

Effects of a Cutting Fluid on Aerosol Size Distribution during Turning

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Cutting fluids are complex mixtures used to cool, lubricate and remove metal chips from tools and metal parts during grinding, cutting, or boring operations. Utilization of cutting fluids in the technological process of metalworking often generates aerosols which represent a significant hazard to the safety of workers and to the environment. The paper deals with the research of cutting fluid's impact on aerosol production by expressing particle size distribution. We used a special image analysis algorithm for the data obtained by a high-speed camera to determine the particle size. The procedure of result assessment was created for measuring the size of small droplets and it was implemented in a MATLAB application. Multifactor analysis of variance (ANOVA) and nonparametric analysis of variance were used for statistical result evaluation.

Keywords: Cutting Fluids, Aerosol Particle Size, Image Analysis, High-speed Camera

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