Analisis pengaruh dimensi vortex finder terhadap performa cyclone separator pada sistem gasifikasi biomassa = Analysis of the influence of vortex finder dimension on cyclone separator performance in biomass gasification system

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Abstrak

Producer gas hasil gasifikasi biomassa masih mengandung pengotor berupa abu. Pembersihan producer gas dilakukan menggunakan cyclone separator. Sebuah model cyclone separator konfigurasi standar 2D2D berdiameter 150 mm telah dibuat. Tiga variasi panjang (3/8 D; 5/8 D; 1 D) dan tiga variasi diameter (35; 70; 85) vortex finder digunakan untuk mengetahui pengaruhnya terhadap performa cyclone. Eksperimen dan simulasi CFD menggunakan Ansys Fluent telah dilakukan. Simulasi CFD bertujuan untuk mengetahui profil kecepatan didalam cyclone separator. Hasil eksperimen menunjukkan semakin panjang vortex finder, collection efficiency semakin tinggi. Hasil simulasi CFD mendukung kesimpulan hasil eksperimen. Didapatkan dimensi vortex finder optimum dengan diameter 35 mm (1/4 D) dan panjang 1D (150 mm).
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Producer gas produced from biomass gasification still contain particulate ash. Producer gas is cleaned by use of cyclone separator. A cyclone separator model with 2D2D standard configuration with diameter150 mm was made. Three variation of length (3/8 D; 5/8 D; 1 D) and three variation of diameter (35; 70; 85 mm) of vortex finder are used to identify their influence on cyclone performance. Experimental study and CFD Simulation using Ansys Fluent were performed. CFD simulation goal is to determine the velocity profile inside cyclone separator. Experimental results shows that increasing vortex finder length can increase the collection efficiency. The optimum vortex finder dimension is 35 mm (1/4 D) in diameter and 1 D (150 mm) in length.