ABSTRACT

The production unit of urea manufacture is a factory that produces Urea fertilizer by using CO_2 gas and liquid ammonia from ammonia factory of PT. Petrokimia Gresik as raw material from urea manufacture. The process of making urea fertilizer through the stages of the synthesis unit using reactor tool, stripper, and condenser. The reactor functions to produce ammonia with CO_2 which forms ammonium carbamate with a very exothermic reaction which is then followed by the dehydration reaction of carbamate into urea which is an endothermic reaction. Where the synthesis reactor operates at 190˚C and at a pressure of 175 kg / cm^2G. The fluids flowing in the DC-101 reactor are mostly corrosive fluids, especially ammonium carbamate. This is a major factor that has the potential to cause a decrease in the quality of the reactor which will affect the conversion of reaction, flow rate, and so forth.

In making this final task carried out several stages such as the introduction which is the introduction of PT Petrokimia Gresik. Then pass the literature study and field study to study the deeper urea unit. Finally, the final drafting is done by evaluating the work of the DC-101 Reactor by calculating the mass balance and energy balance in the urea production unit of PT Pertrokimia Gresik.

From the specific tasks that have been completed it can be concluded that the design mass balance is 196973 kg / hour, while the actual mass balance is 189670.35 kg / hour. While in the calculation of the energy balance, the total yield Q obtained from the input energy balance is 330407233.1 kJ and the total Q of the output energy balance design is 205678519.7 kJ. Whereas, the total Q of the balance of the actual input energy is 310537133.2 kJ and Q the total actual output is 191225814.9 Kj. Heat efficiency in design and actual shows 62.25% and 61.58% respectively.

Keywords: Urea, Reactor, Mass Balance, Energy Balance.