

Accepted Manuscript

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PII: S1359-4311(17)35805-2

DOI: <https://doi.org/10.1016/j.applthermaleng.2018.02.026>

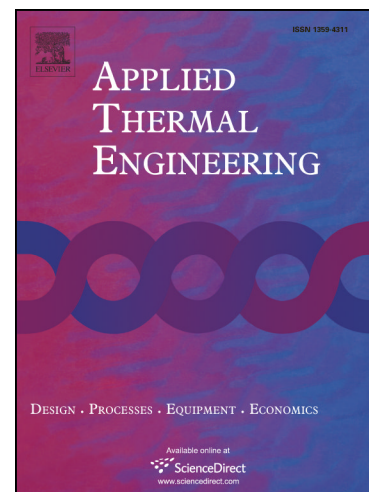
Reference: ATE 11808

To appear in: *Applied Thermal Engineering*

Received Date: 7 September 2017

Revised Date: 11 December 2017

Accepted Date: 8 February 2018



Please cite this article as: L. Chen, P. Zhou, R. Huang, X. Han, S. Hua, Z. Li, L. Gao, Experimental investigation on the suppression factor in subcooled boiling flow, *Applied Thermal Engineering* (2018), doi: <https://doi.org/10.1016/j.applthermaleng.2018.02.026>

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Experimental investigation on the suppression factor in subcooled boiling flow

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Abstract

Subcooled boiling flow is the optimal choice for engine cooling system design, as no essential changes in its architecture are required while it is still possible to take advantage of the highest rates of heat transfer associated with nucleate boiling. The Chen's model is widely used for heat transfer coefficient (HTC) prediction in practical application conditions. However, direct validation based on experimental data upon the phenomenon interpreted by 'suppression factor' in the boiling component of Chen's model is rarely shown in previous literatures. The present work conducted an experimental study on heat transfer from the bottom side of a rectangular heated block heated by the heating device to the upper side cooled by an internally flowing fluid in a rectangular channel. Tests were operated under representative pressure and temperature conditions with heat transfer coefficient (HTC) obtained in almost all the practical application velocity of flow. Results show that in the fully developed boiling region (FDB) the subcooled boiling heat transfer coefficient decreases as the flow velocity speeds up, which provides direct evidence for the validity of Chen's model. However, the wall heat transfer coefficient predicted by Chen's model doesn't fit well

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