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Classification of Particle by Size Using Aerodynamic Vectoring¹ HUMES, BARTON SMITH, Utah State University, ANGELA ZACHARY MINICHIELLO, CastleRock Engineering Inc — An experimental and numerical demonstration of a non-contact particle sorting and particle concentration technique called Aerodynamic Vectoring Particle Sorting (AVPS) is presented. AVPS uses secondary suction control flows to sharply turn a planar, particle-laden jet. As the jet is turned, particles present in the flow experience a resultant drag force dependent upon their size. Since the balance of the drag and inertia determines the particle's trajectory, turning the flow leads to a separation of particles. This simple, low-pressure-drop sorting technique classifies and concentrates particles with less risk of damage or contamination than currently available sorting devices. AVPS also allows multiple cuts simultaneously. Particle size and trajectory are measured using the Shadowgraphy method. Numerical simulations are performed to calculate the 2D turbulent vectored jet flow field using a RANS approach. Currently, AVPS is capable of a cut sharpness of .8 and .9 for industrial and laboratory particles respectively. A concentration factor of 9.5 for particles between 7 and 10 micron has also been achieved.

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