

S2.2.2 IMPACT OF UNIFLOW CYCLONE SEPARATOR ON CONTROL OF FUGITIVE DUST DURING MATERIAL HANDLING IN PROCESS INDUSTRIES

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Fugitive dust is a menace in workplaces of many process industries during bulk material handling especially in mines/ shipping yards. The only solution as suggested by many experts is to handle fugitive dust at source. Uniflow cyclone separator, if designed properly, can capture particle sizes up to 2 μm . In this context, the present paper addresses influence of major design parameters and operating gas flow on performance. The novelty of the present work is the cyclone system is fabricated using 3D printing facility and tested for performance characteristics on efficiency and cut particle size. The influence of vane angle on velocity profile has already been reported by B. Pitchumani, and has been used in the selection of suitable vane angle for the present study. The diameter of uniflow cyclone is 20 mm with a total length of 150 mm. The powder used for performance is calcined petroleum coke with an average size 11.8 μm . The particle size distribution of feed and fines are obtained using laser diffraction analyzer Horiba LA 960. The paper presents the data for separation efficiency and cut particle size for a range of inlet gas velocity 2m/s - 12 m/s. The test results indicate that the surface energy associated with fine particles smaller than 3 μm leads to higher separation efficiency for the particles in this size range, as observed and reported by many. The suggested configuration is very simple in design of a module that could be used effectively to control fugitive dust emissions at source and preventing from spreading.