

# Accepted Manuscript

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PII: S0032-5910(18)30274-2  
DOI: doi:[10.1016/j.powtec.2018.04.001](https://doi.org/10.1016/j.powtec.2018.04.001)  
Reference: PTEC 13302  
To appear in: *Powder Technology*  
Received date: 23 August 2017  
Revised date: 29 March 2018  
Accepted date: 2 April 2018

Please cite this article as: Jie Pei, Aihua Lui, Qiong Zhang, Ting Xiong, Pan Jiang, Wei Wei , Numerical investigation of the maximum erosion zone in elbows for liquid-particle flow. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Ptec(2017), doi:[10.1016/j.powtec.2018.04.001](https://doi.org/10.1016/j.powtec.2018.04.001)

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## **Numerical investigation of the maximum erosion zone in elbows for liquid-particle flow**

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### **Abstract**

Erosion caused by particles transported in pipes is a major concern in industrial processes. To describe the erosion behavior in elbows, the flow field, particle trajectories, and relationship between the maximum erosion zone and influencing factors were investigated by using computational fluid dynamics (CFD). The accuracy of the presented method was verified by experimental data available in the literature. Good agreement between the predictions and experimental data was observed. Furthermore, the particle diameter, pipe geometry parameters, and operating conditions in pipeline transportation were analyzed to determine the maximum erosion zone. The results show that (1) the Stokes number for particle motion in the elbow has a certain effect as the particles move with the eddy but has no decisive influence on the location of the maximum erosion zone; (2) the erosion zone is directly related to the particle diameter; and (3) increasing the radius of curvature will change the flow field in the pipe and, in turn, the location of the maximum erosion

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