

ABSTRAK

Dewasa ini ada berbagai jenis pompa yang telah ditemukan, contohnya pompa sentrifugal, pompa desak, pompa hidrolis, *jet pumps*, pompa udara tekan dan lainnya. Pompa udara tekan memiliki efisiensi yang paling rendah diantara pompa lainnya. Parameter yang mempengaruhi kinerja pompa udara tekan adalah tinggi pompa, diameter pipa, sistem injeksi pompa, kondisi udara yang disuntikkan, dan rasio terendam

Tujuan penelitian : (a) Mengetahui debit air yang dialirkan dan efisiensi dari tiap variasi diameter pipa yang diuji. (b) Mengetahui efisiensi terbaik dan debit terbesar dari lima variasi diameter pipa yang diuji. Penelitian dilakukan dengan metode eksperimental dengan membuat pompa udara tekan. Pompa udara tekan menggunakan udara yang dihasilkan dari kompresor. Tekanan pada kompresor di atur pada 60 psi dengan ketinggian pipa terendam 50 cm. Pompa udara tekan diuji dengan menggunakan fluida air. Variasi penelitian dilakukan pada diameter. Variabel untuk variasi diameter pipa adalah 0,5 inci, 0,625 inci, 0,75 inci, 1 inci, dan 1,25 inci, dengan 3 variasi laju aliran massa udara dan 2 perbandingan rasio terendam.

Hasil penelitian menunjukkan : (a) Efisiensi tertinggi sebesar 15,037% pada pipa 1,25 inci dengan \dot{m} udara 0,0000534 Kg/s dan rasio terendam 1:2. (b) \dot{m} air tertinggi sebesar 0,0973 Kg/s pada pipa 1,25 inci dengan \dot{m} udara 0,0000534 Kg/s dan rasio terendam 1:2. (c) Presentase kenaikan efisiensi dan \dot{m} air tertinggi sebesar 184,121% pada diameter pipa 0,5 inci dengan 0,625 inci pada \dot{m} udara 0,0000378 Kg/s dan rasio terendam 1:2. (d) Pembesaran pada diameter pipa penghantar menyebabkan efisiensi dan \dot{m} air semakin besar.

Kata kunci : pompa udara tekan, diameter pipa, efisiensi

ABSTRACT

There are many kinds of pumps which are invented nowadays, some of them are centrifugal pumps, positive displacement pumps, hydraulic pumps, jet pumps, airlift pumps and many more. Airlift pumps are the lowest in terms of their efficiency rate among other pumps. The parameters that affect the performance of airlift pumps are pump height, pipe diameter, pump injection system, injected air condition, and submerged ratio.

The research is expected to : (a) Identify water discharge conveyed by the observed pipes and the efficiency of each observed pipes which vary in their diameters. (b) Measure which one of five observed pipes have the highest efficiency rate and convey the highest amount of water discharge. This research is carried out employing experimental research method on airlift pumps creation. Airlift pumps benefit from the air produced by a compressor. The pressure is set at 60 psi with 50 cm submerged pipe height. The device is examined with the help of water. Its research variation is implemented on the pipes diameters. In order to obtain the intended result, the variable which is observed in this research are five pipes with the variations of diameters as follows : 0,5 inch, 0,625 inch, 0,75 inch, 1 inch, 1,25 inch with 3 air mass flow rates and 2 submerged ratio comparison.

The result of this research can be concluded as follows : (a) The highest efficiency rate at 15,037% is shown from the 1,25 inch in diameter pipe with the air mass flow rate at 0,0000534 Kg/s and 1:2 submerged ration comparison. (b) The highest water mass flow rate at 0,0973 Kg/s is shown from the 1,25 inch in diameter pipe with the air mass flow rate at 0,0000534 Kg/s and 1:2 submerged ration comparison. (c) Percentage increase in efficiency and the highest water mass flow rate at 184,121% is shown from the 0,5 inch in diameter pipe with 0,625 inch air mass flow rate at 0,0000378 Kg/s and 1:2 submerged ratio comparison. (d) Enlargement in the diameter of pipe causes the higher efficiency rate and water mass flow rate.

Keywords : airlift pumps, pipe diameter, efficiency