

S1.4.3 CONTINUOUS EFFLUENT PRODUCTION FROM CATALYTIC SLURRY REACTOR VIA CANDLE FILTRATION

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In a 3-phase slurry reactor, a solid phase catalyst is used to promote a reaction between a liquid phase component and a gas phase component. This continuous reactor system provides solids-free liquid effluent as the product, while retaining the catalyst within the system to promote the reaction. This system is complicated by the need to manage fines that accumulate in the system due to attrition of the solids. A number of separation technologies were screened for this application. Continuous candle filtration in an external circulation loop around the reactor was chosen as the preferred technology.

This study covers a laboratory investigation of a model system of alumina in water to better understand solids accumulation and management within the system. Approach velocity towards the candle (or flux) and downward tangential velocity of the slurry past the candle were found to be important variables affecting solids accumulation rate. Through use of appropriate media, fines could be managed by purging them in the filtrate, and then caught in downstream polish filtration. A high-level schematic of a preliminary production scale filtration system is presented.