

## Accepted Manuscript

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PII: S1359-4311(16)33753-X

DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2017.02.041>

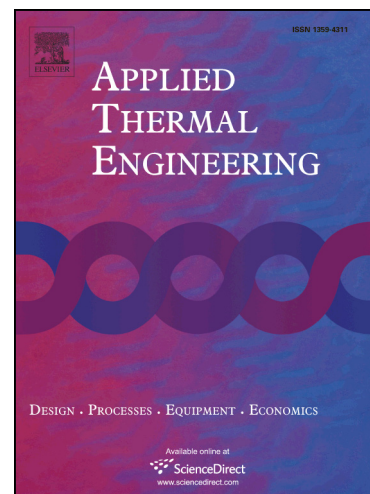
Reference: ATE 9922

To appear in: *Applied Thermal Engineering*

Received Date: 29 November 2016

Revised Date: 20 January 2017

Accepted Date: 10 February 2017



Please cite this article as: M. Li, C. Wang, S. Yang, J. Zhang, Precursor flame characteristics of flame spread over aviation fuel, *Applied Thermal Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2017.02.041>

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# Precursor flame characteristics of flame spread over aviation fuel

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## ABSTRACT

Research on flame spreading over liquids is indispensable to make a fire risk assessment of large-sized pool fires in their incipient stages. This precursor flame that is a unique behavior for flame spread over hydrocarbon oils is still not exhaustively understood. A series of tests on flame spread over aviation fuel of RP-5 is well designed and conducted by using a high-speed camera, an infrared camera and several high-sensitive thermocouples. Pulsating performance, spreading velocity, and temperature distribution of this flame are achieved and compared with previous hypotheses. The controlling mechanism of precursor flame is interpreted by coupling effects of gas- and liquid-phase flows in flame spread. The pulsation frequency is qualitatively predicted by Fick's second law and Raoult partial pressure law. The precursor flame attribute is achieved according to spreading velocity. This precursor flame velocity synchronously illustrates that hydrocarbon fuel spilling is potentially more hazardous than alcohol fuel owing to significant large speed of precursor flame.

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