RE-DESIGN METHANATOR FEED/EFFLUENT EXCHANGER
114-C PLANT AMMONIA PT. PETROKIMIA GRESIK USING
HEAT TRANSFER ANALYSIS AND THERMODYNAMIC

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Abstract
Towards fulfill necessity of demand, PT PETROKIMIA GRESIK be accused to give a good service with fulfill the demand. That need high efficiency of production rate and this related to products equipment exist within, no exception the methanator feed/effluent exchanger. But the last data said the plugging have done in this HE cause the effectiveness weaken, high pressure drop too. Because of that, need a Re-design to get a new dimension from this HE in order to get better performance.

This methanator feed/effluent exchanger redesign using thermodynamic analysis and heat transfer with LMTD method to get their dimension dimensinya. This redesign variated number of passes and percent of plugging eventually going to cause effect for this heat exchanger effectiveness. With LMTD method, a value of U(Overall heat Tranfer Coefficient) will be obtained by iteration process which will compare with the U assumption and the real U will be obtained too with the correction of value less than 0,001 . After get the best dimension, using NTU-ε to know the performance of designed HE. Pressure drop calculation were also performed to find out pressure loss occured, whether exceed the allowable pressure drop . In NTU-ε, will varied number of plugging to find out maksimal value on the new design.

The result from this final project is a new dimension fro methanator feed/effluent exchanger which have 2 passes tube and one shell pass. The obtained dimension from this methanator feed/effluent exchanger grouped into two kind, tube and shell dimension. In tube dimension, length of the tube is 14,63594395 m with same existing number of tube HE 1619. And the length of the shell’s zone is 7,31797 m with three baffles. And the inside shell’s diameter is 1,999538804 m. Maksimum value from the number of tube plugging allow is 20% from 1619 tube, if more than 20%, fluids temperature product less than
280°C which a requirement chemical process reaction inside the methanator, is 279°C

Keyword: Methanator Feed/Effluent Exchanger; LMTD; NTU; Pressure Drop; Re-Design Heat Exchanger; Shell and tube dimension; %Plugging