

PROCESS RAMAN

Replace aging Gas Chromatographs with an affordable, data-rich, and reliable ALTERNATIVE

WHAT IS RAMAN?

Raman spectroscopy is an optical analysis technique. It relies on the measurement of the vibrational properties of molecules. Raman has revolutionized process analysis with its high-resolution compositional data, linear response to concentration, non-destructive nature, ability to measure samples in real-time, and NO sampling system or carrier gasses.

WHY RAMAN?

The manufacturing industry has relied on Gas Chromatography (GC) as a preferred analytical method despite its lack of reliability and constant maintenance requirements. A GC will cost roughly \$1 million to acquire and operate during its 10-year lifetime. Operational costs include carrier gases, sampling system maintenance, columns, and the need for experienced analyzer technicians to keep the GC running within specification.

A MarqMetrix® Raman spectrometer eliminates all of these additional costs while offering superior analysis that requires NO calibration – ever.



MarqMetrix® All-In-One Raman System

RAMAN VS. GAS CHROMATOGRAPHY

	RAMAN SPECTROSCOPY	GAS CHROMATOGRAPHY
Analysis Time	Seconds	Minutes
Ease of Use	Yes	No
Sample Prep Required	None	Sample prep is required
Calibration	No; Factory-calibrated	Yes; Weekly maintenance
Setup Time	15 mins	Days
Scientist Required	No	Yes
Cost of Ownership / 10 years	\$100,000	\$1,000,000

TAKEAWAYS

- **A Raman spectrometer is easy to install:**
NO sophisticated sampling system, carrier gas or consumables required
- **Affordable with a low capital investment**
- **Zero ongoing operating expenses:**
 - NO yearly planned maintenance by the vendor
 - NO weekly/monthly/quarterly/yearly maintenance by an analyzer technician
 - Ultra-stable solid-state device
 - NO moving parts
 - MTBF for key components >10 years
- **Rapid analysis:**
Results in seconds, not minutes
- **Superior analysis data every 6 seconds**
- **Uptime better than 99%:**
Designed to analyze 24/7/365
NO intervention by analyzer techs, and NO Ph.D. scientists required
- **Able to use existing enclosure, power, conduit, I/O**



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RAMAN IN ACTION: GC REPLACEMENT APPLICATION NOTE

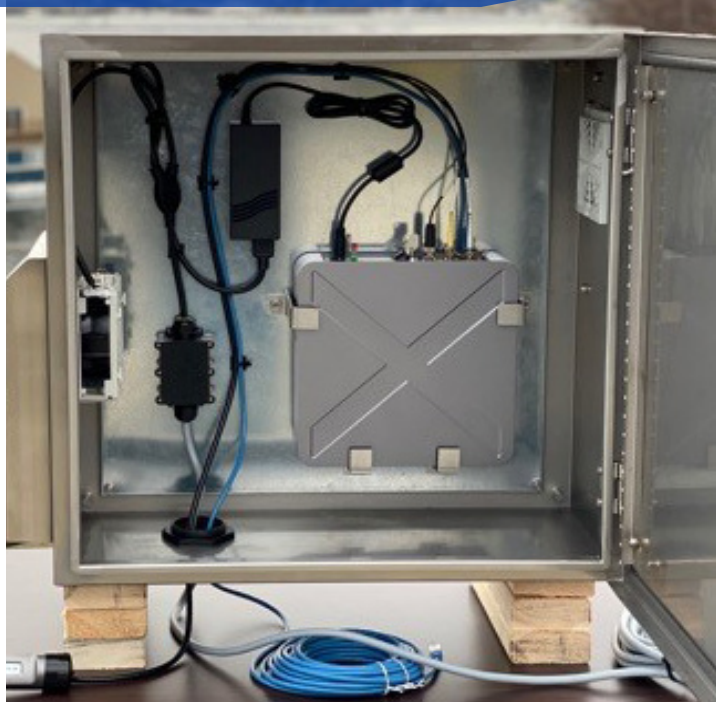
A manufacturer is currently using a MarqMetrix All-In-One (AIO) Raman System to replace their existing Process GCs at the end of their lifecycles.

Requirements:

- Replace the existing sample extraction probe with a simple MarqMetrix process BallProbe® immersion optic
- Replace existing sample transfer tubing with flexible armored weather-resistant fiber-optic signal transfer cable
- Remove the sample conditioning system and calibration system (neither are required for the MarqMetrix AIO Raman System)
- Remove the gas chromatograph oven and controller
- Utilize existing power & signal conduits with their wiring & I/O

Solution:

The AIO Raman spectrometer [mounted inside of a NEMA 4X welded SS enclosure (24in x 24in x 16in), heated and cooled with thermostatic-control, certified to ANSI/ISA-12.12.01-2000 for use in Hazardous (Classified) Locations Class I Groups A - D Div. 2 (outdoor)] can economically replace process gas chromatographs that are reaching the end of their lifecycle.



MarqMetrix All-In-One Raman System in SS Enclosure
NO Sampling System



FM 705363