

Latest Developments of the Electrodynamic Dust Shield

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Abstract— The Electrodynamic Dust Shield (EDS) for dust mitigation from surfaces is a well established technology. The traditional system is typically comprised of a set of metallic or metallic-oxide electrodes applied to rigid, or to some extent, flexible surfaces. Now the EDS technology has been advanced to include carbon nanotube (CNT) ink electrodes for use on very flexible substrates like fabrics, and to a 3D version of the EDS. The CNT system has the advantage in that the electrodes can be printed using standard ink-jet printers onto fabrics and can be extremely flexible. The 3D system is an advance on the current EDS system, where the electrodes are deposited onto the surface of a substrate, to the use of a single electrode grid embedded within a dielectric parallel to a well-grounded plane. Once activated this system lifts and repels dust similar to the conventional 2D version of the EDS. However, the system does not possess some of the inherent limitations of the two dimensional version. A major advantage is that the electrical breakdown is between dielectric layers as opposed to across the surface allowing for much higher breakdown strengths. Furthermore, electrodes could be damaged or sliced without affecting the performance of the EDS. In this paper, examples of both variations will be presented.