

Monitoring the Air Quality in Conventional Wet Machining

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Metalworking fluid (MWF) aerosols are generated continuously during conventional machining operations and can have a number of adverse health effects. Exposure to the aerosols has often been reported to cause acute respiratory difficulties including asthma, hypersensitive pneumonitis and lung cancer. Aerosol measurement data was conducted to identify the major determinants that may affect exposure to aerosol fractions during turning of a cylindrical work piece on an uncovered conventional lathe. The aerosol mass concentration was investigated as function of spindle speed, fluid flow rate and sampling position. Synthetic fluid, mixed at 5% concentration with water, was applied via nozzle centred above the work piece at a distance of 70 mm. The aerosol mass concentration was determined gravimetrically and particle size analysis was performed by optical method. The results show that aerosol mass concentration increases with increasing the fluid flow rate and decreases by increasing the spindle speed. Moreover, the particle size analysis detected that a high quantity of particles smaller than 0.2 μm is generated at higher spindle speeds.

Keywords: Metalworking Fluid, Aerosol, Mass Concentration, Particle Size, Turning

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