Abstract:

One of the challenges by the development of novel gasifiers operating at high pressures (up to 65 bar) is the construction of alternative proper feeding systems for the brown coal without obstacles of the currently used feeders. The currently applied feeding systems operate discontinuously using locks with a maximum pressure level of approx. 35 bar. A new developed feeding system must achieve a higher pressure level and waive the use of locks. A promising alternative is the use of briquetting press. A highly compacted moving brown coal briquette plug of sufficient length and density allows a gas tight separation of pressurized gasifier from the environment. The required gas tightness of the transport channel between briquetting press and pressurized gasifier can be achieved through the sufficient density and cross-bracing of briquettes in the press channel by compression of the brown coal with 1400-1500 bar briquetting pressure. The different qualities of brown coal from the various coal deposits concerning their material composition (for example bitumen, wax, resin) require the adjustment of the operational process parameters for the feeding of the respective brown coal sort in to the pressurized vessel. Special attention is paid to the grain size and the water content of the brown coal for the creation of a dense and gas-tight briquette plug. In addition, operating parameters of briquetting as a briquetting pressure and the briquetting velocity play a decisive role for the successful sealing of the pressurized gasification reactor against the feeding system.

The investigations with various coal qualities and different new developed press channel geometries show a uniform pressure profile without big fluctuations during the briquetting process. The best results were achieved using fine brown coal with a grain size of 0-1 mm and a water content of approx. 20 %. In this paper, the feeding experiments in to a pressurized vessel by means of a briquetting press with systematical variation of the operating parameters and raw materials are discussed in presentation.

Keywords: brown coal, pressurized gasifier, feeding system

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* Corresponding author:
e-mail: Alexander.Rosin@tun.tu-freiberg.de
Tel: +493731 39 2694, fax. +493731 39 3652