

Testing of Recleanable and Sustainable Metal Media Filters

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Abstract

Many types of filter media, ranging from single use (deposable) to semi-permanent, are utilized today for separation of particular matter in industrial filtration applications. Semi-permanent media are usually cleanable, either on or off-line, and are intended for sustainable, often multi-year, operating life. Sintered metal powder media are semi-permanent media that provide excellent performance for demanding solids/liquid separation and gas/solid separation processes found in the chemical process, petrochemical and power generation industries. Applications require particulate removal to protect downstream equipment, for product separation, or to meet environmental regulations. Sintered metal media have demonstrated high particle efficiency removal, reliable filtration performance, effective backwash capability, and long on-stream service where other media often are not a cost-effective solution. Along with the filtration efficiency consideration, equally important criteria include corrosion resistance, mechanical strength at service temperature, cake release (blowback cleanability), and long on-stream service life. These issues are critical to achieving successful, cost effective operations.

This paper will discuss the basic approaches used for media selection and testing to ensure successful implementation of porous metal media in sustainable (cleanable) filter operation. Selection of the appropriate filter media starts with an evaluation of the process requirements. Proper media selection requires appropriate knowledge of the media, fluid, and particle properties. Fluid properties include fluid velocity through the filter media, viscosity, temperature and pressure, and corrosive nature. Selection of specific media grade requires an understanding of the particle properties such as particle size, shape, density and stickiness. For example, catalyst particulate matter of the same type can produce totally different filtration results. Attrition of the catalyst will also affect overall filter performance. Media testing begins with a simple disc test to qualify media and determine filtration characteristics. More advanced bench-scale and pilot scale testing is then used to verify filter-operating parameters for scale-up design of a commercial filter system. Experimental data will demonstrate the effect of particle size on filter performance. Also included are guidelines for filter scale-up design regarding operating parameters and recommended filter housing configuration using different particulate materials.