

# Newmix® - Levtech® Application note

## Packing a Chromatography Column Using a Pad-Drive™ Mixer

Mixing system: Newmix®- Levtech® Pad-Drive™ 1000 system

Mixing bag: 200L

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

Mixing large quantities of a solid and a liquid, such as while preparing a chromatography sorbent slurry, can be challenging for single-use disposable mixing systems. Often, the force needed to suspend the solid can lead to stalling of the impeller.

In this experiment, a Pad-Drive 1000 was used to prepare a chromatography sorbent slurry, the slurry packed was into a column, and then the performance of the column was assessed. The objective was to demonstrate that the paddle impeller is able to suspend large loads of solid without stalling, and that slurry uniformity is sufficient to ensure good column performance.

## Experimental

A 200L mixing bag was filled with 40L of chromatography sorbent, and then approximately 120L of 10mM sodium phosphate buffer (pH 6.5) were added to the slurry. The sorbent was then allowed to settle for approximately 72 hours.

After settling, the slurry was re-suspended by the Pad-Drive mixer at 30rpm mix speed, 9° mix angle. The sorbent was entirely re-suspended within 5 minutes. The slurry was then pumped at 15L/minute, using a diaphragm pump, from the bottom drain of the bag into the chromatography column (a 400 mm ID acrylic tube, packing height 20cm). As the slurry was pumped, the Pad-Drive mixer was run at 30rpm to keep the sorbent in a uniform suspension.

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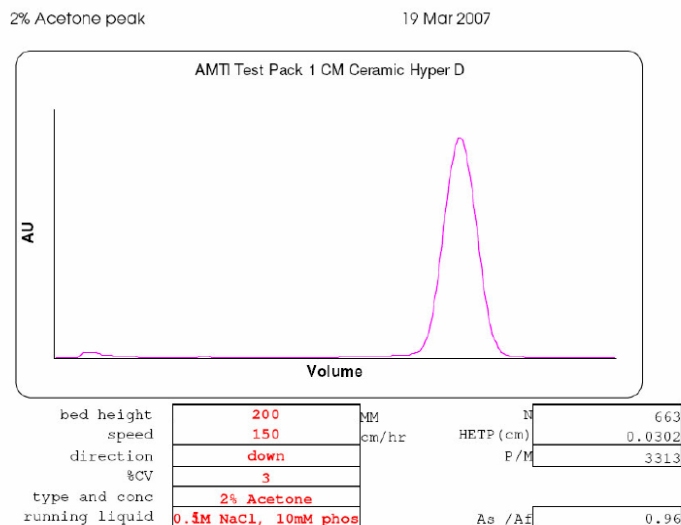
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Once packed and conditioned, the column's performance was assessed by a HETP determination. After completion of the test, the slurry was pumped back out of the column and into the mixing bag for storage and subsequent reuse. The containment provided by the bag ensures a low contamination risk for the longest possible sorbent life.



## Results

The accompanying chart demonstrates that the column achieved the desired efficiency, comparable to that from traditional packing methods. The re-suspension time was less than 5 minutes, and at no time during the mixing cycle did the paddle impeller stall or hesitate.

## Conclusions

The paddle mixing action of the Newmix-Levtech Pad-Drive 1000 system is capable of high mixing efficiency without stalling in high-load solid-liquid applications. When used to prepare chromatography sorbent slurry and pack a column, the resulting column efficiency is comparable to traditional packing methodologies. The mixing system is entirely closed, ensuring protection of the sorbent from possible contamination that can reduce its operational life.