

Heat Transfer Analysis of Corrugated Plate Heat Exchanger

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Abstract : Plate type heat exchangers has many thin plates that are slightly apart and have very large surface areas and fluid flow passages that are good for heat transfer. This can be a more effective heat exchanger than the tube or shell heat exchanger due to advances in brazing and gasket technology that have made this plate exchanger more practical. Plate type heat exchangers are most widely used in food processing industries and dairy industries. Mostly fouling occurs in plate type heat exchanger due to deposits create an insulating layer over the surface of the heat exchanger, that decreases the heat transfer between fluids and increases the pressure drop. The pressure drop increases as a result of the narrowing of the flow area, which increases the gap velocity. Therefore, the thermal performance of the heat exchanger decreases with time, resulting in an undersized heat exchanger and causing the process efficiency to be reduced. Heat exchangers are often oversized by 70 to 80%, of which 30 % to 50% is assigned to fouling. The fouling can be reduced by varying some geometric parameters and flow parameters. Based on the study, a correlation will estimate for Nusselt number as a function of Reynolds number, Prandtl number and chevron angle.

Keywords : heat transfer coefficient, single phase flow, mass flow rate, pressure drop

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