



ملخص البحث باللغة الإنجليزية:

**" Shell and Tube Heat Exchanger with New Segmental Baffles Configurations:
A comparative experimental investigation "**

This paper presents a comparative experimental study on shell and tube heat exchanger with four different segmental baffle configurations (BC) looking for enhancing the thermal, hydraulic and thermodynamic performances. The baffle configurations are: conventional single segmental baffle (CSSB), staggered single segmental baffle (SSSB), Flower segmental baffle (FSB) and hybrid segmental baffle (HSB). Each BC is tested with various shell side flow rates (SSFR) varied between 12 and 17 LPM. Also, flow resistance in the shell side is measured to evaluate the energy loss in heat exchangers due to the proposed augmentation method. Also, the thermodynamic performance for each BC based on exergy efficiency are analyzed and discussed. Presented results show that the new baffle configuration, such as SSSB, FSB, and HSB have a considerable improvement on the heat exchanger performance. The BCs variation increases the overall heat transfer coefficient (U), effectiveness (ϵ), and NTU of heat exchanger. The influence of HSB configuration on heat exchanger performance augmentation is higher than the others for all test cases. On the other hand, the shell side flow resistance for the HSB configuration is higher than the others for all test cases. The enhancement in U by using HSB configuration was 185–248%. HSB baffle configuration enhances the exergy efficiency by 1.27 to 1.4 times compared to CSSB.