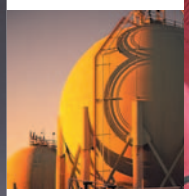
Product Specifications

The Pulsar EX provides real-time information on contaminant levels in carbon dioxide. With the Pulsar EX, you can detect contamination before it reaches the final product, which will improve product quality and protect your brand investment.

Pulsar EX
CO_2 Quality Assurance System
On-line CO_2 Purity Analyzer



Benefits

- Early detection of contamination
- Cost effective testing solution
- Improve product quality
- Protect your brand investment

Contaminants in carbon dioxide can come from many sources including the CO_2 manufacturing process, storage, transportation and handling. Ultimately, the quality of the carbon dioxide you use will impact your customers and your brand. On-line monitoring of carbon dioxide purity with the highly sensitive Pulsar EX CO_2 Quality Assurance System from Thermo Electron Corporation allows for early detection of impending contamination before your final product is affected. With automated analysis at multiple points in a process, the Pulsar EX is an ideal, cost-effective solution for suppliers and users of beverage-grade CO_2. The Pulsar EX provides the tools needed to meet the International Society of Beverage Technologists (ISBT) Quality Guidelines for beverage-grade carbon dioxide, Compressed Gas Association (CGA) and European Industrial Gases Association (EIGA) standards.

Tailored to the unique requirements of the beverage and food industries, the Pulsar EX is a complete stand-alone system capable of monitoring CO_2 quality at up to 6 points in your process - from delivery to point-of-use. Using dedicated modular analyzers, the Pulsar EX offers four primary measurements to levels specified by the ISBT: total sulfur, total volatile hydrocarbons, total aromatic hydrocarbons and acetaldehyde. The Pulsar EX's analytical range can be extended for those who require additional analysis capabilities. Certificates of Analysis (COA) or reports can be generated for selected samples, providing a record for ISO and other quality systems.

- Eliminates need for "grab" sampling
- Easy to navigate user interface with multi-level password controlled access
- Cost-effective automatic internal calibration method

Detect Contaminants Critical to Your Product Quality

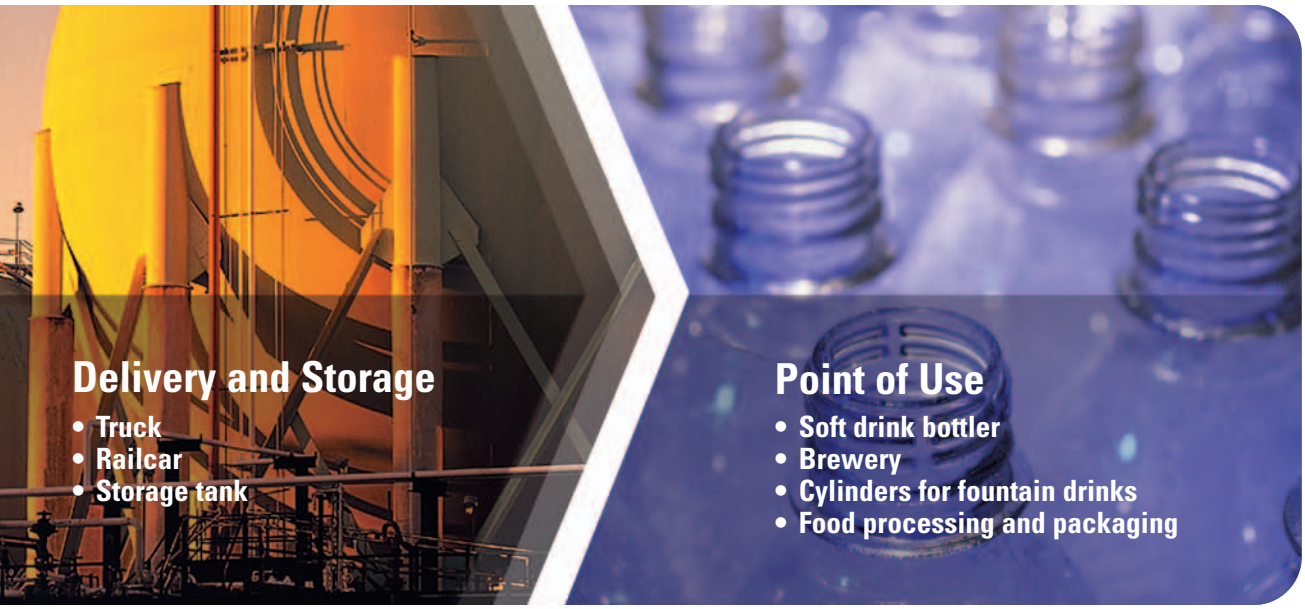
The carbon dioxide source often determines the amounts and types of contaminants in beverage grade CO_2. Up to the point of use, contaminants can be introduced many different ways. There are four primary classes of contaminants that impact the taste and odor of a beverage or food: sulfur, aromatic hydrocarbons, volatile hydrocarbons and acetaldehyde. With the Pulsar EX's modular design, you can configure the system to analyze for only those contaminants that are critical to your process.

Up-to-the-Minute Results

Results and system status alarms are continuously updated. If a result is out of specification or system alarm occurs, the system can provide visual and audible alarm notification. The activity log provides a chronological record of all alarms, system configuration changes, and users who access the system.

Multi-point Continuous Monitoring

The Pulsar EX is capable of continuously sampling up to 6 points or streams in your process from delivery to point of use. The software allows you to define the frequency and sequence the streams will be analyzed.



Delivery and Storage

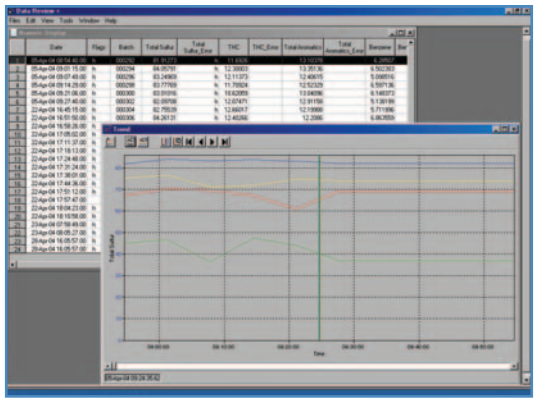
- Truck
- Railcar
- Storage tank

Point of Use

- Soft drink bottler
- Brewery
- Cylinders for fountain drinks
- Food processing and packaging

Ensure Purity at Delivery

The Pulsar EX Loading Dock Interface (LDI) accessory provides all the tools necessary to test a delivery prior to and during off-load. The LDI includes an operator interface and system for proper sampling of liquid CO_2.



Data Analysis and Review

All data including individual stream results and activity logs are automatically saved to the Pulsar EX hard drive. The historical data can be easily accessed at any time via the ProLink for Pulsar software and reviewed in graphical or numeric format.
The data can also be analyzed in Microsoft Excel or other spreadsheet applications.

Technology

The analyzers in the Pulsar EX use one of two measurement methods, Pulsed Ultraviolet Fluorescence (PUVF) or Non-dispersive Infrared (NDIR). The Total Volatile Hydrocarbons analyzer uses NDIR technology. All other analyzers use PUVF. Both technologies are based on the absorbance or emission of light (optical spectroscopy) and require no additional chemicals or external gas cylinders.

In Pulsed UV Fluorescence, ultraviolet light is used to excite the contaminant molecules in the gaseous carbon dioxide sample. The excited molecules relax through a process called Fluorescence releasing a photon of light at a specific wavelength. A detector measures the amount of light emitted by the sample. The signal at the detector is proportional to the amount of contaminant in the sample.

The Total Sulfur analyzer has a pyrolyzer prior to the Pulsed UV Fluorescence detector. The sample gas is mixed with air and passed through a heated zone at 1200°C where all the sulfur species are oxidized to sulfur dioxide (SO_2). The oxidized sample is then measured using the PUVF technique.

With Non-dispersive Infrared, infrared energy is directed to the sample gas. The contaminants, hydrocarbons, in the gas absorb the infrared energy. A detector measures the amount of light not absorbed by the sample. The signal at the detector is inversely proportional to the contaminant concentration.

Pulsar EX CO_2 Quality Assurance System

	Specification
Sample Types	Liquid CO_2 Gas phase CO_2
Detection Capabilities	Total Sulfur Total Volatile Hydrocarbons Total Aromatic Hydrocarbons Acetaldehyde
Detection Modules	Up to 4
Sample Streams	Up to 6
Pulsar to Sample Point Distance	213 m (700 ft) maximum
Alarm output	Dry contact relay for audible or strobe type alarm
Modem	Standard for remote diagnostics and service
Enclosure (standard)	IP40
Enclosure (optional)	IP54 (includes air conditioning for climate control)
Power	220 VAC Single Phase, 20 Amps
Weight*	Standard Enclosure: 136 kg (300 lb) IP54 Enclosure: 199 kg (439 lb)
Operating temperature range	5°C to 35°C (41°F to 95°F)
Operating Relative Humidity	0 to 95% RH, non-condensing
Size	Standard Enclosure: 61 cm (24.02 in) wide x 81 cm (31.89 in) deep x 175 cm (68.90 in) high IP54 Enclosure: 100 cm (39.37) wide x 81 cm (31.89 in) deep x 193 cm (75.98 in) high
Utilities	Air, Clean and Dry, 4.14 bar (60 psi), 5 CFM Dedicated analog phone line
Display	800 x 600 color LCD touch-screen
Computer	Built in PC, Windows® operating system interface
Software Security	Multi-level user access
Regulatory Approvals	CE

**Dependent upon modules installed.*

Parameter	Total Sulfur	Total Hydrocarbons	Total Aromatic Hydrocarbon	Acetaldehyde
Measurement Method	Pulsed UV Fluorescence	Non-Dispersive Infrared	Pulsed UV Fluorescence	Pulsed UV Fluorescence
Lower Detection Limit	2.0 ppb	0.5 ppm	0.5 ppb	20 ppb
ISBT Guideline	100 ppb Total Sulfur	50 ppm (as Methane)	20 ppb	200 ppb
Full Scale Range – Upper Limit	200 ppb	100 ppm (as Methane)	50 ppb	10,000 ppb
Calibration Method	Internal Permeation Tube	Internal Permeation Tube	Internal Permeation Tube	Internal Permeation Tube
Calibration Reference	Carbonyl Sulfide	Pentane	Benzene	Acetaldehyde

Other impurities can be specified on request—please contact sales for details.

Literature Code PI.0002.0205

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