

Commercial Development of a Descending Packed Bed Electrowinning Cell

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This paper describes technical work done to develop a Spouted Bed Electrode Cell into a commercially viable Electrowinning Cell. The studies have included hydrodynamic tests to understand the criteria for the circulating flow of metallic beads in the cell, particularly in the region at the entrance to the draft tube, and electrochemical tests to find a suitable diaphragm for extended time electrolysis.

Various patent pending features were developed including a double nozzle to allow for automatic stopping and restarting of the bed, an arrowhead shaped draft tube to control the flow of beads into the entrance to the draft tube, a roof-top shaped device to control the flow of beads out of the top of the draft tube, an overflow weir to allow the continuous recovery of beads from the cell, and a family of diaphragm fabrics for extended operation. Prior to the identification of the diaphragm material, short circuits would develop within a few hours.

A pilot scale cell was operated for three days, with continuous operator attention, and then for ten days coverage only on day shift. The cell is currently advancing to the next stage of development which will involve continuous testing in a commercial copper electrowinning facility.