INTISARI

Karena meningkatnya populasi dunia, dan meningkatnya permintaan air bersih, dibutuhkan sebuah sistem *waste treatment* yang ekonomis, dan dapat diterapkan secara massal. *Micro-bubble* adalah metode waste treatment yang menjadi sorotan akhir-akhir ini, karena sederhana dan dapat diandalkan. Maka dari itu, sangat penting untuk mengetahui karakteristik dari *micro-bubble generator*—mesin yang menghasilkan *micro-bubble*—unttuk dibahas dalam penelitian ini.

Dalam penelitian ini, dilakukan studi eksperimental terhadap karakteristik *micro-bubble generator* tipe *porous-venturi* dengan sudut inlet 30° sudut outlet 12°. Penelitian dilakukan dengan cara menganalisis pengaruh beberapa variasi debit gas dan debit air terhadap parameter-parameter tertentu yaitu: *hydraulic power*, *bubble generating efficiency*, *pressure loss*, koefisien perpindahan massa volumetris, dan distribusi diameter bubble.

Dari penelitian ini ditemukan bahwa *hydraulic power* meningkat seiring peningkatan debit air. Dengan debit air (Q_L=30 lpm) menghasilkan *hydraulic power* yang paling rendah. Sedangkan debit gas mempunyai efek yang kecil terhadap *hydraulic power*. *Bubble generating efficiency* terendah ditemukan pada debit Q_L=80 lpm dan Q_G=0,2 lpm dan tertinggi pada Q_L=30 lpm dan Q_G=1 lpm. Lalu, koefisien perpindahan massa volumetris meningkat seiring meningkatnya debit gas. Kemudian pada analisis distribusi diameter *bubble* ditemukan bahwa *mean bubble diameter* turun seiring penurunan debit air, dan meningkat seiring peningkatan debit gas. Dimana *mean bubble diameter* terendah terdapat pada Q_L=80 lpm dan Q_G=0,2 lpm.

Kata kunci: *Micro-bubble*, *Micro-bubble generator*, MBG, karakterisasi, karakteristik, DO (*Dissolved Oxygen*), venturi

ABSTRACT

Because of the rising world population, also increases with clean water demand, therefore it is needed to develop a new and economical water treatment system, which can easily be applied to the masses. Micro-bubble is a water treatment method that is trending recently, because of its simplicity and reliability.

Therefore, in this research, the characteristics of venturi type micro-bubble generator with a porous pipe with an inlet angle of 30° and outlet angle of 12° was studied. To study the characteristics, an experimental study was conducted on effects of multiple parameters to a variety of liquid and gas flow rate combination. These parameters are: hydraulic power, bubble generating efficiency, pressure loss, volumetric mass transfer coefficient, and bubble size distribution.

After the study has been conducted, it has been found that hydraulic power increases as the liquid flow rate increases, whereas at Q_L=30 lpm produces the lowest hydraulic power, and the increase of gas flow rate had little to no effect to the hydraulic power. Lowest bubble generating efficiency is found at Q_L=80 lpm and Q_G=0,2 lpm. Highest was found at Q_L=30 lpm dan Q_G=1 lpm. Then, the volumetric mass transfer coefficient was found increasing as the gas flow rate increases. In the bubble size distribution analysis was found that mean bubble diameter declines as the water flow rate declines, and the gas flow rate increases. Whereas the lowest mean bubble diameter was found at Q_L=80 lpm and Q_G=0,2 lpm.

Keywords: Micro-bubble, Micro-bubble generator, MBG, characterization, characteristics, DO (Dissolved Oxygen), venturi