

RADIATION ATTENUATION AND OPACITY IN SMOKE AND WATER SPRAYS

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ABSTRACT. Radiation attenuation through sprays, smoke and mixings of both media was studied in the infrared and in the visible range, by conducting real scale experiments in a corridor. The effect of water injection by a water mist nozzle and a sprinkler device was investigated. Radiation attenuation in the infrared range and opacity in the visible range were measured, by using a FTIR spectrometer and a dedicated opacimetry device especially built for the present application. Measurements were done using a blackbody source and a heptane pool fire aimed at producing smoke. For opacimetry measurements the difficulties raised by the harsh environment involving a hot mixing of gas, soot and vapor carrying water droplets was circumvented with an original device involving an optical fiber network. The better attenuation capability of the water mist has been confirmed despite a lower water flow rate. Present data were used to evaluate the water droplet volumetric fraction by using a Monte Carlo simulation.