

Analisis karakteristik operasi berkelanjutan reaktor gasifikasi biomassa tipe unggun tetap aliran bawah terhadap kualitas gas sintetis = Analysis of fix bed downdraft biomass gasification reactors continues operating characteristics towards synthetic gas quality

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Abstrak

Segala potensi sumber daya energi perlu kita manfaatkan demi terjaganya ketahanan energi bangsa. Indonesia, negara kepulauan dengan kapasitas biomasnya yang mencapai potensi 32,6 GW perlu memperdalam penguasaan teknologi pengolahannya. Gasifier Biomassa Fixed Bed Downdraft cocok digunakan untuk menghasilkan energi pada kondisi ini. Dengan target 50 kW reaktor berdiameter 25 cm memerlukan karakter operasi agar produk hasil mampu stabil dan bernilai energi tinggi. Secara teoritis perlu diciptakan kesetabilan ER 0,23 untuk gasifier pendahulunya dimana reaktor merupakan silinder kedap, agak berbeda dengan gasifier prototype ini. Implementasi karakter operasi berupa feed rate 10,52 kg/jam, flow primer 2,83 m³/s, flow hisap 4,64 m³/s, dan char removal rate 1,43 RPM, didapatkan mampu continuous memiliki nilai HHV tertinggi 3,72 MJ/Nm³, dengan cold gas efficiency sebesar 9,9% yang menandakan perlu koreksi desain untuk reaktor.

We need to use all potential energy resources for the sake of maintaining the nation's energy security. Indonesia, an archipelagic country with a biomass capacity that reaches a potential of 32.6 GW, needs to deepen its mastery of processing technology. Fixed Bed Downdraft Biomass Gasifier is suitable for producing energy in this condition. With a target of 50 kW reactor with a diameter of 25 cm, it requires the character of the operation so that the product can be stable and of high energy value. Theoretically it is necessary to create an ER 0.23 stability for its predecessor gasifier where reactors are impermeable cylinders, somewhat different from this gasifier prototype. The operational character implementation is in the form of a feed rate of 10.52 kg / hour, primary flow of 2.83 m³ / s, suction flow of 4.64 m³ / s, and char removal rate of 1.43 RPM, which is found to have the highest HHV value of 3.72 MJ / Nm³, with a cold gas efficiency of 9.9% indicating a need for design correction for the reactor.