

# Accepted Manuscript

## Research Paper

Modeling industrial scale reaction furnace using computational fluid dynamics:  
a case study in Ilam Gas Treating Plant

Ehsan Keshavarz, Davood Toghraie, Mojtaba Haratian

PII: S1359-4311(17)31628-9

DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2017.05.079>

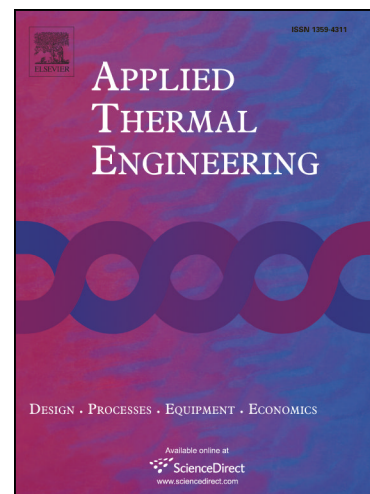
Reference: ATE 10391

To appear in: *Applied Thermal Engineering*

Received Date: 9 March 2017

Revised Date: 11 May 2017

Accepted Date: 14 May 2017



Please cite this article as: E. Keshavarz, D. Toghraie, M. Haratian, Modeling industrial scale reaction furnace using computational fluid dynamics: a case study in Ilam Gas Treating Plant, *Applied Thermal Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2017.05.079>

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.

# **Modeling industrial scale reaction furnace using computational fluid dynamics: a case study in Ilam Gas Treating Plant**

Ehsan Keshavarz<sup>1</sup>, Davood Toghraie<sup>1\*</sup>, Mojtaba Haratian<sup>1</sup>

<sup>1</sup>Department of Mechanical Engineering, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr, Iran

<sup>1\*</sup>Department of Mechanical Engineering, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr, Iran,

[Toghraee@iaukhsh.ac.ir](mailto:Toghraee@iaukhsh.ac.ir)

## **Abstract**

In this study, the industrial scale reaction furnace of Ilam gas treating plant has been modeled by using of 3D computational fluid dynamics (CFD) method and the impact of checker-wall, refractory, ceramic seals are investigated. The simulation findings showed that Oxygen and acid gas at center tend to swirling when encounter to blades of air and acid gas diffusers, respectively as passes through furnace and directed to conical wall. Finally, good mixing between air and fuel is provided for combustion. Moreover, Sulfur dioxide is formed at beginning of flame, middle stage and before of choke-ring area and continues till checker-wall. Maximum production of Sulfur dioxide is attributed to pre-choke ring area. From obtained results, it can be found that Sulfur dioxide is formed at interface of air and acid gas and reaches to its maximum rate at air swirling area. Sulfur dioxide and Oxygen have a decreasing trend after checker-wall. The results also revealed that amount of radiation and tube-sheet temperature are reduced about  $10571\text{W/m}^2$  and  $17.63^\circ\text{C}$ , respectively, when checker-wall exists in the reaction furnace.

**Keywords:** Reaction furnace, Checker-wall, Combustion, computational fluid dynamics, Ilam Gas Treating Plant

## **1. Introduction**

Download English Version:

<https://daneshyari.com/en/article/4990511>

Download Persian Version:

<https://daneshyari.com/article/4990511>

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