Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Experimental evaluation of deposit formation during powder transport[1] HOLGER GROSSHANS, NUKI SUSANTI, Physikalisch-Technische Bundesanstalt (PTB), MILTIADIS V. PAPALEXANDRIS, Universit catholique de Louvain — When powders are transported pneumatically they often gain an electrostatic charge and form subsequently deposit layers on component surfaces. The resulting local accumulation of electrostatic energy can lead to hazardous spark discharges which caused in the past numerous dust explosions. In order to contribute to operational safety of industrial plants we explore the deposit of particle-laden flows with our new experimental test-rig. To this end, the particle flow will be analyzed optically using a transparent pipe as measuring section. We quantify deposit formation through the characterization of the pattern and the thickness of the deposit layers depending on the flow conditions. The parameters under consideration include the flow Reynolds number, the powder loading, the particle material, the ambient conditions (temperature, humidity), and the particle size distribution. The presented experimental facility is designed with the aim to maximize consistency with our complimentary numerical simulations.

[1]The authors gratefully acknowledge the financial support from the Max Buchner Research Foundation.

Holger Grosshans
Physikalisch-Technische Bundesanstalt (PTB)

Date submitted: 31 Jul 2019 Electronic form version 1.4