

INTISARI

Dalam rangka mencapai target produksi BBM diperlukan peralatan-peralatan yang andal untuk menunjang operasional fasilitas produksi pengolahan minyak bumi. Mengingat proses pengolahan minyak bumi sangat dinamis menyesuaikan dengan kondisi *feed* minyak mentah yang diolah, maka peralatan-peralatan utama seperti *reciprocating compressor* harus dapat menyesuaikan dengan kondisi operasional yang diharapkan. Penelitian dilakukan untuk mengetahui pengaruh dari diameter silinder kompressor terhadap unjuk kerja kompressor.

Dalam studi ini, dilakukan perubahan diameter silinder kompressor $d = 205$ mm menjadi $d = 213$ mm dengan alat uji berupa *reciprocating compressor double acting* dengan konfigurasi 2 (dua) silinder dengan daya 315 kW dan putaran 356 rpm. Kompressor tersebut menggunakan fluida kerja *mixture gas* dominan H_2 .

Hasil penelitian menunjukkan bahwa diameter silinder berpengaruh terhadap unjuk kerja kompressor seperti *capacity / flow*, efisiensi volumetrik, dan *brake horsepower*. Dari hubungan antara nilai diameter silinder terhadap *capacity*, pada $d = 205$ mm diperoleh nilai *capacity* rata-rata sebesar 16844,59 stdm³/jam, kemudian pada $d = 213$ mm diperoleh nilai *capacity* rata-rata sebesar 18132,65 stdm³/jam atau terdapat peningkatan sebesar 7,65%.

Hubungan antara nilai diameter silinder terhadap efisiensi volumetrik, pada $d = 205$ mm diperoleh nilai E_v rata-rata sebesar 92,85%, kemudian pada $d = 213$ mm diperoleh nilai E_v rata-rata sebesar 92,60% atau terdapat penurunan sebesar 0,26%. Hubungan antara nilai diameter silinder terhadap *brake horsepower*, pada $d = 205$ mm diperoleh nilai *BHP* rata-rata sebesar 70,71 kW, kemudian pada $d = 213$ mm diperoleh nilai *BHP* rata-rata sebesar 79,26 kW atau terdapat peningkatan sebesar 12,08%.

Kata Kunci: *reciprocating compressor*, unjuk kerja, silinder, *capacity*, *flow*, efisiensi volumetrik, *brake horsepower*

ABSTRACT

In order to achieve the fuel production target, reliable equipment is needed to support the operation of petroleum processing production facilities. Considering that the petroleum processing process is very dynamic in adapting to the feed conditions of the crude oil feed being processed, the main equipment such as a reciprocating compressor must be able to adapt to the expected operational conditions. The research was conducted to determine the effect of the compressor cylinder diameter on compressor performance.

In this study, compressor cylinder diameter changed from $d = 205$ mm to $d = 213$ mm. Compressor type is double acting reciprocating compressor with configuration of 2 (two) cylinders with rated power of 315 kW and rotation of 356 rpm. The compressor uses a mixture of H_2 dominant gas as service fluid.

The results showed that the cylinder diameter affects the compressor performance such as capacity / flow, volumetric efficiency, and brake horsepower. The relationship between cylinder diameter value and capacity, at $d = 205$ mm, the average capacity value obtained is 16844,59 stdm³/hour and at $d = 213$ mm the average capacity value obtained is 18132.65 59 stdm³/hour or there is an increase of 7.65%.

The relationship between cylinder diameter value and volumetric efficiency, at $d = 205$ mm the average E_v value obtained is 92.85% and at $d = 213$ mm the average E_v value obtained is 92.60% or there is a decrease of 0.26 %. The relationship between cylinder diameter value and brake horsepower, at $d = 205$ mm obtained average values of BHP is 70,71 kW and at $d = 213$ mm the average BHP value obtained is 79.26 kW or there is an increase of 12.08 %.

Keywords: reciprocating compressor, performance, cylinder, capacity, flow, volumetric efficiency, brake horsepower