

# SERIES 9100 BEVALERT®

## ABTEX IN BEVERAGE-GRADE CO<sub>2</sub>

Analysis of acetaldehyde, benzene, toluene, ethylbenzene, and xylenes (ABTEX) in beverage-grade carbon dioxide

- Sensitive
- Exceeds ISBT Guidelines and Methodologies
- Direct measurement of ABTEX
- Interference free response
- Photoionization Detector

### Introduction

Carbon dioxide (CO<sub>2</sub>) produced for the beverage industry is both a co- and by-product of numerous industrial processes such as combustion, fermentation, ammonia and hydrogen production, and chemical and refinery operations. It is also derived from natural sources. With such varied and numerous sources, coupled with the complex supply chain used to deliver it to user facilities—a multitude of trace contaminants, many posing health concerns or causing undesirable odors—may find their way into the CO<sub>2</sub>. These impurities must be removed before it can be classified and used as an ingredient in beverage products.

The Series 9100 BevAlert® Gas Chromatograph adheres to the stringent guidelines and methodologies established by the International Society of Beverage Technologists (ISBT) to monitor the most critical trace impurities

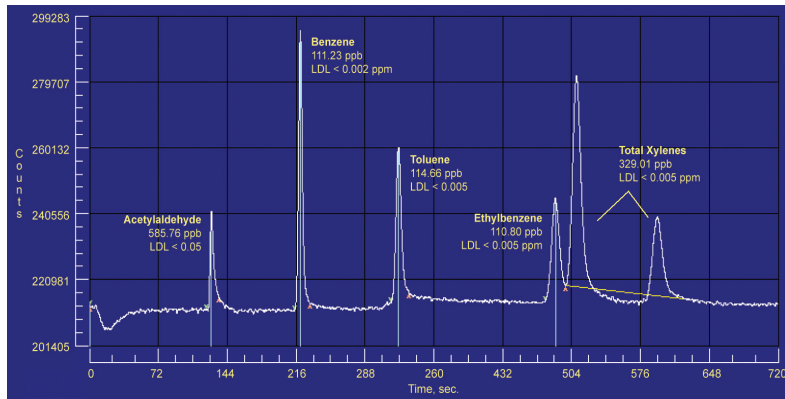
	ISBT Method	ISBT Spec	Series 9100 MDQ*
Acetaldehyde	11 - GC w/PID	< 0.2 ppm	< 0.05 ppm
Benzene	12 - GC w/PID	< 0.02 ppm	< 0.002 ppm
Toluene	12 - GC w/PID	< 0.02 ppm	< 0.005 ppm
Ethylbenzene	12 - GC w/PID	< 0.02 ppm	< 0.005 ppm
Xylenes	12 - GC w/PID	< 0.02 ppm	< 0.005 ppm

\*Minimum Detectable Quantity

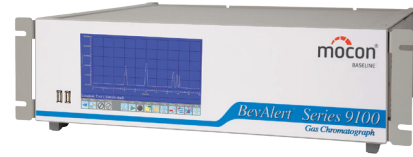


# SERIES 9100

## ABTEX IN BEVERAGE-GRADE CO<sub>2</sub>



Separation of ABTEX using Series 9100 BevAlert® Gas Chromatograph



### Conditions

Instrument:	Series 9100 BevAlert® GC
Detector:	Photoionization (PID)
Columns:	Col 1: Part #043-866 x 30 m Col 2: Part #043-159 x 30 m
Temperature:	Column Oven 75–85 °C, isothermal*
Carrier Gas:	Hydrogen (H <sub>2</sub> ), Helium (He) or Nitrogen (N <sub>2</sub> )
Carrier Gas Flow:	7.0 mL/min.
Sample Matrix:	CO <sub>2</sub>
Sample Flow Rate:	150–200 cc/min (typical)
Sample Size:	100 µL
Analysis Run Time:	720 seconds
Precision/Accuracy:	1% of Full Scale / 2% Measured Value

\*Note: actual temperature is determined by the carrier gas used.

### Analysis

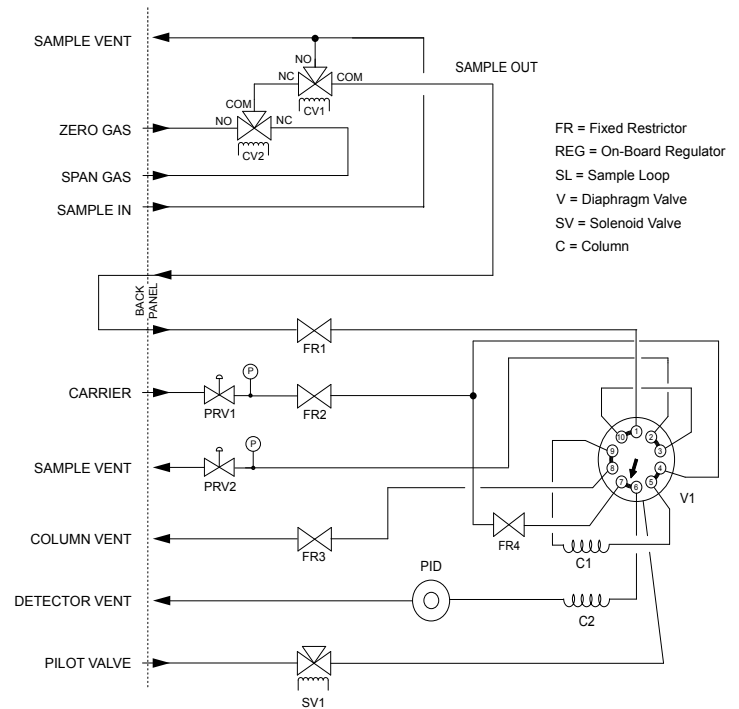
The Series 9100 Gas Analyzer combines the selectivity of gas chromatography with the sensitivity of a photoionization detector (PID). This provides an interference free response to acetaldehyde, benzene, toluene, ethylbenzene and xylenes (ABTEX).

This application uses a dual column configuration with timed backflush to vent using proprietary GC columns. A pre-cut column is used in series with an analytical column. A fixed volume of sample is injected and carried through the pre-cut column where it is stripped of initial interfering heavier components and moisture, thus reducing analysis time and protecting the analytical column.

Backflush of the pre-cut column is timed from sample injection so that only ABTEX and remaining similar components are eluted to the analytical column. Contaminants on the pre-cut column are then vented.

Acetaldehyde, benzene, toluene, ethylbenzene and xylenes are separated from potentially interfering components on the analytical column and elute to the photoionization detector for analysis.

### Flow Diagram (typical)



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