Fluorinated By-Products Analyzer (FBA)

Fluorinated By-Products Analyzer

- Protects catalyst beds and reduces costs.
- Sensitivity in the ppb to high ppm concentration range.
- Selective response for fluoride vs. hydrocarbon.
- Results in 2–3 minutes.
- Stable and reliable design minimizes maintenance requirements.
- Very low solvent usage reduces costs and disposal problems.
- No computer software required for analyzer operation.

The OI Analytical Fluorinated By-Products Analyzer (FBA) is designed to quantify the level of fluorinated contaminants in a process stream such as LPG or butane. The FBA continuously determines fluoride content every 2–3 minutes as an on-line process measurement. This offers numerous advantages when compared to the intermittent and timely (3–4 hours) lab-based Wickbold Method.

The FBA's performance is based on the high selectivity available from OI Analytical's electrolytic conductivity detector (ELCD). This selectivity permits the analysis of fluoride in a hydrocarbon process stream without requiring a complete GC-based separation. The Class I Division II housing permits installation within a facility, in close proximity to the sample streams and other process analyzers. The FBA is optimized to accurately detect total fluoride concentrations in the 1–1.5 ppm range. The general concentration range detectable by the FBA is approximately 50 ppb to 50+ ppm. The single peak response, generated in only 2–3 minutes, corresponds to the total concentration of organic fluoride (or other halogens as well) present in the process stream. A 0–1 V (or 0–10 V) analog signal is provided from the system and is routed to the customer-provided data handling system for quantification. With its high selectivity and continuous measurement, the FBA offers substantial time and cost reductions.

Principle of Operation: The FBA uses the same technology as OI Analytical's very successful lab-based systems. The basic system is designed primarily as an "add-on" module to operate in conjunction with an existing process analyzer, such as a C4 hydrocarbon analyzer, and a data highway. Sample selection and injection are typically controlled by the process analyzer.

A 2-µL sample of LPG or related process stream is injected into a heated "column." The "column" effluent is transferred into the ELCD where the response for fluorinated compounds has been optimized. The peak height or the peak area is used to quantify the fluoride content by comparison to a known standard.

Principal Applications:
- Gaseous process streams
- Refinery feedstocks
- LPG

OI Analytical P.O. Box 9010 College Station, TX 77842-9010
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Product Specifications

General Specifications

Solvent/Gas Supply
- Solvent: *t*-butyl alcohol in D.I. water
- Solvent usage: 0.75 L every 3–4 weeks
- Column carrier gas: 15 mL/min (He)
- Reaction gas: 100 mL/min (H_2)

Dimensions
- 44" H x 41" W x 13.7" D
- 111.8 cm H x 104.2 cm W x 34.8 cm D

Weight
- Approx. 150 lbs (dependent on final configuration)
- Approx. 56 kg (dependent on final configuration)

Column
- 54' 10" x 1/16" stainless steel

Concentration Range
- Standard 50 ppb–50+ ppm
- Optional ranges up to 1000+ ppm

Performance Specifications

Detection Range
- 5 x 10^5

Selectivity
- F/HC > 10^6

Column Oven Temperature
- 100°C

Reactor Operating Temperature
- 900°C

Reactor Temperature Range
- 800°–1100°C in 100°C increments
- Stability: ±1°C

Detector Output
- 0–1 V or 0–10 V full scale analog voltage

Requirements

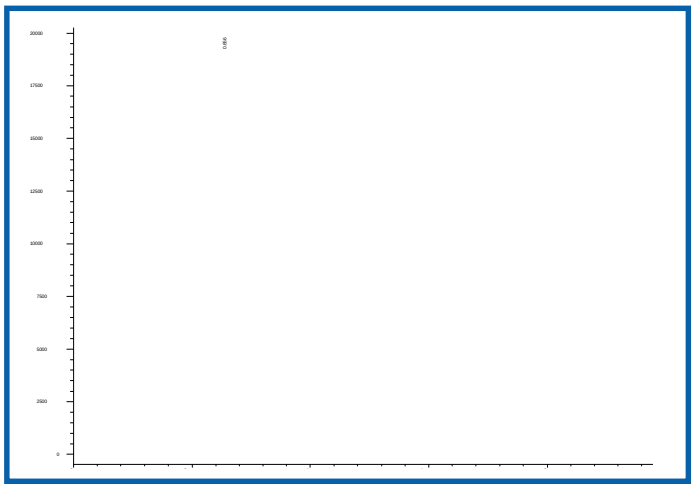
Gas Requirements
- Reaction: hydrogen, ultrahigh purity, 99.999% or better
- Carrier: helium, ultrahigh purity, 99.999% or better
- Housing purge gas: nitrogen or air

Power Requirement
- 90–260 (±10) VAC/47–63 Hz, 200 W
- Surge-protected power supply

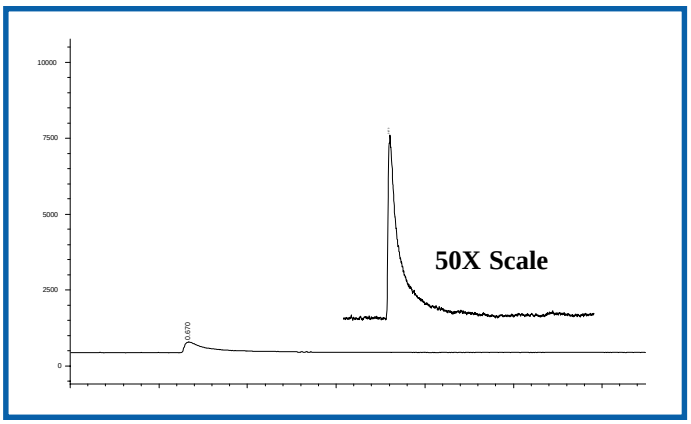
Unit Safety Classification
- Class I Div. II

Data Reporting
- 0–1 V or 1–10 V analog signal must be routed into a data handling system for signal processing

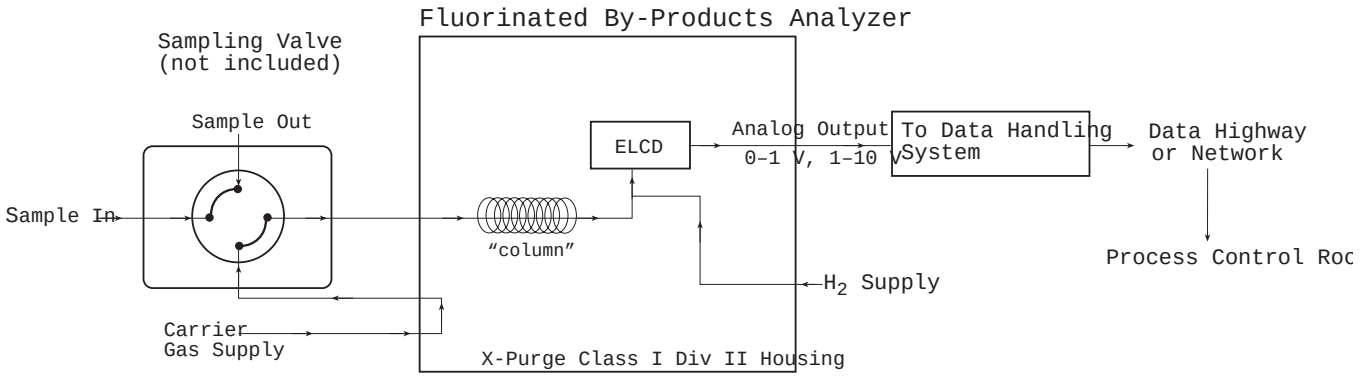
Sampling
- The basic analyzer does not include a sampling valve. A separate sampling system or process analyzer provides the 2-µL samples to the analyzer.



0.75 ppm Fluoronaphthalene in Butane



40 ppb Fluorinated By-Product Contamination in C4 Process Stream



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