Pulsed-plate Column

Winter 2007

TO: Engineering Development Branch

FROM: Engineering Division

SUBJECT: Pulsed-plate Column

Our company has recently received a computer controlled pulsed-plate column. We intend to use it to purify Stoddard solvent which has been contaminated with small amounts, 2 - 3 wt%, of propionic acid. Only sketchy operating instructions have been included. We need to evaluate the usefulness of the column in **extracting** propionic acid from the solvent using water. We also need to learn the operating procedures and the useful range of operating conditions. Please perform some experiments on this piece of equipment which will help us determine its proper use in the future. It is important that we find the equilibrium distribution of propionic acid in the water and Stoddard solvent phases (in wt%).

The variables you should vary include pulse frequency, pulse amplitude, and water flow rate. Fix the organic flow rate at 35% of pump capacity.

Hint from JLOscarson (5/99): From previous experience with pulsed-plate columns, it has been found that entrainment is a problem. Before determining the concentrations of the solutions, let the organic and the aqueous phases separate and then analyze each phase. Also, determine the amount of entrainment in the overhead and the bottoms for each of the runs.

Do trends you observe in HTU agree with HTU values you can estimate from packed column correlations found in the literature?

Reference

White, S. C., Ph. D. Dissertation, *Dynamic Matrix Control of a Pulsed-Plate Liquid-Liquid Extraction Column Using a Low-Level Controller*, Brigham Young University, Provo, Utah (1994).

see Dr. Hecker for other literature.