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NUMERICAL MODELLING AND ANALYSIS OF COILED FINNED TUBE HEAT EXCHANGER FOR HELIUM LIQUEFACTION PLANT

Content :

Coiled finned-tube heat exchangers have been used in small and medium capacity helium refrigerators/liquefiers, miniature J-T refrigeration systems for many years. The efficiency of these cryogenic systems strongly depends on the thermal and pressure drop performance of these heat exchangers. Major requirements of these heat exchangers are high effectiveness and low pressure drops to stipulate limits, in both of fluid streams. To develop these heat exchangers successfully, as per requirements of helium liquefier/refrigerator, systematic both theoretical and experimental investigations are needs to be carried out. Considerable improvement in the performance of heat exchanger is possible by choosing an appropriate geometrical configuration for a given process requirement. The present work reports numerical modelling and optimization of different parameters of the heat exchanger in the temperature range of 300 K – 77 K of the medium capacity helium liquefier. An attempt has been made to address different operating parameters by transient analysis which significantly affects the performance of heat exchanger.

Primary authors : Prof. MEHTA, Shreya (L.D.College of Engineering)

Co-authors : Mr. PATEL, Sanket (Citizen industry Ltd.) ; Prof. DESAI, Keyur (S.V.National Institute of technology) ; Prof. NAIK, Hemant (S.V.National Institute of technology)

Presenter : Prof. MEHTA, Shreya (L.D.College of Engineering)

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