

Design and simulation of heat exchangers using Aspen HYSYS, and Aspen exchanger design and rating for paddy drying application

Abstract

Air heating unit is one of the most important parts in paddy drying to ensure the efficiency of a drying process. In addition, an optimized air heating unit does not only promise a good paddy quality, but also save more for the operating cost. This study determined the suitable and best specifications heating unit to heat air for paddy drying in the LAMB dryer. In this study, Aspen HYSYS v7.3 was used to obtain the minimum flow rate of hot water needed. The resulting data obtained from Aspen HYSYS v7.3 were used in Aspen Exchanger Design and Rating (EDR) to generate heat exchanger design and costs. The designs include shell and tubes and plate heat exchanger. The heat exchanger was designed in order to produce various drying temperatures of 40, 50, 60 and 70°C of air with different flow rate, 300, 2500 and 5000 LPM. The optimum condition for the heat exchanger were found to be plate heat exchanger with 0.6 mm plate thickness, 198.75 mm plate width, 554.8 mm plate length and 11 numbers of plates operating at 5000 LPM air flow rate.