abstract

Two-dimensional Eulerian–Lagrangian model is presented for heat and mass transfer in pneumatic con-

veying dryer. The model takes into account the particle–particle and particle–wall collisions, lift forces,

particle rotation, turbulence modulation and turbulence dispersion (i.e., four-way coupling). The drying

simulation is based on a two-stage drying model. Different correlations for heat transfer coefficient are

tested and assessed in terms of their accuracy. The model is validated against the available experimental

data and good agreement is obtained. The model predictions are compared to other models from litera-

ture and it produces better results than existing models. It is also found that the turbulence dispersion

has greater effect on the model predictions than particle–particle collision. However, neglecting either

particle–particle collision or turbulence dispersion results in a lower heat transfer and drying rates.

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