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Second stage distribution of biogas to an area of application after the first stage distribution has reached the zero pressure as displayed on the gauge

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Abstract content (Max 300 words) Formatting & Special chars

Every biogas digester is designed with a gas storage chamber of volume V_c . The chamber stores the gas accumulated as the result of the fermentation process within the digestion chamber until the pressure P for the specific period of time is reached. For this study a small scale $6m^3$ prefabricated biogas digester system has been deployed underground in order to study the possibility of distributing the gas to the appliance forcefully immediately after the initial supply has reached the zero pressure as displayed on the gauge. According to the manufacturer specification, the digester has $1.13 m^3$ as the maximum gas the chamber can hold. The possible upper limit of the pressure inside the chamber is $8.5 kPa$. Exceeding this limit can destroy the chamber; however, a system is designed so that if the upper limit pressure is reached the gas escapes through the outlet and inlet. It was found in this study that when $0.00 kPa$ is displayed on the gauge, the biogas at the area application is almost reduced with no pressure making any difference to the appliance. However, when a gas detector was positioned at the end of the gas outlet pipe it detected a useful concentration level of CH_4 for a reasonable period of time. This led to the second test using a meter to measure the amount of biogas that can be forcibly removed from the digester using a simple hand held vacuum pump placed at the end of the gas supplying pipe. The aim of this study was to develop a method that can be used to aid biogas digesters operators to optimise the production of biogas at low cost.

Key words: biogas digester, zero pressure, vacuum pump,

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PhD

Main supervisor (name and email) and his / her institution

DR DAVID TINARWO

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Primary author: Mr NEKHUBVI, vhutshilo 1st mountaineer (UNIVERSITY OF VENDA)

Co-author: Dr TINARWO, DAVID (UNIVERSITY OF VENDA)

Presenters: Dr TINARWO, DAVID (UNIVERSITY OF VENDA); Mr NEKHUBVI, vhutshilo 1st mountaineer (UNIVERSITY OF VENDA)

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