Process Simulation, Dimensioning and Automated Cost Optimization of CO2 Capture

Master's thesis number: MT-69-22

Introduction and background:

Master projects from 2007 at the University of South-Eastern Norway and Telemark University College have included cost estimation in a spreadsheet connected to an Aspen HYSYS simulation. USN (HSN and TUC) has collaborated with different companies (SINTEF Tel-Tek, Equinor, Aker Solutions, Norcem, Yara, Skagerak and Gassnova) working on CO2 capture.

Problem description and objective:

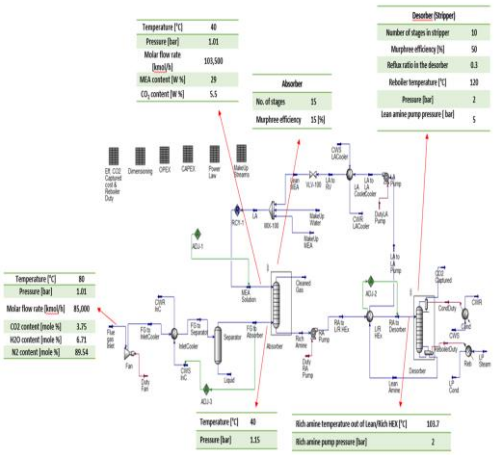
The general aim is to develop further models in Aspen HYSYS, especially for cost optimization of CO2 capture by amine absorption. A special aim is to utilize possibilities like the spreadsheet facility in Aspen HYSYS, the Aspen simulation workbook or an Excel connection to optimize the process.

1. Literature search on cost estimation and optimization of amine-based CO2 capture with emphasis on optimization based on simulation, dimensioning and cost estimation.

2. Aspen HYSYS simulation, dimensioning and cost estimation of different alternatives utilizing the spreadsheet facility in Aspen HYSYS.

3. Process optimization of process parameters and possibly automated optimization based on the Aspen simulation workbook or an Excel connection. Typical parameters are gas inlet temperature, temperature approach in the main heat exchanger and packing height in the absorption column. Possible challenges are optimization of the gas velocity and the pressure drop through the absorber.

4. Evaluation of limitations for cost optimization in cost estimation and cost optimization of amine-based CO2 absorption.



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