

ABSTRAK

Pada instalasi proses produksi *Vinyl Chloride Monomer* (VCM) yang berbahan dasar *Ethylene Dichloride* (EDC) di sebuah perusahaan kimia terdapat keperluan proses pemanasan 320000 kg/jam aliran fluida EDC *Heavy* dari *Top Columb Distillation* temperature $95 \text{ }^\circ\text{C}$ menjadi $108 \text{ }^\circ\text{C}$ pada *Bottom Columb*. Alat penukar kalor *Heat Exchanger Shell and Tube* dengan dimensi Diameter *shell* 930 mm , panjang 4872 mm , Jumlah tube 677 dengan ukuran tube standar 1 inch dipergunakan untuk keperluan tersebut, dengan media pemanas aliran fluida *steam* yang bertemperatur $134 \text{ }^\circ\text{C}$. Setelah dioperasikan selama kurang lebih sepuluh bulan, *performance* alat penukar kalor tersebut mengalami penurunan efisiensi yang dimana terdapat pemborosan fluida pemanas yang selalu dipantau dalam proses operasinya. Dalam penelitian ini akan dilakukan inspeksi secara visual dengan mengukur ketebalan dinding pada bagian *heat exchanger* serta menghitung dan membandingkan nilai faktor pengotoranya. Penurunan *performance* termal *heat exchanger* terjadi karena kurang maksimalnya penyerapan panas antara fluida pemanas (*steam*) dengan fluida yang dipanaskan (*EDC Heavy*) hal ini terjadi karena adanya pengotoran atau deposit yang menempel pada *tube* menyebabkan terjadinya penghambat proses perpindahan panas antara fluida di luar dan di dalam *tube*. Hal ini terlihat dari nilai faktor pengotoran $Rd = 0,00101460150$ jauh dari nilai pengotoran awal yaitu $0,000032768$. Dari hasil analisis efisiensi performa *heat exchanger* direkomendasikan *maintenance* untuk mengembalikan performa alat penukar kalor ini berupa pembersihan rutin setiap delapan bulan sekali pada seluruh permukaan *tube* baik pada bagian luar maupun bagian dalam *tube* menggunakan *water jetter* (dengan campuran cairan *chemical*) guna untuk mengembalikan *performance heat exchanger* dalam kondisi optimal operasi.

Kata Kunci: *Shell and Tube Heat Exchanger, Ethylene Dichloride, Performance, Alat Penukar Kalor, Faktor Kekotoran.*

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**PERFORMANCE ANALYSIS OF SHELL AND TUBE HEAT EXCHANGER
VH131 CAPACITY 320000 KG/H FOR REBOILER
HEAVY ETHYLENE DICHLORIDE**

ABSTRACT

At the production process installation of the Vinyl Chloride Monomer (VCM) production process which is made from Ethylene Dichloride (EDC) in a chemical company, there is a need for a heating process of 320,000 kg/hour of EDC Heavy fluid flow from Top Columb Distillation temperature of 95 °C to 108 °C in Bottom Columb. Shell and Tube Heat Exchanger heat exchanger with dimensions of shell diameter 930 mm, length 4872 mm, number of 677 tubes with a standard tube size of 1 inch is used for this purpose, with a steam fluid flow heating medium with a temperature of 134 °C. After being operated for approximately ten months, the performance of the heat exchanger decreased in effectiveness, which resulted in wastage of heating fluid which was always monitored during the operation process. In this research, a visual inspection will be carried out by measuring the wall thickness of the heat exchanger section and calculating and comparing the impurity factor values. The decrease in the thermal performance of the heat exchanger occurs due to less than optimal heat absorption between the heating fluid (steam) and the heated fluid (EDC Heavy). This occurs due to dirt or deposits attached to the tube causing obstacles to the heat transfer process between the fluid outside and inside tubes. This can be seen from the fouling factor value $R_d = 0.00101460150$ which is far from the initial fouling value, namely 0.000032768. From the results of the analysis of the effectiveness of the heat exchanger performance, maintenance is recommended to restore the performance of this heat exchanger in the form of routine cleaning every eight months on the entire surface of the tube, both on the outside and inside of the tube using a water jetter (with a mixture of chemical fluids) in order to restore the performance of the heat exchanger in optimal operation.

Keywords: *Shell and Tube Heat Exchanger, Ethylene Dichloride, Performance, Heat Exchanger, Fouling Factor.*