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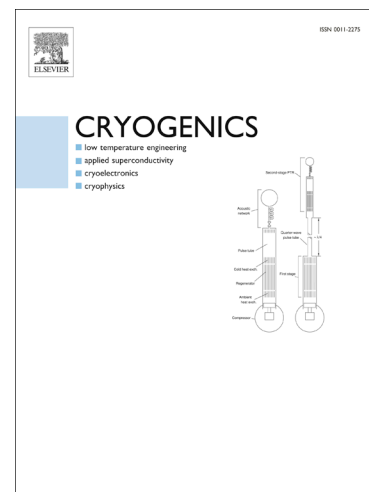
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Experimental study on the thermal hydraulic performance of plate-fin heat exchangers for cryogenic applications

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ABSTRACT

Efficient and compact plate-fin heat exchangers are critical for large-scale helium liquefaction/refrigeration systems as they constitute major part in the cold box. This study experimentally explores the heat transfer and pressure drop behaviors of helium gas at low temperature in four types of plate-fin channels, namely offset-strip and perforated fins, with different geometrical parameters. A series of cryogenic experiments at approximately liquid nitrogen temperature are carried out to measure the Colburn j factors and Fanning friction f factors with a wide range of Reynolds number. Besides, to reveal the performance variations under different operating temperatures, comparative experiments respectively conducted at room temperature and liquid nitrogen temperature are implemented. The results show that in comparison with the performance data at room temperature, most of j factors are relatively smaller

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