

An overview on thermal and fluid flow characteristics in a plain plate finned and unfinned tube banks heat exchanger

Tahseen Ahmad Tahseen, M. Ishak, M. M. Rahman

**Department of Mechanical Engineering, College of Engineering, Tikrit University,
Tikrit, Iraq**

**Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang,
Malaysia**

**Automotive Engineering Centre, Universiti Malaysia Pahang, 26600 Pekan, Pahang,
Malaysia**

Abstract: The heat exchangers have a wide spread use in industrial, transportation as well as domestic applications such as thermal power plants, means of transport, air conditioning and heating systems, electronic equipment and space vehicles. The key objectives of this article are to provide an overview of the published works that are relevant to the tube banks heat exchangers. A review of available and display that the heat transfer and pressure drop characteristics of the heat exchanger rely on many parameters. Such parameters as follows: external fluid velocity, tube configuration (in-line/staggered, series), tubes rows, tube spacing, fin spacing, shape of tubes, etc. The review also shows the finned and un-finned tube configurations heat exchangers. The important correlations for thermo fluids in tube banks heat exchangers also discussed. The optimum spacing of tube-to-tube and fin-to-fin with fixed size (i.e., area, volume) with the maximum overall heat conductance (heat transfer rate) were summarized in this review. In addition, the few studies show the effect of tube diameter in a circular shape compared with elliptic tube shape. Overall, the heat transfer coefficient and pressure drop increases with increasing fluid velocity regardless the arrangement and shape of the tube. In the mean time, the other shape of tubes (such as flat or flattened) for finned and un-finned with the optimum design needs more research and investigation due to have lesser air-side pressure drop and improved air-side heat transfer coefficients. They have putted some the significant conclusions from this review.

Keywords: Heat exchanger, Flat tube In-line/staggered configurations, Optimum spacing, Thermo fluids characteristics

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