

Use of a moving bed granular filter for clean up of hot producer gas

J. Nunez, K. Cummer, R. C. Brown, and J. Smeenk
Center for Sustainable Environmental Technologies
Iowa State University
286 Metals Development Building
Ames, IA 50011-3020
Fax: 515-294-3091; rcbrown@iastate.edu

We have developed a moving bed granular filter (MBGF) suitable for dry scrubbing of product gas from biomass gasifiers. The filter is intended to remove particles from producer gas with high efficiency and low-pressure drop. Moving bed granular filters operate on the principle that a flowing bed of particles can effectively scrub particulate contaminant from a gas stream. Although very promising for achieving high filtration efficiencies, the relatively large footprint of the equipment and high throughputs of granular material as filter media are cited as drawbacks to MBGFs. We are exploring mechanical changes in the design of MBGFs ameliorate these problems. A counter-flow arrangement establishes a dust cake at the interface between the gas and granular bed. We hypothesize that the dust cake, if carefully maintained at optimum thickness, will enhance filtration efficiency.

We have successfully tested a moving bed granular filter to remove dust from hot producer gas. A filter of 0.914 m (36 in.) dia. was able to remove 97 - 98% of the 60 g m⁻³ dust loading from a 345 m³ h⁻¹ (220 ft³ min⁻¹) gas flow. Steady state pressure drop never exceeded 80 mm water (3.0 in. water).

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