

Accepted Manuscript

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PII: S1359-4311(17)35815-5

DOI: <https://doi.org/10.1016/j.applthermaleng.2017.12.020>

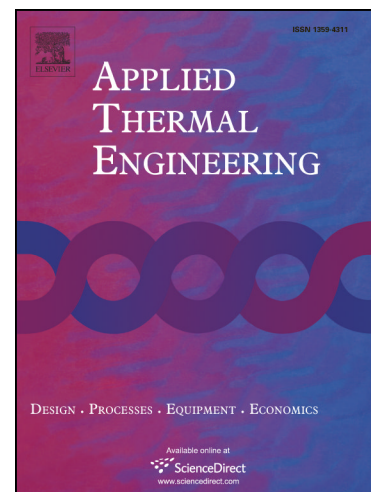
Reference: ATE 11541

To appear in: *Applied Thermal Engineering*

Received Date: 7 September 2017

Revised Date: 15 November 2017

Accepted Date: 3 December 2017



Please cite this article as: C. Ding, H. Hu, G. Ding, J. Chen, X. Mi, S. Yu, Influences of tube pitches on heat transfer and pressure drop characteristics of two-phase propane flow boiling in shell side of LNG spiral wound heat exchanger, *Applied Thermal Engineering* (2017), doi: <https://doi.org/10.1016/j.applthermaleng.2017.12.020>

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Influences of tube pitches on heat transfer and pressure drop characteristics of two-phase propane flow boiling in shell side of LNG spiral wound heat exchanger

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Abstract

For clarifying the influences of tube pitches on heat transfer and pressure drop characteristics of two-phase flow in the shell side of LNG spiral wound heat exchanger, experiments are performed on test samples covering the longitude tube pitch of 2~6 mm and the radial tube pitch of 1~4 mm. Propane is used as the tested fluid. The operational conditions cover the vapor quality of 0.2~0.9, the mass flux of 40~80 kg (m²·s)⁻¹, the heat flux of 4~10 kW m⁻², the pressure of 0.25 MPa and the temperature of -19.4°C. The uncertainties of tested heat transfer coefficients and pressure drops are within 14.4% and 4.0%, respectively. The results indicate that, as the longitude tube pitch increases, both the heat transfer coefficient and pressure drop decrease; while as the radial tube pitch increases, the heat transfer coefficient always decreases for the mass flux of 60 and 80 kg (m²·s)⁻¹, but varies non-monotonously for the mass flux of 40 kg (m²·s)⁻¹; and the pressure drop decreases maximally by 61% with the increasing radial tube pitch. Two-phase heat transfer and pressure drop correlations reflecting the

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