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## **Balance and stability between particle collection and re-entrainment in a wide temperature-range electrostatic precipitator**

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### **Abstract**

In an electrostatic precipitator, particles migrate to the collecting plates through electrostatic force. Simultaneously, the effect of gravity and hydrodynamic drag force will cause these particles to vacate the plates. Emission concentration and removal efficiency gradually stabilize after the particles pass through multiple electric fields, and this stability value determines the high limit of electrostatic precipitation capacity. In this study, the balance between particle electrostatic trapping and air re-entrainment was investigated through a closed-loop electrostatic precipitator system, and the behavior of the particles deposited into the collecting plates was qualitatively analyzed. The particle emission concentration was reduced significantly when residence time was within 40 s. The particle concentration reached its limit and remained relatively stable after remaining stable for 100 s in the electric field. The applied voltage, velocity of flow, and temperature are the influencing factors considered in this study, here it was found that the decreased flow velocity,

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