Accepted Manuscript

Numerical analysis on the gas flow dynamics from a rectangular slot-nozzle for pulse cleaning of filter unit

Haixia Li, Joohong Choi, Bin Li, Ire Kim, Jungwon Heo

PII: S0032-5910(16)30211-X
DOI: doi: 10.1016/j.powtec.2016.04.040
Reference: PTEC 11627

To appear in: *Powder Technology*

Received date: 26 May 2015
Revised date: 21 April 2016
Accepted date: 25 April 2016

Please cite this article as: Haixia Li, Joohong Choi, Bin Li, Ire Kim, Jungwon Heo, Numerical analysis on the gas flow dynamics from a rectangular slot-nozzle for pulse cleaning of filter unit, *Powder Technology* (2016), doi: 10.1016/j.powtec.2016.04.040

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Numerical analysis on the gas flow dynamics from a rectangular slot-nozzle for pulse cleaning of filter unit

Haixia Li [a], Joohong Choi [b,*], Bin Li [a], Ire Kim [b], Jungwon Heo [b]

[a] *School of Mechanical and Power Engineering, Henan Polytechnic University, Jiaozuo 454000,China*

[b] *Department of Chemical Engineering, Gyeongsang National University, Jinju 660-701, South Korea*

*Corresponding author. Tel.: +82-55-7721783; fax: +82-55-7721789.

E-mail: jhchoi@gnu.ac.kr (J-H. Choi).

ACCEPTED MANUSCRIPT

ABSTRACT

The flow dynamics of the pulse-jet gas around a rectangular slot-nozzle was analyzed numerically to predict the effects of nozzle shape and dimension on the pulse cleaning performance. The entrainment ratio and pressure magnitude along the nozzle axis were analyzed using Computational Fluid Dynamics (CFD) around a 3-D rectangular slot-nozzle of venturi shape and specified as the index to evaluate the cleaning effect. The influence of both the convergent ratio in the narrow direction (R_{ch}) and in the wide direction (R_{cw}) as well as the divergent ratio (R_{dw}) in the wide direction of the nozzle was discussed, respectively. It was discovered that among of R_{ch}, R_{cw} and R_{dw}, the flow dynamics were most sensitive to changes of R_{ch}. Thus, the entrainment effect increased with increases of R_{ch}, R_{cw} and R_{dw}, respectively, while the total mass of the entrained-air increased inversely. The dimensionless correlations for the entrainment ratio according to the relative variables of R_{ch}, R_{cw} and R_{dw} were also developed to predict the entrainment ratio for the nozzle of different sizes compared with the reference novel nozzle proposed in the study.

Download English Version:

https://daneshyari.com/en/article/6676748

Download Persian Version:

https://daneshyari.com/article/6676748

Daneshyari.com