

Accepted Manuscript

Experimental evaluation of separation performance of fine particles of circulatory circumfluent cyclone separator system

Pan Zhang, Guanghui Chen, Jihai Duan, Weiwen Wang

PII: S1383-5866(18)31903-8
DOI: <https://doi.org/10.1016/j.seppur.2018.08.008>
Reference: SEPPUR 14829

To appear in: *Separation and Purification Technology*

Received Date: 1 June 2018
Revised Date: 26 July 2018
Accepted Date: 7 August 2018

Please cite this article as: P. Zhang, G. Chen, J. Duan, W. Wang, Experimental evaluation of separation performance of fine particles of circulatory circumfluent cyclone separator system, *Separation and Purification Technology* (2018), doi: <https://doi.org/10.1016/j.seppur.2018.08.008>

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.



Experimental evaluation of separation performance of fine particles of circulatory circumfluent cyclone separator system

Pan Zhang¹, Guanghui Chen^{2*}, Jihai Duan², and Weiwen Wang^{2*}

1. College of Electromechanical Engineering, Qingdao University of Science and Technology, Qingdao 266069, China

2. College of Chemical Engineering, Qingdao University of Science and Technology, Qingdao 266043, China

Abstract: Removal of fine particles from exhaust gases is an importance task currently. These particles, which are hazardous to human health or have to be recovered for products, are difficult to remove by conventional separation technology. In this work, the separation performance of fine dust in a new designed circumfluent circulatory separator system (CCSS) was investigated experimentally. The separator system that we have developed consists mainly of two circumfluent cyclones (CFC) and a separation column. Experiments were carried out to investigate the effects of inlet gas velocity and the refluxing mode on the removal efficiency of fine particles. The separator system showed 100 % removal efficiency of particles equal and greater than $1.0\mu\text{m}$, and 97 % for particles $0.3\text{-}0.6\mu\text{m}$ in diameter at the inlet gas velocity range of 17 to 36.5 m/s when the gas discharged from the second separator returned to the separation column. In addition, the pressure drops of CCSS are only about 20% higher than that of the common cyclone. This work demonstrates that CCSS has a low pressure drop and higher removal efficiency of fine particles. Consequently, it provides an easy, cheap and efficient alternative approach for removal of fine particles from gas steam.

Keywords: fine particle; circumfluent circulatory separator system; separation efficiency; pressure drop

1. Introduction

Large amount of fine dust is produced in the process of industrial production, such as chemical engineering, combustion processes, and kiln furnace. These fine particles should be separated from

* Corresponding author. Tel.: +86 532 84022752; fax: +86 532 84022752
Email: longtengchen01@163.com (G. Chen), wwwang@qust.edu.cn(W. Wang)

Download English Version:

<https://daneshyari.com/en/article/7043421>

Download Persian Version:

<https://daneshyari.com/article/7043421>

[Daneshyari.com](https://daneshyari.com)