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Research on the Influence of Driving Gas Types in Compound Jet on Extinguishing the Pool Fire

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Highlights

- Two kinds of driving gases in compound jet on extinguishing the pool fire;
- Fire extinguishing efficiency such as fire extinction time and cooling efficiency are studied;
- Compressed air as the driving gas of the compound jet is feasible.

Abstract

Compound jet fire extinguishing technology is an efficient technology for oil fires. The hydrophobic ultrafine dry powder is used for the solid phase in the compound jet, but it can't be supplied continuously due to the insufficient supply of compressed nitrogen. Thus, the feasibility of using the compressed air to replace the compressed nitrogen in the compound jet was explored. The key factor for the replacement, which influences the fire extinguishing efficiency, is the oxygen content in the contact point between the jet and the flame. Firstly, the oxygen content of the ultrafine powder jet driven by air or nitrogen were investigated by gas analyzer; Secondly, 150 liter (L) gas oil and 50 L water were put in a oil pan, the compared fire extinguishing experiments were conducted, the fire extinction time and the temperature drop range were investigated. In order to reveal the effect of ultrafine dry powder on oxygen content in gas jet, the experiment that spray the compressed nitrogen were conducted. The results show that there are not much differences for the two gases in extinguishing the pool fire, indicating that compressed air as the driving gas of the compound jet is feasible during fire extinguishing process.

Key words: Compound jet; Driven gas; Fire extinguishing experiment; Compressed air.

1. Introduction

Oil tank fires have posed a major threat to the lives and properties of people due to their strong radiant heat, explosion hazard and rapid fire spread^[1]. As for the large oil tank fire, Williams Fire & Hazard Controls has developed a new type of adjustable flow hydro-chem hand-line nozzles and the POK fire-fighting equipment co.ltd also developed a new type of compound gun. The principles of the two kinds of composite jet guns are very similar: during fire extinguishing process, the gun can discharge gas phases,

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