Experimental study on propane jet fire hazards:

1. Assessment of the main geometrical features of horizontal jet flames

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Abstract

Jet fires are among the least severe fires in terms of direct effects, but are very important in terms of risk assessment due to the potential escalation of the incident by impingement or engulfment of the jet fire on the surrounding vessel, pipework or other components. This paper focuses on the determination of the main geometrical features (flame shape, length, and width) of large-scale horizontal jet fires in air. The study is based on the experimental results of LPG jet fire released from a horizontal pipe of 1.9 cm diameter at different flow rates, with either vapor or two-phase flows, reaching a flame size of 1 to 10m long. For each test, visible and infrared visualizations were recorded. First, the two visualization techniques are compared with each other, and with the different methods of flame shape determination available in the literature. The flame detected with each technique, both instantaneous and averaged, is then compared with basic flame shapes such as cone or cylinder.

Keywords

Jet fires, LPG, flame shape, image processing