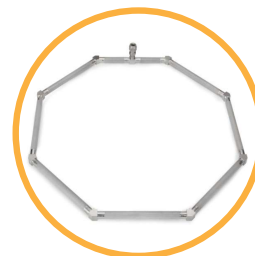


POROUS METAL SPARGERS

OVERVIEW

Mott's porous metal spargers increase the rate and efficiency of oxygen transfer within a bioreactor resulting in significant cell yield increases, significant increases in aerobic growth conditions, and significant reduction in gas consumption. Please contact Mott to obtain a detailed copy of the results and to determine how this technology can be used to increase your reactor output.

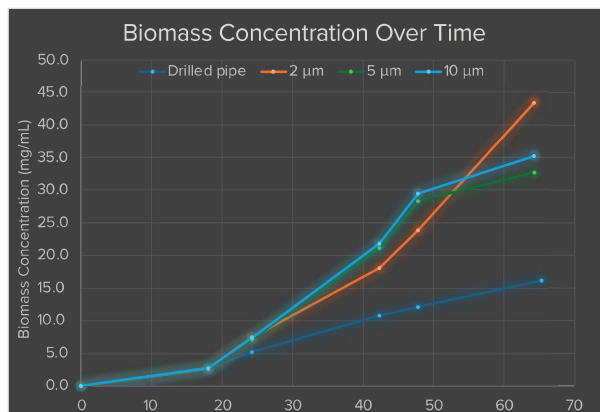
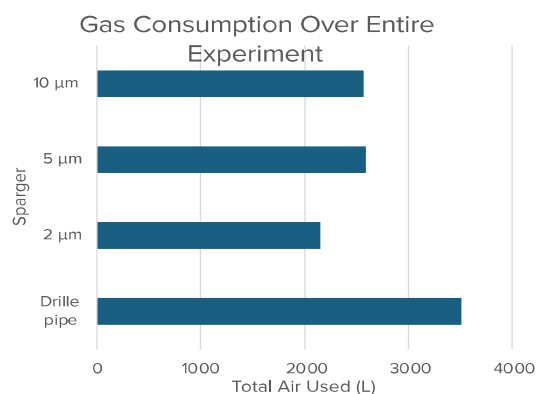


INDEPENDENT LAB STUDY:

Mott Porous Metal Spargers Deliver Superior Performance Over Traditional Drilled Pipes in Biomass Growth

Total air consumption was reduced by up to 40% (2150 L compared to 3510 L), and significantly extended aerobic growth conditions

With Mott's porous metal spargers, overall cell growth was increased by up to 170% (43.5 mg/mL up from 16.2 mg/mL)



Mott's porous metal sparging technology was evaluated in one-liter bioreactors for its ability to outperform a drilled pipe sparger. Yeast (*Saccharomyces Cerevisiae* CEN.PK113-7D) was grown over 64 hours under 500 RPMs of agitation at a target dissolved oxygen set point of 40%.

KEY EXPERIMENT RESULTS

- Oxygen transfer efficiency testing determined that the oxygen transfer rate, measured via a sulfite depletion method, was increased by 20% (370 mmol*L⁻¹*Hr⁻¹ compared to 308 mmol*L⁻¹*Hr⁻¹)
- Volumetric oxygen transfer coefficient (KLA) was measured to be up to 233% faster (0.020 s⁻¹ compared to 0.006 s⁻¹).