

Newmix® - Levtech® Application note

Mixing Uniformity in Cubical Mixing Bags with Pad-Drive™

Mixing system: Newmix®- Levtech® Pad-Drive™ 50 system

Mixing bag: 50L Q-Mix™ bag (US Pat.No. 7,249,880)

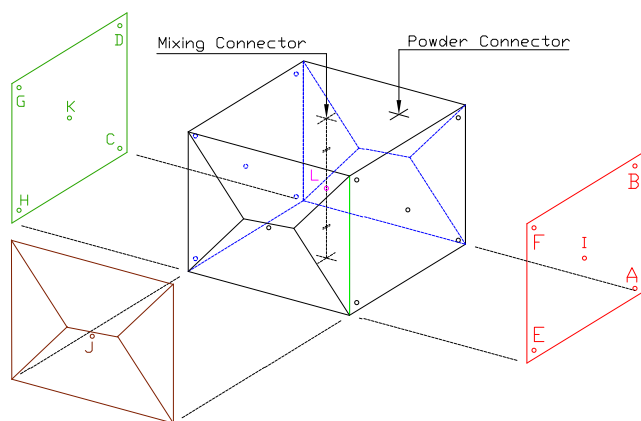
Mixing type: Solid-liquid

The Newmix-Levtech Pad-Drive system is a scalable and non-invasive single-use mixing system. The heart of this mixer is an innovative top-mounted mixing paddle that allows effective and uniform mixing in demanding applications, such as preparation of contained high-solids solutions or mixing of high-viscosity liquids.

Introduction

The cubical design of the Q-Mix single-use mixing bag delivers superior mixing efficiency because of the way its shape disrupts laminar flow and promotes thorough mixing.

In this experiment, a Pad-Drive 50 was fitted with a 50L mix bag/vessel, and used to prepare 50L of a 25g/L sodium chloride solution. Although the mixing speed range for this mixer is 30-150rpm, a speed at the low end of this range was chosen to demonstrate mixing efficiency under the least favorable conditions.



Position of the Conductivity Sensors

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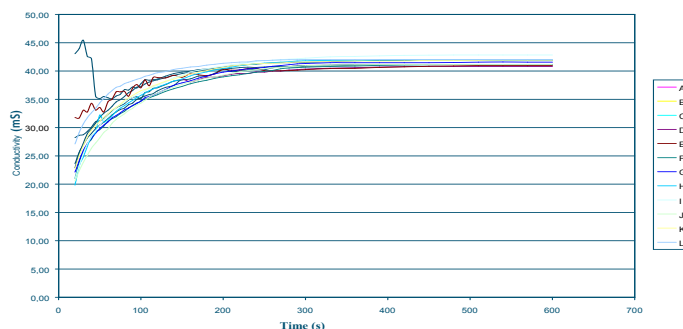
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Experimental

A 50L Q-Mix cubical bag was filled with 45L of room temperature DI water and 1125g of sodium chloride. Once mixed, this would result in a solution containing approximately 2.5%w/v NaCl. The mixing bag was then connected to the a Pad-Drive 50 system, and mixing performed at a setting of 50rpm and a mixing angle of 20°.

To measure mixing uniformity, conductivity sensors were placed in 12 different positions inside the mixing bag (see A-L in the accompanying drawing). Conductivity measurements were recorded every at 5 second intervals. This experiment was performed in triplicate.



Average Mixing speed 50l Q-mix bag

Results

The accompanying chart shows the mean conductivity readings over time for each of the 12 sensors.

Note the elevated conductivity indicated by sensor “A” during the first 40 seconds of mixing. This sensor was located in the corner where the solid sodium chloride was delivered at the beginning of each experiment, and demonstrates the speed with which the solid material was dispersed within the bag.

It can be seen from this chart that mixing was completed within approximately 400 seconds, and that uniformity within the bag was excellent.

Conclusions

The paddle mixing action of the Newmix-Levtech Pad-Drive 50 system is capable of high mixing efficiency and uniformity inside a cubical bag, even when operated at its least vigorous, lowest-shear settings.