

89^a DEFESA DE TESE EM ENGENHARIA INDUSTRIAL

PROGRAMA DE PÓS-GRADUAÇÃO EM ENGENHARIA INDUSTRIAL - PEI



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Resumo:

Absorbers belong to the group of industrial equipment used for separation/ purification of process currents. Among the equipment to promote the absorption falling film and packed column have an extensively application in industrial plants. So, this thesis aims to propose a phenomenological model for a falling film absorber and to carry out a comparative study between it and a packed column. The falling film model is described by differential mass and energy balances coupled with algebraic equations representing the mass and energy transfer as well as the phase-equilibrium. A packed absorption column is designed by empirical correlations and modeled in Aspen Plus. This thesis also investigates a rigorous thermodynamic description for the systems: NH₃-H₂O and for the electrolyte system NH₃-H₂O-CO₂. The absorbers and thermodynamics models results are in accordance with the experimental data from literature. Regarding the comparative study of the absorbers, the technical analysis is based on phenomenological models to predict the efficiency of absorption monitoring of the temperature and concentration profiles. The economic analysis of the absorbers is based on the estimation of the investment and installation cost. The comparative study between the absorbers shows that the falling film type absorber has greater absorption capacity and it is 78% more compact than the column. But the falling film cost is almost the double of the packed column.

Palavras-chaves: falling film, packed column, absorption, ammonia and water

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