

Carbonated Soft Drinks: Quality Incident Protection

Summary:

Soft drinks are enormously popular beverages consisting primarily of carbonated water, sugar, and flavourings. Enjoyed worldwide by nearly 200 nations, there are over 500 types of soft drinks on the market with an annual consumption of more than 34 billion gallons.

The carbonation of the beverage is undertaken by forcing carbon dioxide (CO₂) into the liquid and storing under pressure. The presence of this gas creates bubbles and fizzing in the liquid when pressure is reduced.

The CO₂ that is injected into the beverage must be free of particles, microorganisms and unwanted chemical compounds. Existence of these contaminants may result in a Quality Incident. Such an incident may occur where a delivery of out-of-specification CO₂ has been made to the plant or where CO₂ has been contaminated on-site during the production process.

Parker recognises that the effects of a Quality Incident can challenge consumer safety, damage brand names, company reputations and revenues.

Soft drink manufacturer's adhere to a multitude of strict quality standards. These standards are under constant review. During recent years, growing interest and concern has been shown by the beverage industry in the possible effects of poor quality Carbon Dioxide used in carbonation of the beverage. This has resulted in a greater focus being placed on the purity of the CO₂ used in the canning and bottling plants.



Introduction – PCO2 Quality Incident Protection Systems:

The Parker PCO2 system is a Quality Incident Protection device which is installed to protect against poor quality contaminated gas which may pass through the supply chain and into the beverage.

Parker systems are designed to meet the mandatory requirements of the current International Society of Beverage Technologists (ISBT) guidelines and are 3rd party performance validated by Lloyds Register.

All models of the PCO2 system meet full CE approval including accreditation to the European Pressure Equipment Directive (PED), and are manufactured to the highest quality standards and guarantees active regulatory compliance. Materials of construction have independent verifications to comply with FDA Code of Federal Regulations title 21 CFR.

The Parker domnick hunter PCO2 range of Carbon Dioxide Purifiers has been designed to incorporate six levels of purification, offering effective quality incident protection against a combination of potential contaminants.

Quality Incident Protection:

The PCO2 is a static adsorption bed constructed from specially selected adsorbents to remove trace contamination from CO2. It is designed as a quality incident protection device, it will treat 'out-of-specification' CO2 to return it back to specification within the limits of the specification.

Additional Parker domnick hunter specialised filtration is provided at both the inlet and outlet points of the system as standard. Pre filtration ensures protection of the adsorbent beds from Non-Volatile Organic Residue (NVOR) that may be present in the gas supply and other contaminants down to 0.01 micron. Post filtration ensures no carry-over of particles from the adsorbent beds to 0.01 micron particle filtration.

An optional - Sterilising Grade gas filter may also be supplied when live bacteria or phage contamination of CO2 represents a hazard to product quality or consumer safety.

Conclusion:

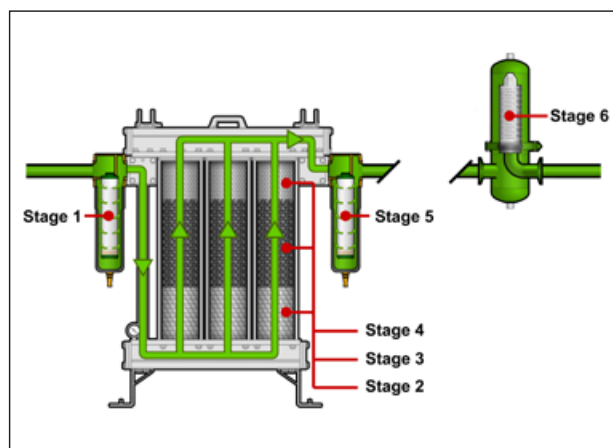
The PCO2 system will treat CO2 with up to 10 times the ISBT / EIGA levels of the named contaminants for a specified quantity of processed CO2 gas. The installation of a PCO2 system allows production to continue by processing the contaminated CO2 whilst the corrective actions are implemented.

The PCO2 system is essential for an effective 'quality incident' containment strategy outlined for a range of CO2 gas capacities.

Potential Contaminant	Critical Limit ppm (v/v)	Rationale
Total Volatile Hydrocarbons (as Methane)	50 ppm (v/v) max of which a maximum of 20 ppm (v/v) as total non-methane hydrocarbons.	Sensory
Total Aromatic Hydrocarbons	0.02 ppm (v/v) max.	Regulatory
Acetaldehyde	0.2 ppm (v/v) max.	Sensory
Total Sulphur (excluding SO2 as S)	0.1 ppm (v/v) max.	Sensory

Source :- ISBT CO2 Quality Guidelines & Analytical Procedure Bibliography, 2019

The three layered adsorbent bed adsorbs contamination as it flows through. The three materials preferentially adsorb differing contaminants thus providing effective protection against a wide spectrum of potential contaminants known to create beverage flavour defects.



Stage 1	0.01 micron NVOR filtration
Stage 2	Removal of moisture & partial removal of hydrocarbons
Stage 3	Primary removal of hydrocarbons (Aromatic Hydrocarbons, Toluene)
Stage 4	Removal of sulphur compounds (COS, H2S)
Stage 5	0.01 micron particle filtration
Stage 6	Sterile Gas Filter

For additional product information, FAQs, white papers and support documents relating to Parker PCO2 Carbon Dioxide Quality Incident Protection Systems please visit www.parker.com/gsf