

# Effect of plenum chamber design on discharge coefficient in swirling fluidized bed

## **Abstract**

Using a conventional fluidization systems might tend to use high energy consumption due to the certain parameter design on fluidization. The current study was run to give some overview on the new method which is might useful in fluidization process especially in mineral processing. By designing a combination of cyclone and the inclination angle of annular blade distributor, the gas will cause swirling flow from the cyclone plenum chamber then pass through the distributor gap and certainly achieve suitable performance in term of uniformity fluidization. Numerical simulation such as Computational Fluid Dynamics (CFD) has been widely used to investigate the parameters that influence the system itself. The parameter design of 60 blade distributor with 15° horizontal inclination angle at different depth (0mm, 100mm and 200mm) via several cone height (150mm, 200mm and 250mm) blade distributor to the cyclone plenum chamber has been applied in this current studies. The CFD software is used to compute and obtain the velocity magnitude. The uniformity of velocity distribution are the crucial investigation as this will be used to determine the optimum SFB systems. Effect of 0mm depth blade distributor to the cyclone plenum chamber with 200mm cone height via 60 blade distributors through to 15° of horizontal inclination angle was the most suitable parameter to assist the velocity uniformity.