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Study of Heat Exchangers in Small Modular Reactors

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Abstract : This paper presents a comparative study of different coolants, materials, and temperatures that can affect the effectiveness of heat exchangers that are used in small modular reactors. The corrugated plate heat exchangers were chosen out of different plate options for testing purposes because of their ease of access and better performance than other existing heat exchangers in recent years. SolidWorks enables us to see various results between water coolants and helium coolants acting upon different types of conducting metals, which were selected from different fluids that ultimately satisfied accessibility requirements and were compatible with the software. Though not every element, material, fluid, or method was used in the testing phase, their purpose is to help further research that is to come since the innovation of nuclear power is the future. The tests that were performed are to help better understand the constant necessities that are seen in heat exchangers and through every adjustment see what the breaking points or improvements in the machine are. Depending on consumers and researchers, the results may give further feedback as to show why different types of materials and fluids would be preferred and why it is necessary to keep failures to improve future research.

Keywords : heat exchangers, Solidworks, coolants, small modular reactors, nuclear power, nanofluids, Nusselt number, friction factor, Reynolds number
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