DESIGN OF MULTI-CYCLE SINGLE-USE FILTER SYSTEMS

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In recent years, single-use (SU) processing has gained acceptance in the biotech and pharma sector to meet FDA regulations and eliminate issues with cross contamination. Disposable solid-liquid separation devices can offer cost advantages and increased productivity over traditional reusable, fixed-design equipment. SU filter systems eliminate the need for cleaning and sterilization in place, as well as validation of these steps, that are required to prevent contamination between batches or between production campaigns.

This paper presents a new solid-liquid filter design for single-use biotechnology operations. To meet industry requirements for harvesting cell cultures and slurries from bioreactors, a membrane-type filter has been developed with a high ratio of filter area to vessel volume which minimizes hold-up time. The media is back-washable in place thus offering multi-cycle operation, as well as cake washing and drying, all important for fed-batch and perfusion processes. This offers a significant extension of the utilization of a SU filtering device.

Guidelines are included for media selection, materials of construction, pressure and flow capacity, and post-filtration solids processing like cake washing and dewatering. Of particular interest for plant designers and operators, multi-cycle single-use filters provide a viable alternative to traditional one-time use depth filters. This design has also found uses in other industries where handling toxic substances is required.