
Pengembangan Alat Pemadam Api Ringan Berbasis Kabut Air untuk Berbagai Kelas Kebakaran

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Water is known as fire extinguishment media due to effective cooling mechanism. However, the common practices rules out the application of water based fire extinguisher for Class B (oil) and Class C (electrical) fires since it can cause explosions and shorts in electrical equipments. Recent progress in fire protection technologies found that the potentials for oil explosion and electrical short can be moderated by reducing the water droplet sizes to mist form. In fire protection field, water mist represents the size of water droplets less than 1,0 mm or 1000 μm .

In this research work a low pressure water mist system, 5 to 15 bar in pressure, has been developed. This system is aiming to extinguish solid woods and oil pool fires. The main results of this work are a fire extinguisher testing facilities, spray characteristics of water mist, as well as flame temperature and extinguishment times of oil pool fires. In general, the spray characteristics of mist developed by the prototype can fulfill the requirement of water mist system (droplet sizes are less than 1,0 mm). The mass flux density of the system with a single nozzle tested at 5 bar and measured 30 cm below was 0.004 g/s.cm². The corresponding results for the five (5) nozzle system was 0.012 g/s.cm². Flame temperature measurement at different levels and time for flame extinguishment show that a pool fire having 5 cm diameter can be extinguished within 7s by 5 nozzle system. Operating parameter such as water pressure and the number of nozzle play significant roles in spray characteristics and time for flame extinguishment.

The results of this work is significant in terms of further development of a practical and reliable fire protection system for domestic fires. Water mist fire protection systems use less water and no chemical. Thus this system is an important candidate in reducing environmental impact from fire fighting operations as well as imported chemical dependency. This work can prove the initial hypothesis that water in mist form can be used effectively for extinguishing oil pool fires.

Keywords : Fire Safety Engineering, water mist system, and pool fire.