

An integrated approach for water minimisation in a PVC manufacturing process

Abstract

This paper presents a water minimisation study carried out for a polyvinyl chloride (PVC) resins manufacturing plant. Due to the complexity of the mixed batch and continuous polymerisation process, an integrated process integration approach, which consists of process synthesis, analysis and optimisation was used for this work. A simulation model was first developed in a batch process simulation software, SuperPro Designer V6.0, based on the operating condition of a PVC manufacturing process. The batch simulation model captured the essential information needed for a water minimisation study, e.g. process duration, water mass flow, etc. Data extracted from the simulation model was later used in the water minimisation study, utilising the widely established process synthesis technique of water pinch analysis. Two water saving scenarios were presented. Scenario 1 reports a fresh water and wastewater reduction of 28.5 and 90.1% respectively, for the maximum water recovery scheme without water storage system. In Scenario 2, higher fresh water and wastewater reduction are reported at 31.7 and 100% respectively, when water storage tank is installed in the water network. © 2007 Springer-Verlag.