Mist or aerosol explosions have resulted in enormous losses to the chemical process industry. Such aerosol explosions have been well documented, but little is know about the mechanisms behind them. This lack of knowledge about the explosive nature of such mists has itself become a cause for such accidents. It has therefore become vital that the hazardous nature of aerosols be studied in depth, in order to develop strategies to reduce the aerosol explosion hazard.

The possibility of aerosols exploding, leads to the understanding that all combustible fluids capable of forming an aerosol can be flammable. This is in direct contrast to the prevalent notion that only fluids with low boiling points that are capable of vaporizing easily are explosive. Moreover, existing theory suggests that aerosol explosions may be more devastating, because of enhanced burning velocities and higher enthalpy concentrations in the liquid aerosol phase.

This paper presents preliminary results of experiments designed to determine the flame speeds as a function of the aerosol droplet sizes and to determine the flammability limits of aerosols. The aim is to understand the conditions and the mechanisms that result in aerosol explosions and to develop strategies to reduce such hazards, thereby improving industrial and occupational safety.