

Table 1: Tube material effect on U

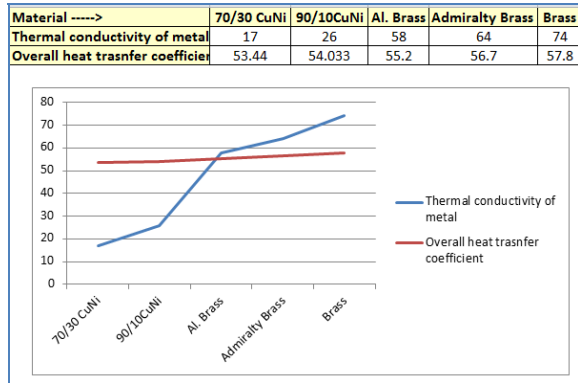


Figure 6: Tube metallurgy Vs. Overall heat transfer coefficient.

6.2 Change in Baffle spacing:

As the baffle spacing is decreased the no of baffles will be increased. Which will lead to increase in shell side Reynolds’s number. That will lead to increase in overall heat transfer coefficient. But at the same time pressure drop will be increased. Following are the graph showing the individual and combine effect of baffle spacing Vs. overall heat transfer coefficient & pressure drop.

Table 2: Baffle spacing effect on U

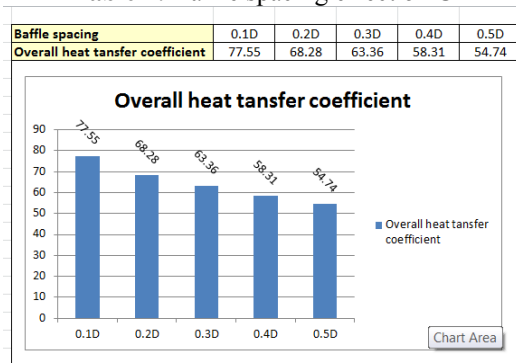


Figure 7: Baffle spacing Vs. Overall heat transfer coefficient

6.3 Effect of baffle spacing on pressure drop:

It can be observed from the following chart that as we decrease the baffle spacing the heat transfer coefficient will be increased but at the same time the pressure drop will increase remarkable. So, for getting better heat transfer from the baffle spacing modification may lead to heavy operational cost. So, the baffle spacing to be selected with available pressure drop margin.

Table 1: Baffle spacing effect on U & Pressure drop

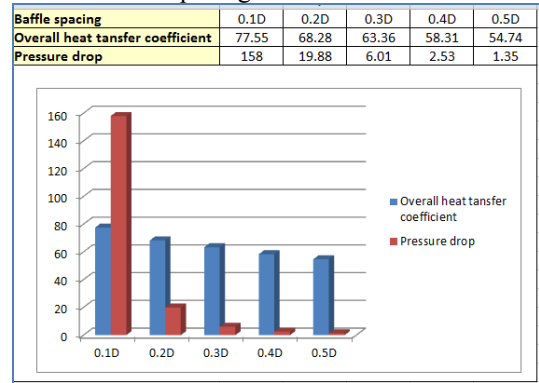


Figure 7: Baffle spacing effect on overall heat transfer coefficient and pressure drop.

7. Conclusion

On the basis of above study it is clear that a lot of factors affect the performance of the heat exchanger and the optimization obtained by the formulas depicts the cumulative effect of all the factors over the performance of the heat exchanger. It is observed that by changing the value of one variable the by keeping the rest variable as constant we can obtain the different results. Based on that result we can optimize the design of the shell and tube type heat exchanger. Higher the thermal conductivity of the tube metallurgy higher the heat transfer rate will be achieved. Less is the baffle spacing , more is the shell side passes, higher the heat transfer but at the cost of the pressure drop. So, while optimization it must be taken care that the advantage in one of the output parameter can affect the other parameters, which can lead to increase in initial or operating cost.

8. Future Scope

Currently developed MS Excel program have many variables which needs to feed manually like liquid properties. The various liquid properties can be saved in database and can be used without feeding manual data. Curve fitting algorithm can be implemented to read the values from the graph when user provides one parameter.

9. Reference

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Durgesh Bhatt received BE in 2006 from IEI, India in 2007, Worked as a design engineer in gear manufacturing company, currently perusing master degree from Sri Satya Sai Institute of Science & Technology in Thermal Branch.

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