

Effect of vortex finder length on the collection efficiency of cyclones

고창국, 김상돈*, 최정후¹, 남궁원²

KAIST; ¹건국대학교; ²POSCO

(kimsd@kaist.ac.kr*)

Gas cyclone is one of the simplest and most widely using devices to collecting solid particles from gas/solids mixture stream. In the present study, the effect of vortex finder lengths (0 – 0.46 m) on the powder collection efficiency of five types of laboratory scale (0.16 m-i.d.) cyclones has been determined. The solid used in this study was iron ore particles in the size range of 1–80 μm with a particle density of 3980 kg/m³. With the cyclones, pressure drop, gravimetric and grade efficiencies were determined at ambient conditions with variation of the inlet powder laden gas velocity in the range of 2–15 m/s. It has been found that pressure drop and the collection efficiency have the highest values of 1800 Pa and 90%, respectively when the vortex finder length is identical to the inlet height of 8 cm in the cyclones at 15 m/s of powder laden gas velocity and decrease with increasing vortex finder length. Also the collection efficiency decreases by 5% when the vortex finder length is shorter than the inlet height because short-circuit of gas flow is generated at the top portion of cyclone, close to cyclone inlet and overflow upper exit.