Process Study & Preliminary design of Scrubber Column

Abstract

Scrubber technology refers to a system used to remove harmful pollutants from exhaust gases by spraying a liquid into the gas stream, allowing the liquid to absorb the pollutants before the cleaned gas is released into the atmosphere. The engineering challenge of designing an efficient gas-liquid contact system - scrubber column to remove specific gaseous pollutants or particulate matter from an industrial exhaust stream to meet environmental or process requirements.

Key Objectives of the Design Problem
• Operational Optimization: Design the system to operate within specified constraints for pressure drop, temperature, and liquid-to-gas flow rates to manage energy consumption and prevent operational problems like flooding or channeling.
• Material Selection: Choose appropriate materials for the column, packing, and other components that can withstand corrosive conditions often present in industrial exhaust streams.

The goal is to optimize the physical dimensions (height and diameter) and operating parameters of the column for maximum mass transfer efficiency while minimizing operational costs, such as pressure drop, power consumption, packing material type etc.

The work involves sizing of the column dimensions, selection of packing material and other ancillary equipment, fluid flow rates & concentration study and optimization. The design process uses principles of chemical engineering, such as mass transfer theory, fluid dynamics, and thermodynamics and may involve simulation software for complex scenarios.

Under graduate student (final year) pursuing degree in Process / Chemical Engineering discipline is preferred.

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: B.E./B.Tech. Other

3) Academic Project duration:

(a) Total academic project duration: 20 Weeks
(b) Student's presence at IPR for academic project work: 3 Full working Days per week

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