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Validation of a LiquiSonic Online Sensor: Towards a Dynamic Measurement of Alkanolamine Strength in Gas Treatment and Carbon Capture Plants

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Abstract

The demand for reliable energy increases daily with new technologies, such as Humanoids, crypto mining, etc., requiring a constant supply of electricity for their production and functionality. In order to meet world's decarbonization targets by 2050, the International Energy Agency (IEA) predicts that the growth of electricity's share in final energy consumption will near 30% in 2030.[1] This growth in energy will be supported by expansions in data centers worldwide [2], which utilize supercomputers for data processing.

Natural gas remains a less pollute source of energy, with less carbon emissions compared to other fossil fuels, such as coal. [3] For it to be accessible to the society, sour gases (H_2S and CO_2) need to be removed and reused either through re-injection in the oil wells or production of Sulphur products. The best separation technology of sour gases, so far, remains the absorption processes using aqueous alkanolamine chemicals. However, their absorption capacity needs to be maintained and monitored for large scale production, through a continuous measurement of the alkalinity of aqueous alkanolamine solutions and addition of fresh amine chemicals to balance the acid-base reaction chemistry.

To continuously produce and balance the acid-base absorption reaction in the gas separation process, continuous measurements using liquid online analyzers is the most feasible, less tedious and fast solution for process engineering which may result in quick decision making and environmental protection. A LiquiSonic Online Sensor was evaluated at a lab scale for the methyl diethanolamine (MDEA) and water (H_2O) solution at different conditions and validated against standard laboratory methods to increase the speed of decision making in gas production plants, located 200 KM away from the central laboratory. This online analyzer will also minimize human errors and improve speed, data availability and reliability for the process engineering.

Accuracy, as trueness, was the key validation parameter monitored in the laboratory piloting scale to ensure a reliable data before the deployment of the analyzer for big decision making in the process.

Keywords: Sensing Solution;Liquid-Based Technology;Process Instrumentation;Gas Sweetening;Online Analyzer.

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