Energy Consumption Optimization in Alumina Production

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Abstract

The alumina production process consumes not only raw materials, but also different forms of energy such as electrical, natural gas and steam. Energy is a key component of production cost, and the alumina industry works toward energy consumption reduction to maintain or improve their place in the world market. Energy is primarily used in the Bayer process as steam in the digestion and evaporation areas. The ETI alumina refinery in Seydişehir has been examining ways to reduce energy consumption and improve the overall energy efficiency of the refinery. This has included evaluating process design parameters, equipment efficiency, and waste heat recovery. In this paper, an understanding the `overall refinery energy usage is first established, then the operating efficiency in terms of energy consumption is evaluated by examining the major energy consuming areas of digestion and evaporation. The study has shown that the energy efficiency of the ETI alumina plant can be improved in the digestion area by lowering the molar ratio and in the evaporation area by by-passing spent liquor around the evaporation circuit.

Keywords: Bayer Process; Energy Optimization; Evaporation; Digestion; Steam