

Lecture Five

Design Analysis Methods in HE by Graphing

The NTU is a measure of the heat transfer size of the exchanger; the larger the value of NTU , the closer the heat exchanger approaches its thermodynamic limit.

The effectiveness of various types of heat exchangers in the form of graphs (prepared by Kays and London) for values of $R \left(= \frac{C_{min}}{C_{max}} \right)$ and NTU are shown in Fig. 10.44 to 10.49.

a- Parallel Flow.

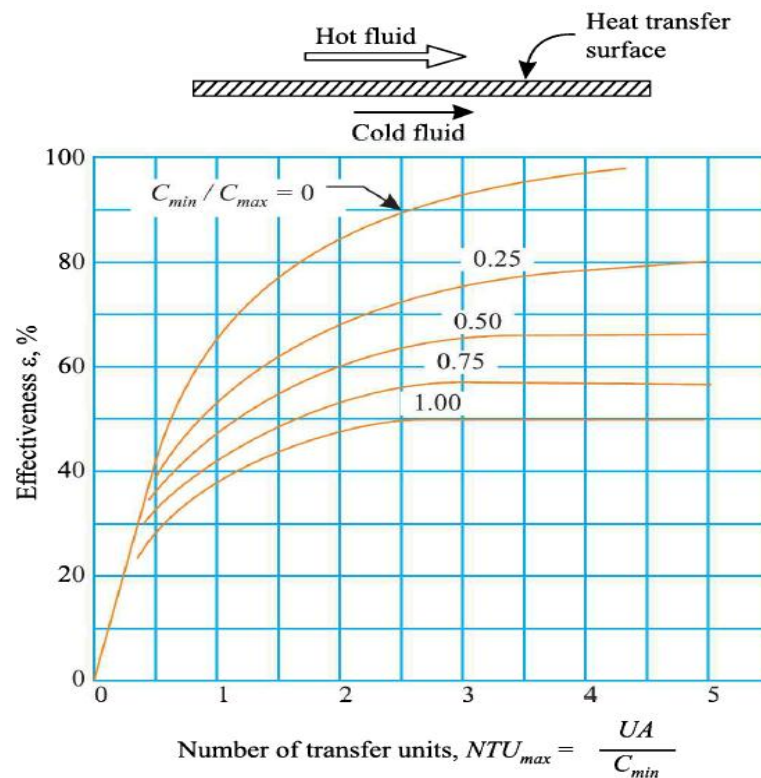


Fig. 10.44. Effectiveness for parallel flow heat exchanger.

b- Counter Flow.

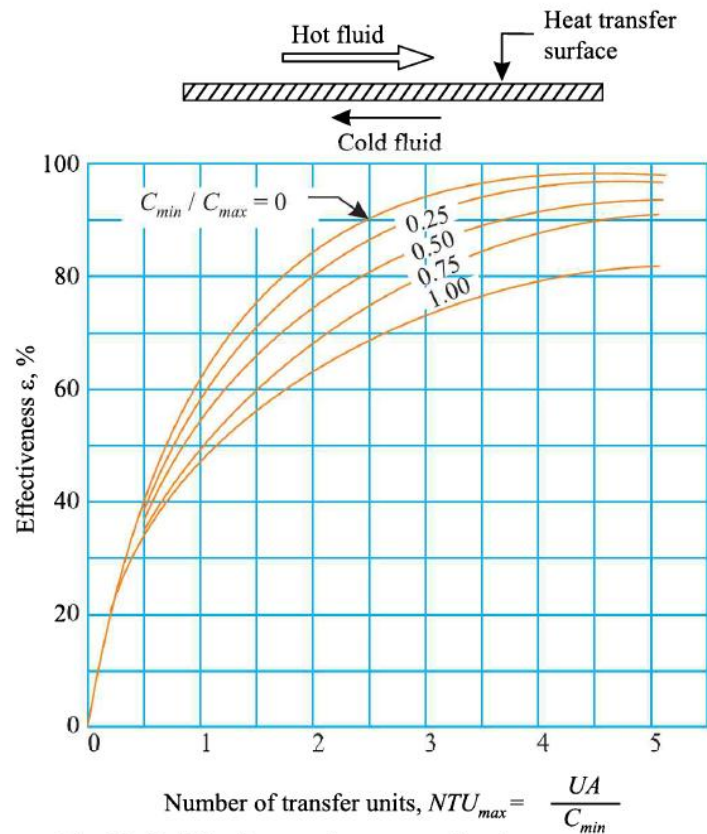


Fig. 10.45. Effectiveness for counter-flow heat exchange.

c- One shell pass and 2,4,6 etc, Tube passes.

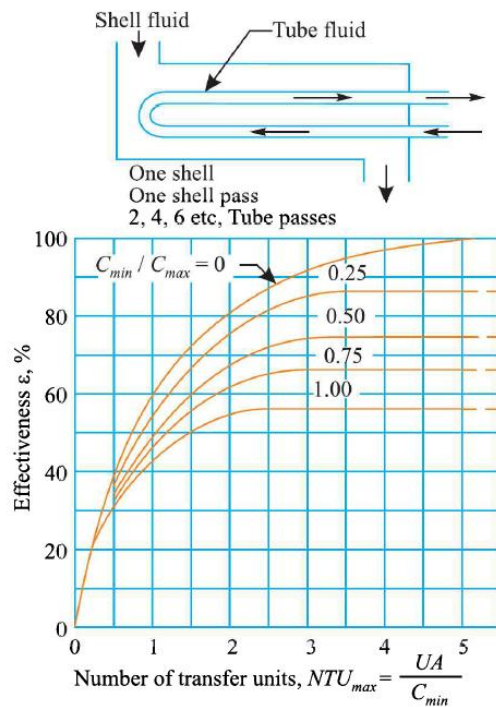


Fig. 10.46. Effectiveness for 1-2 parallel counter-flow heat exchanger.

d- Two shell passes 4,8,12 etc, Tube passes.

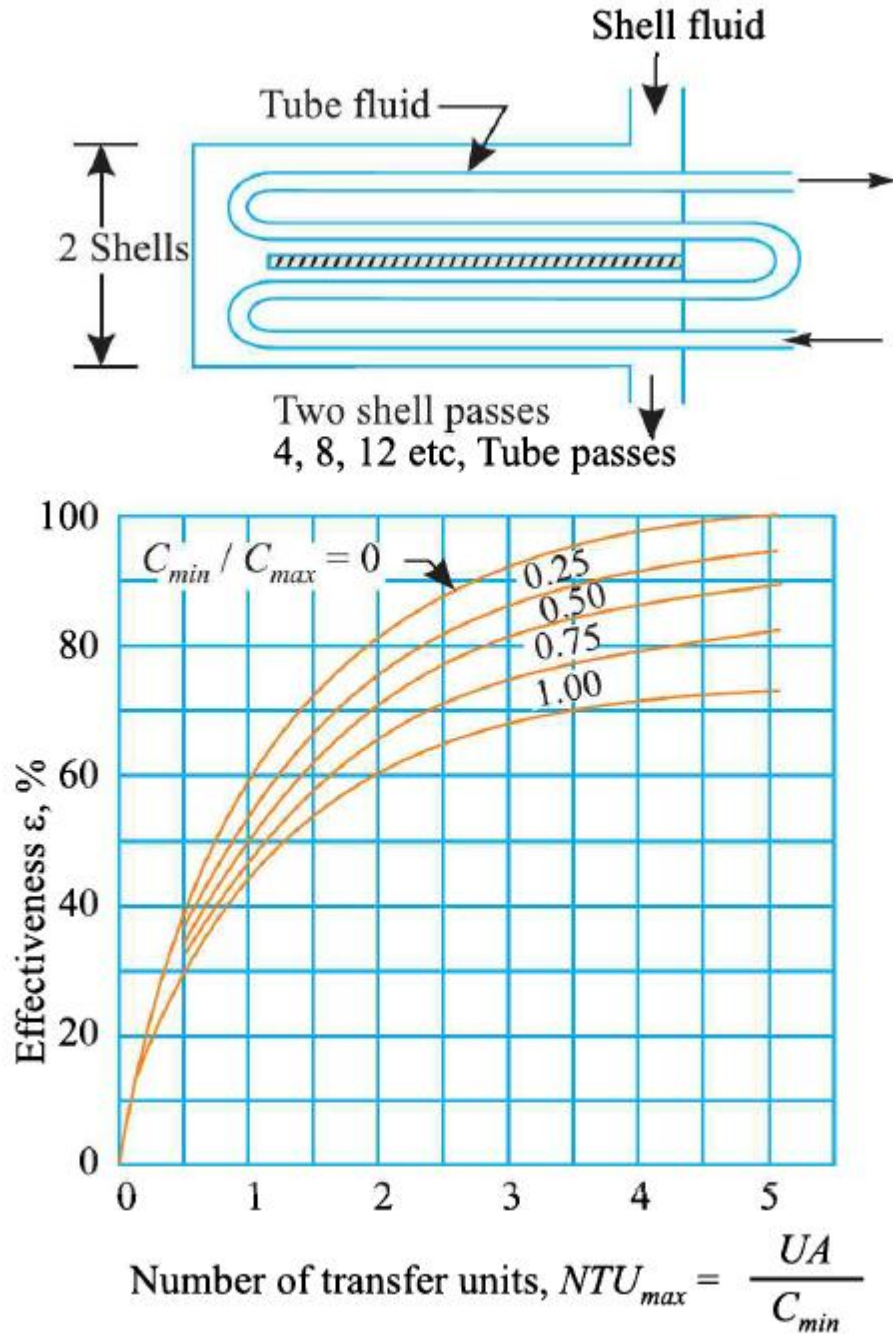


Fig. 10.47.

e- Effectiveness for Cross-Flow HE with both Fluid Unmixed.

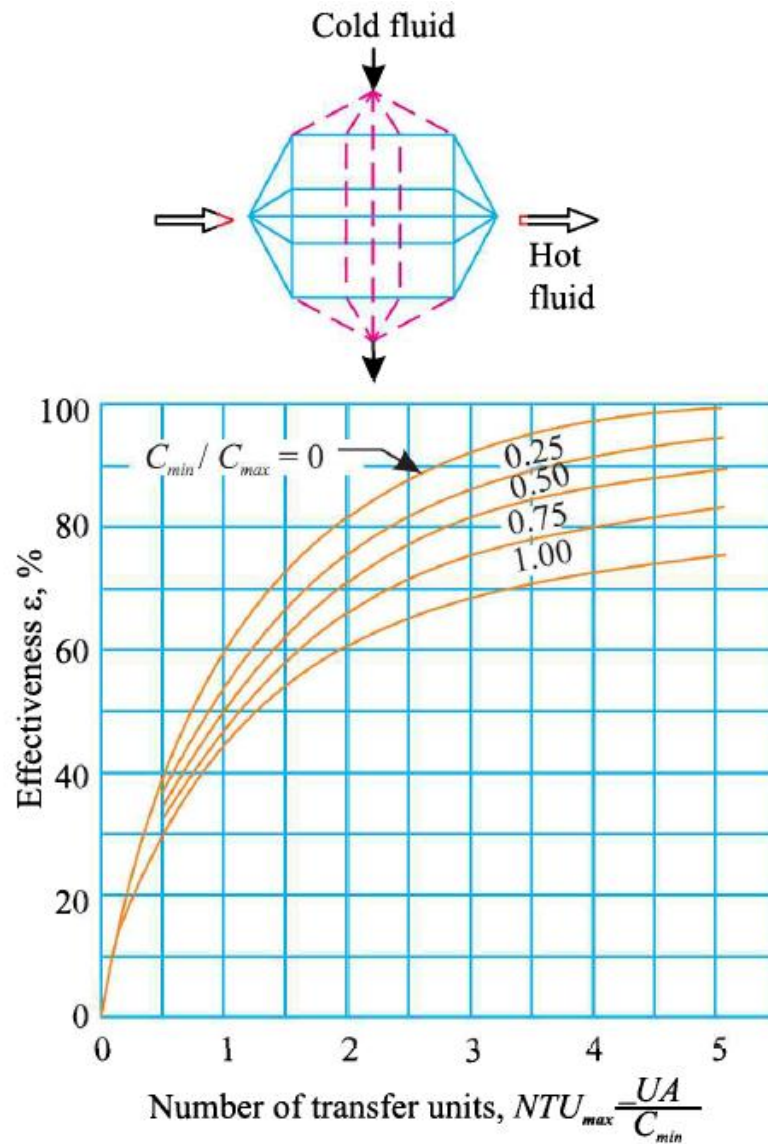


Fig. 10.48. Effectiveness for cross-flow heat exchanger with both fluids unmixed.

f- Effectiveness for Cross-Flow HE with one Fluid mixed and other unmixed.

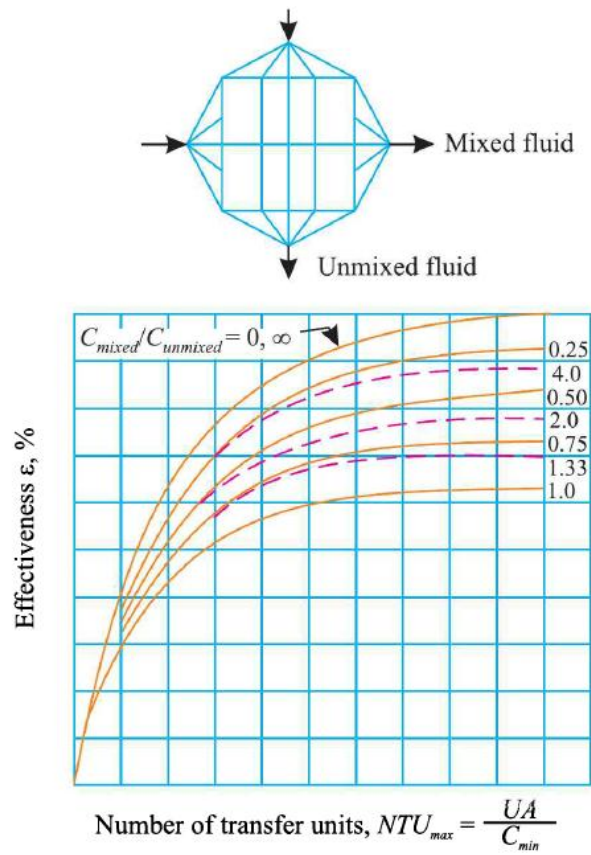


Fig. 10.49. Effectiveness for cross-flow heat exchanger with one fluid mixed and other unmixed.