

515c Development of a High Recovery O2 PvsA System

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Over several decades of evolution, oxygen production from air by pressure swing adsorption (either PSA, VSA or PVSA) has become a cost-effective solution for purity needs of less than 95%. Systems have been commercialized for production rates of less than 1 SLPM for medical concentrators to greater than 200 TPD to serve industrial customers. In spite of the wide range of sizes, the vast majority of these systems are based on one or two bed systems. A few companies have recognized that three or more bed systems can offer cost benefits for certain limited size ranges.

We will show that with the proper integration of process, adsorbent kinetics, and hardware, even four bed systems can be cost effective across a fairly wide range of production rates. We have developed such a four bed PVSA process which can achieve up to 70% recovery at 93% purity. There is no idle time for either the compressor or vacuum and no product tank is required. Process simulation was used to develop the cycle, which was then confirmed by experimental data. Important hardware and adsorbent issues to enable development of commercial systems based on the process will be discussed.