

## PROJECT OF A LOW-COST CYCLONE FOR THE CONTROL OF PARTICLES FROM CERAMICS INDUSTRIES

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### Abstract

The goal of this project was to build a low-cost Stairmand cyclone, made by zinc, and to study its efficiency and how it works. The cyclone's efficiency was lower than expected, due to ceramics particle agglomeration, but still high.

*Key words: Cyclone, ceramics industry, particulate matter.*

### Introduction

Inertial separators are generally used to collect middle size particles. Due to its relatively simple construction, and to the absence of moving parts, the costs of maintenance of this type of equipment are lower than electrical precipitators<sup>1</sup>. Cyclones are inertial separators for gassolid mixtures used as pre-cleaners in industries that give particles as residue<sup>1,2</sup>.

### Results and Discussion

Two experiments were realized on the Stairmand cyclone (Image 1) built in this work, both with particles coming from a ceramics industry.

**Image 1 – Stairmand Cyclone**



The efficiency expected for this cyclone was 85.20%, but the obtained values were 71% and 86% (Chart 1).

**Chart 1 – Collected Results**

	$M_{before}$	$M_{after}$	$\eta$
Exp. 1	3,55 g	2,52 g	71%
Exp. 2	5,92 g	5,09 g	86%

The efficiency results of the first experiment was a little lower than expected, because the efficiency equation does not take into consideration the type of particle being separated and the tendency of agglomeration, which was a problem found in the pipes.

### Conclusions

After the experiments, it could be observed that particle agglomeration tendency is another variable that affects the cyclone efficiency, which can be a subject for future studies.

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<sup>1</sup> Davis, W. T. Air Pollution Engineering Manual. Canada: John Wiley & Sons, INC; 1997. 2th edition. pp. 66-73.

<sup>2</sup> Moraes C. A. C.; Marins L. P. M.; Melo D. C.; Silva F. S.; Junior J. A. A. O.; Souza M. A.; Barca L. F.; Margarida A.; Souza R. F.; Almeida C. S. 2006 Desenvolvimento de hidrociclones para altos, médios e baixos teores de óleo. *Boletim Técnico da Produção de Petróleo*, v. 3, pp. 259-287.