

ABSTRAK

ANALISIS PENGARUH PENAMBAHAN *ACCUMULATOR* PADA MESIN 3R (*RECOVERY, RECYCLE, REUSE*) *REFRIGERANT* TERHADAP KINERJA MESIN

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(2026: xvi + 72 Halaman + 14 Gambar + 9 Tabel + 8 Lampiran)

Mesin 3R (*Recovery, Recycle, Reuse*) *refrigerant* digunakan untuk mengambil kembali *refrigerant* agar dapat dimanfaatkan kembali sehingga mengurangi dampak pencemaran lingkungan. Salah satu komponen yang dapat meningkatkan kinerja mesin adalah *accumulator*, yang berfungsi menjaga kestabilan aliran *refrigerant* menuju kompresor. Penelitian ini bertujuan untuk menganalisis pengaruh penambahan *accumulator* terhadap kinerja mesin 3R *refrigerant* berdasarkan tekanan kerja, konsumsi energi listrik, waktu proses *recovery*, massa *refrigerant* yang dipulihkan, dan *Specific Energy Consumption* (SEC). Metode penelitian yang digunakan adalah metode eksperimen dengan membandingkan kondisi mesin sebelum dan sesudah pemasangan *accumulator*. Hasil penelitian menunjukkan bahwa penambahan *accumulator* mampu meningkatkan efisiensi proses *recovery*. Waktu *recovery* berkurang dari 0,06 jam menjadi 0,05 jam atau lebih cepat sebesar 16,67%, sedangkan konsumsi energi listrik menurun dari 0,021918 kWh menjadi 0,018345 kWh atau sebesar 16,29%. Nilai SEC juga mengalami penurunan dari 0,062622 kWh/kg menjadi 0,052414 kWh/kg atau sebesar 16,30%, sementara massa *refrigerant* yang berhasil dipulihkan tetap sebesar 0,35 kg. Berdasarkan hasil tersebut dapat disimpulkan bahwa penambahan *accumulator* mampu meningkatkan efisiensi kerja mesin 3R *refrigerant* melalui penurunan waktu proses dan konsumsi energi tanpa memengaruhi jumlah *refrigerant* yang berhasil dipulihkan.

Kata Kunci: *Accumulator*, mesin 3R *refrigerant*, *recovery refrigerant*, efisiensi energi, *Specific Energy Consumption* (SEC).

ABSTRACT

ANALYSIS OF THE EFFECT OF ADDING AN ACCUMULATOR TO A 3R (RECOVERY, RECYCLE, REUSE) REFRIGERANT MACHINE ON MACHINE PERFORMANCE

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A 3R (Recovery, Recycle, Reuse) refrigerant machine is used to recover refrigerant for reuse, thereby reducing environmental pollution. One of the components that can improve machine performance is the accumulator, which stabilizes the refrigerant flow entering the compressor. This study aimed to analyze the effect of adding an accumulator on the performance of a 3R refrigerant machine in terms of operating pressure, electrical energy consumption, recovery time, recovered refrigerant mass, and Specific Energy Consumption (SEC). An experimental method was employed by comparing machine performance before and after the installation of the accumulator. The results showed that the addition of an accumulator improved the recovery efficiency. The recovery time decreased from 0.06 hours to 0.05 hours, representing a 16.67% reduction, while electrical energy consumption decreased from 0.021918 kWh to 0.018345 kWh, equivalent to an energy saving of 16.29%. The SEC value also decreased from 0.062622 kWh/kg to 0.052414 kWh/kg, indicating an efficiency improvement of 16.30%, whereas the recovered refrigerant mass remained constant at 0.35 kg. Therefore, it can be concluded that the addition of an accumulator improves the efficiency of the 3R refrigerant machine by reducing recovery time and energy consumption without affecting the amount of recovered refrigerant.

Keyword : Accumulator, 3R refrigerant machine, refrigerant recovery, energy efficiency, Specific Energy Consumption (SEC).