, efficient, and versatile solution for the comprehensive analysis of refinery gases, ensuring high performance and reliability in demanding industrial environments.

Table 1. TRACE 1610 RGA analyzer configurations.

Cat. No.	Description	Channels	Detection limit	Working range	Methods compliance
REFG16030111	RGA C1-C8, permanent gas, He, CO ₂	Ch 1 (TCD) – H ₂ , He Ch 2 (TCD) – PGA, CO ₂ Ch 3 (FID) – C1-C8	H ₂ , He – 10 ppm PGA – 100 ppm CO ₂ – 100 ppm HCs – 0.5 ppm	0.1% to 100% v/v	ASTM D1946
REFG16030121	RGA C1-C5/C6+, permanent gas, He, CO ₂	Ch 1 (TCD) – H ₂ , He Ch 2 (TCD) – PGA, CO ₂ Ch 3 (FID) – C1-C5, C6+	H ₂ , He – 10 ppm PGA – 100 ppm CO ₂ – 100 ppm HCs – 0.5 ppm	0.1% to 100% v/v	ASTM D1946 ASTM D7833 UOP 539
REFG16030131	RGA C1-C5/C6+, permanent gas, He, CO ₂ , H ₂ S	Ch 1 (TCD) – H ₂ , He Ch 2 (TCD) – PGA, CO ₂ , H ₂ S Ch 3 (FID) – C1-C5, C6+	H ₂ , He – 10 ppm PGA – 100 ppm CO ₂ – 100 ppm HCs – 0.5 ppm H ₂ S – 25 ppm	0.1% to 100% v/v	ASTM D1946 ASTM D7833 UOP 539
REFG16040141	RGA C1-C5/C6+, permanent gas, He, CO ₂ , H ₂ S and extended HC analysis	Ch 1 (TCD) – H ₂ , He Ch 2 (TCD) – PGA, CO ₂ Ch 3 (FID) – C1-C5, C6+ Ch 4 (FID) – C1-C16	H ₂ , He – 10 ppm PGA – 100 ppm CO ₂ – 100 ppm HCs – 0.5 ppm	0.1% to 100% v/v	ASTM D1946 ASTM D7833
REFG16040151	RGA C1-C5/C6+, permanent gas, He and low CO/CO ₂	Ch 1 (TCD) – H ₂ Ch 2 (TCD) – PGA, CO ₂ Ch 3 (FID) – C1-C5, C6+ Ch 4 (Methanizer-FID) – Low CO & CO ₂	H ₂ , He – 10 ppm PGA – 100 ppm CO, CO ₂ – 0.5 ppm HCs – 0.5 ppm	0.1% to 100% v/v	ASTM D1946 UOP 603
REFG16040161	RGA C1-C5/C6+, permanent gas, He, CO ₂ and sulfur compounds	Ch 1 (TCD) – H ₂ Ch 2 (TCD) – PGA, CO ₂ , H ₂ S Ch 3 (FID) – C1-C5, C6+ Ch 4 (FPD) – Sulfur speciation	H ₂ , He – 10 ppm PGA – 100 ppm CO ₂ – 100 ppm HCs – 0.5 ppm H ₂ S – 25 ppm Sulfur compounds – 0.3 ppm	0.1% to 100% v/v Up to 0.1% v/v for sulfur	ASTM D1946 ASTM D6228
B51004500	Sulfur gases analyzer with PFPD	Single-channel PFPD for low levels of sulfur compounds	Sulfur compounds – 0.05–0.1 ppm	Up to 50–100 ppm v/v	ASTM D6228

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