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Blended Gas Sparger for Beverages Mott Sparger Element

Industry: Food & Beverage

Application:

A manufacturer of commercial on-site gas blending equipment required a cost effective product to accurately and consistently deliver a precise blend of Carbon Dioxide (CO₂) and Nitrogen (N₂) gases. The gases were being used for the carbonation and dispensing of draught beer and other beverages from kegs or barrels. Sparging technology was required to introduce the gases into the beverage and meet the beverage manufacturer's specifications.

In most cases, the blend of gases is 25-30% CO₂ and the 75 -70% N₂ at 30 psi. But the percentage of dissolved CO₂ gas can be anywhere from 20% through 80%. The amount of CO₂ gas is critical because it sets the carbonation level. Too much CO₂ gas and the beverage over-carbonates, foams excessively during dispensing and leaves the drinker with a full or bloated feeling. Too little CO₂ gas and the beverage becomes flat, adversely affecting the desired taste. The N₂ gas is inert and does not affect the taste of the beverage. The dissolved N₂ gas is used to provide extra pressure to dispense the beverage.



Typically gas blenders use needle valves or drilled orifices with gas regulators to balance pressures and control the gas flow to set the blend. For this application, the client determined that the typical gas blender was not accurate or consistent. It also did not shut down when either of gases ran out resulting in undesirable taste and appearance of the dispensed beverage. This not only affected the quality of the dispensed product, but also spoiled product remaining in the keg or barrel.

Solution:

Mott provided a sintered powder metal porous flow product that consistently and accurately met the application's gas flow values, dissolved gas efficiency and tight dimensional requirements.

Working with the client, Mott was able to replace the traditional needle valve/drilled orifice with a single porous metal bushing. This bushing provided and maintained N₂ and CO₂ gas flow rates with an accuracy of +/-2% or better in the flow range of 0.80 to 80 scfh and +/-2% in the flow range of 1 to 160 scfh.

In gas/liquid contacting applications, Mott's sparging elements effectively produce fine gas bubbles and introduce the gas into the liquid through thousands of tiny pores. The fine gas bubbles produced by our media are more numerous and far smaller than those produced by needle valves and drilled orifices, making Mott porous metal sparging elements most efficient and effective.

Control of the ID and gas flow of the porous bushing is critical to the successful operation of the client's gas blender. The same porous bushing controls both the flow of the CO₂ and N₂ gases. Inside the gas blender, a piston with a circumferential seal is inserted into the tight tolerance ID of the porous bushing. This piston divides the ID into 2 chambers. The need for a critical ID to assure a seal between the 2

chambers is therefore achieved. One chamber is for the CO₂ gas and the other for the N₂ gas. As the piston is repositioned along the fixed ID length, one chamber is lengthened while the other is shortened. By changing the lengths of the chambers, the areas for flow are changed as is the total flow of gas through its chamber. The various required flow specifications tolerated at +/-10% assure the required pressure drops of the gases for proper operation of the blender.

Mott has over 50 years of expertise in manufacturing sintered powder metal porous media in various shapes and sizes, as well as established manufacturing procedures and processes, which allows a product that consistently meets or exceeds flow and dimensional accuracy required by the application.

Product Description:

Mott Flow Grade Special Axially Compacted Bushing Type 1300S Sparger Element of various OD, ID and Length dimensions and porous materials manufactured to customer's specifications.

