Droplet Size Distributions of Heat Transfer Fluid Aerosols in Air

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ABSTRACT

Heat transfer fluids are widely used in the chemical process industry and are available in a wide range of properties. These fluids are flammable above their flash points and can cause explosions. Though the possibility of aerosol explosions has been widely documented, knowledge about the explosive potential of such aerosols is limited. The aerosol droplet size distributions of heat transfer fluids must be studied to characterize their explosion hazards.

Current research by the Mary Kay O’Connor Process Safety Center involves non-intrusive measurement of aerosol sprays using a Malvern Instrument Diffraction Particle Analyzer. The aerosol is generated by plain orifice atomization to simulate the formation and dispersion of heat transfer fluid aerosols through leaks in process equipment. A predictive model to relate the characteristic aerosol droplet size to bulk liquid pressure, temperature, fluid properties, and ambient conditions will be developed. This model will be used to estimate the explosion hazards of heat transfer fluid aerosols.