

Impacts of Pressure Differentials between Flash Tanks on Flash Train Performance

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Abstract

The operational performance of a Bayer process digestion facility and the hence overall performance of an alumina refinery are significantly influenced by flash train design and performance. The mechanical and process design of a digestion facility must include the correct number of flash stages to match the range of operating conditions that are likely to be encountered. This will ensure the pressure differentials between flash tanks are within acceptable limits and the facility availability is high. This paper will review a number of digestion facility designs that accommodate maximum digestion temperatures across the range of 145 – 280°C. The design methodologies used to suppress the onset of three-phase flow between flash tanks (including both up-flow and down-flow designs) and the techniques used to minimise erosive wear will be discussed in detail. Finally, recommendations will be provided emphasising considerations that need to be understood when designing bauxite digestion facilities.

Keywords: Three-phase mixture velocity; wears; number of flash stages; pressure differentials.