A Study of Liquid Film Neutralization of Welding Aerosol Emissions

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Abstract: To reduce the concentration of harmful aerosols (solid fine particles) in welding processes, it is proposed to use liquid neutralization, in which a film flow of liquid is organized along vertical plates. When gases or air contaminated with solid fine particles move between the plates, the liquid film intensively absorbs gaseous and solid pollutants. The intensity of absorption of aerosols of solid fine particles into a water film was studied on the experimental setup. In the experiments, the gas velocity, liquid flow rate, and concentration of harmful substances in the gas were changed. Based on the findings, a generalization of the obtained results in a wide range of changes in gas concentrations, liquid flow rates, and the velocity of movement of aerosol-contaminated gas were compiled; the generalization was presented in the form of a relationship between the Sherwood, Reynolds, and Schmidt numbers.

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