

Carbon Dioxide Purification for the Carbonated Soft Drink Industry Market Application Publication



Snap open a bottle of soda and the fizz and bubbles you see are the result of carbon dioxide (CO₂), a colorless, odorless, non-combustible gas. In the beverage industry, CO₂ is used to carbonate soft drinks as well as offering some protection against microbiological growth. CO₂ is typically produced as a by-product from various processes including chemical manufacturing or combustion as well as collection from natural resources. Common sources of CO₂ include hydrogen and ammonia production, fermentation and collection from geothermal wells. Prior to its use, the carbon dioxide must be purified before being considered suitable for its intended use as a direct food additive to the beverage. Potential contamination of a CO₂ supply can occur as the result of natural impurities in the raw gas source not being effectively removed, or from gas contamination during storage and distribution. It is the responsibility of both the gas supplier and the user to take appropriate steps to ensure the quality of the carbon dioxide. Safety and good manufacturing practices for food additives should be applied throughout the process, from production, delivery, and storage to retail dispense. Traditional methods for contamination removal for CO₂ centered on a large carbon tower which was placed downstream of the vaporizer. In some cases, no filtration was used at all. The carbon towers rarely used pre and post filtration and upon further analysis and understanding of the total bottling operation, it was determined that carbon alone could not protect the bottlers from all of the contaminants which may be found in purchased CO₂.

Working with the International Society of Beverage Technologists, to gain a better understanding of the contaminants in question and the maximum allowable levels, Parker domnick hunter developed a multiple stage purifier that would essentially take 'out of spec' beverage grade CO₂ and bring the quality of gas back within spec.



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Features and Benefits:

- Added security of CO₂ quality
- Protection against impurities known to result in beverage flavor defects
- Effective for removing a combination of potential contaminants
- Low pressure drop
- Easy maintenance, disposable cartridge design
- Compact design
- 10 year housing guarantee
- World-wide sales and support
- Manufactured in accordance with ISO 9001:2000
- Materials of construction independently verified to comply with FDA Code of Federal Regulations, Title 21 "Food & Drug"

Why was Parker domnick hunter chose as the solution?

A major bottler of Carbonated Soft Drinks (CSD) approached Parker domnick hunter with concerns over specific contaminants and/or impurities in the CO₂ gas being used to bottle their soft drinks. The solution was the PCO₂ range which allows the bottler to continue to bottle product and not risk a quality incident and potential product recall.

The Parker domnick hunter PCO₂ systems purchased by the company offers them added insurance against potential contamination of the beverage, thus avoiding potential costly product spoilage.

Under HACCP principles, the quality of the

CO₂ used at the point of carbonation is defined as a Critical Control Point (CCP) and the installation of a PCO₂ system at this point form part of a completed CO₂ quality approach.

The polishing system offers five stages of CO₂ purification in a compact, modular design to give the highest level of protection to the beverage industry. In addition to inlet and outlet particulate filtration, the plant scale MAXI and MPlus systems incorporate a 3-layer adsorption bed, pre-loaded into cartridges for ease of maintenance. The materials used have been carefully selected for their ability to preferentially adsorb potential contaminants, thus ensuring the optimum removal efficiency of the system during its operational life. The system

removes a wide range of contaminants including acetaldehyde, benzene, hydrogen, sulphide, toluene, non-volatile organic residue and many others.

Complete system range from 600 lbs/hr to 10,000 lbs/hr and are rated at 350 psi g.



Typical installation

