

Determination of Flow Arrangement for Optimum Performance in Heat Exchangers

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Abstract : This task involves the determination of the flow arrangement for optimum performance and the calculation of total heat transfer of two identical double pipe heat exchangers in series. The inner pipe contains the cold water stream at 27°C, whilst the outer pipe contains the two hot stream of water at 50°C and 90 °C which can be mixed in any way desired. The analysis was carried out using counter flow arrangement due to its good heat transfer ability. The best way of heating this cold stream was found out to be passing the 90°C hot stream through the two heat exchangers. The outlet temperature of the cold stream was found to be 39.6°C and overall heat transfer of 131.3 kW. Though starting with 50°C hot stream in the first heat exchanger followed by 90°C hot stream in the second heat exchanger gives an outlet temperature almost the same as 90°C hot stream alone, but the heat transfer is low. The reason for the low heat transfer was that only the heat transfer in the second heat exchanger is considered. Whilst the reason behind high outlet temperature was that the cold stream was already preheated by the first stream.

Keywords : cold stream, flow arrangement, heat exchanger, hot stream

Conference Title : ICGHOST 2016 : International Conference on Ghost Conference

Conference Location : ghost city, Other

Conference Dates : December 12-13, 2020