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Particle removal from smooth and rough surfaces by turbulent jet impingement THOMAS LIEBNER, GARY SETTLES, Mechanical & Nuclear Engr.. Dept., Penn State University — Recent experiments, e.g. Phares, Smedley & Flagan, J. Aerosol Sci. 31(11) 1335, 2000, have characterized monodisperse particle removal as a function of the theoretical wall shear stress induced by a free turbulent jet impinging upon a smooth surface. These experiments were done with variable jet impingement angle, duration, pressure, standoff distance, etc. The current research expands upon this theme through the experimental investigation of particle removal at larger standoff distances and correspondingly lower wall shear stress levels. We determine particle removal efficiency ratings as a function of the induced wall shear stress for particles of varying size and composition. Finally, we address the complications that arise in particle removal by turbulent jets if the impingement surface is no longer smooth (e.g. a fabric surface). This work has application to such problems as contamination control and the sampling of chemical traces from common surfaces.

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