Numerical simulation of multi-tubes tank heat exchanger: toward an optimized configuration

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Résumé en anglais	Heat recovery is the reutilization of thermal energy lost by any industrial and resident ial application. Heat exchangers play a very effective role in recovering process. This paper deals with an optimization analysis of a suggested heat recovery heat exchanger. The suggested heat recovery heat exchanger is a multi-concentric tubes tank. This heat exchanger is designed to utilize thermal energy carried out by exhaust gases of a chimney to heat water for residential usage. The analysis is carried out numerically using a computational fluid dynamics “Comsol”software. Three configurations are considered, in which one tube, three tubes and six tubes systems are studied. The results show that in order to increase water temperature from 20°C to 70°C it requires 14 hours, 8 hours and 4 hours when using one tube, three tubes and six tubes system respectively. This makes six-tubed heat exchanger the best choice to heat the water quickly. However, one-tubed heat exchanger experiences the lowest corrosion phenomenon compared to other systems that makes one-tubed system to provide the longest lifetime.
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