

Fluid flow simulation in a double L-bend pipe with small nozzle outlets

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Abstract

The results of fluid flow simulation in a double L-bend pipe with small nozzle outlets were presented in this paper. The pipe geometry represents a sparger for a mixing process in a tank. The flow simulation was performed with a commercially available computational fluid dynamics package, Star-CD. The effects of the L-bend and small nozzle outlets on the velocity and pressure distributions in the pipe were discussed. The discussion will lead to an improved design of the sparger with the objective to obtain a uniform fluid discharge from the nozzle outlets.

Keywords: Flow simulation, computational fluid dynamics, velocity and pressure distributions

1 Introduction

The primary process in manufacturing computer hard discs is the process of coating nickel sulphamate solution onto the discs. The nickel solution is normally fed into a mixing tank via a double L-bend pipe, which represents a sparger with small nozzle outlets. However, the coating process may be affected by non-uniform distribution of the nickel solution inside the mixing tank, resulting in an uneven nickel coating thickness at the discs surface. It is therefore desirable to have a uniform fluid discharge from the pipe nozzle outlets in order to obtain a uniform distribution of the nickel solution inside the mixing tank. The variables that may be changed in order to get the optimum results would be the pipe geometry, design or even the control of pressure of the fluid flow as