

Particles mass flow rate and concentration measurement using electrostatic sensor

Abstract:

In many industries where flow parameters measurement is essential to control manufacturing process, the use of a reliable, cost effective and high accuracy instrument is an important issue. Appropriate measurement method and design leads to improvement of pneumatic conveyors operation and process efficiency. This paper present an instrumentation design based on passive charge detection using a single electrostatic sensor. Two different sensor electrodes are applied to show the flexibility of electrostatic sensor application. A time domain signal processing algorithm is developed to measurement of mass flow rate and concentration profile from acquired electrical charge signal. The findings is led to a low cost and high accuracy design, the experimental test results of the design shows less than $\pm 5\%$ error between measured parameters and reference reading acquired from the manual weighing.