



Application Note

USD 3029

Mixing and Resuspension of High Powder Loads Using a Pall® Magnetic Mixer

Mixing system: Pall Magnetic Mixer

Mixing biocontainer: 200 L Mixer biocontainer

Application mixing type: Powder-liquid

The Pall Magnetic Mixer is a compact single-use mixing system. The heart of this system is a mixing biocontainer incorporating an innovative bottom-mounted magnetically-driven impeller capable of providing efficient high-torque mixing for all powder-liquid and liquid-liquid mixing applications. The impeller rides on a low-friction, inert bearing assembly designed to ensure low particle shedding while allowing mixing of high powder loads in large liquid volumes.

Introduction

Powder-liquid mixing is a common requirement in biopharmaceutical processing. In order to maximize mixing efficiency for powder-liquid applications, the Magnetic Mixer is available with a 16.13 cm (6.35 inch) magnetic impeller.

In this experiment, a Magnetic Mixer system's ability to suspend a high powder load, and its resistance to stalling when buried by compacted solid, was tested. The powder chosen was diatomaceous earth, a fine, inert and insoluble, powdered filter medium that is light and fluffy when it is dry, yet forms a dense mud when mixed with water.



Experimental

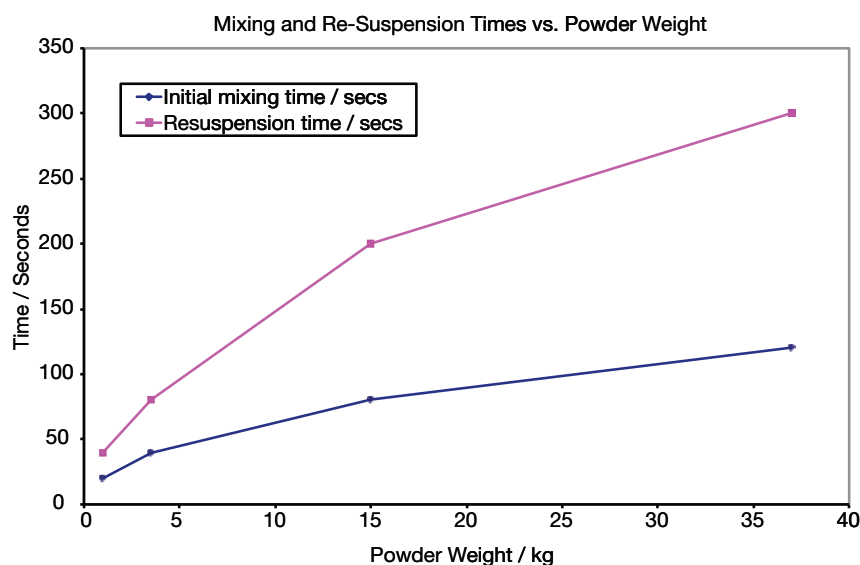
A 200 L Magnetic Mixer mixing biocontainer was filled with ~160 L of water, and mixing speed was set to 300 rpm. Diatomaceous earth powder ($d=0.22$ kg/L) was then added, incrementally, to the top of the mixing biocontainer up to a cumulative added weight of 37 kg. After each addition, the time taken to create a uniform suspension was noted, then the mixer was shut off and the suspended powder was allowed to settle into a dense, compacted mud at the bottom of the mixing biocontainer. After the powder had settled, mixing was restarted, and the time to completely re-suspend the powder was recorded.

Results

Figure 1 shows initial suspension (mixing) time, and the subsequent re-suspension time, as a function of the cumulative amount of diatomaceous earth added. The data demonstrates that even the highest powder load of 37 kg was successfully suspended within only a few minutes. Furthermore, after allowing the powder to settle such that it completely buried the magnetic impeller, the mixer was able to fully re-suspend the powder within 5 minutes. At no time during the experiment did the impeller stall or hesitate.

Figure 1

Shows initial suspension (mixing) time



Conclusions

The Pall Magnetic Mixer system is well suited to powder-liquid mixing applications, even when very high powder loads are anticipated. The Magnetic Mixer is also capable of functioning properly and effectively without stalling when the impeller is buried under a dense layer of sediment.



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