

Accepted Manuscript

The Transition Velocities in a Dual Circulating Fluidized Bed Reactor with Variation of Temperatures

Myung Won Seo, Jeong Hoi Goo, Sang Done Kim, Jae Goo Lee, Young Tae Guahk, Nam Sun Rho, Geon Hoe Koo, Do Yeon Lee, Won Chul Cho, Byung Ho Song

PII: S0032-5910(14)00526-9
DOI: doi: [10.1016/j.powtec.2014.05.059](https://doi.org/10.1016/j.powtec.2014.05.059)
Reference: PTEC 10314

To appear in: *Powder Technology*

Received date: 30 August 2013
Revised date: 30 April 2014
Accepted date: 31 May 2014



Please cite this article as: Myung Won Seo, Jeong Hoi Goo, Sang Done Kim, Jae Goo Lee, Young Tae Guahk, Nam Sun Rho, Geon Hoe Koo, Do Yeon Lee, Won Chul Cho, Byung Ho Song, The Transition Velocities in a Dual Circulating Fluidized Bed Reactor with Variation of Temperatures, *Powder Technology* (2014), doi: [10.1016/j.powtec.2014.05.059](https://doi.org/10.1016/j.powtec.2014.05.059)

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.

The Transition Velocities in a Dual Circulating Fluidized Bed Reactor with Variation of Temperatures

Myung Won Seo^{1,2}, Jeong Hoi Goo³, Sang Done Kim^{4*}, Jae Goo Lee^{1,2}, Young Tae Guahk¹, Nam Sun Rho¹,
Geon Hoe Koo¹, Do Yeon Lee⁴, Won Chul Cho⁵, and Byung Ho Song⁶

¹Clean Fuel Laboratory, Korea Institute of Energy Research (KIER), 152 Gajeong-ro, Yuseong-gu, Daejeon, 305-343, Republic of Korea

²Department of New Energy Technology, UST (University of Science and Technology), 217 Gajeong-ro, Yuseong-gu, Daejeon, 305-333, Republic of Korea

³Oil & Gas Process Team, SK Engineering and Construction, 100 Euljiro, Jung-gu, Seoul, 100-847, Republic of Korea

⁴Department of Chemical and Biomolecular Engineering, Korea Advanced Institute of Science and Technology (KAIST), 291 Daehak-ro, Yuseong-gu, Daejeon 305-701, Republic of Korea

⁵Hydrogen Laboratory, Korea Institute of Energy Research (KIER), 152 Gajeong-ro, Yuseong-gu, Daejeon, 305-343, Republic of Korea

⁶Department of Chemical Engineering, Kunsan National University, 1170 Daehangno, Gusan, Jeonbuk 573-701, Republic of Korea

Tel.: 82-42-350-3913, Fax: 82-42-350-3910, E-mail: kimsd@kaist.ac.kr

Abstract

The extra-heavy oil fractions upgrading process, which consisted of a pyrolyzer and a bubbling bed as a combustor/gasifier, was developed. Prior to operating a dual circulating fluidized bed reactor, the transition velocities of flow regime were determined at different temperatures using silica sand particles as the bed material. The transition velocities included minimum fluidization velocity (U_{mf}), transition velocity to turbulent fluidization (U_c , U_k) and transport velocity (U_{tr}). The minimum fluidization velocity determined by measuring bed pressured drop with increasing gas velocity was observed to decrease with increasing temperature. Both the transition velocities from bubbling to turbulent fluidized bed behavior determined by measuring bed pressure drop fluctuation and transport velocity from turbulent to fast fluidized bed behavior by emptying time method increased with increasing temperature. Based on the experimental data, correlations are proposed to predict the transition velocities at different temperatures. As the actual dual circulating fluidized bed reactor operation occurs at relatively high temperature, the correlations obtained in this study is directly applicable to the extra-heavy oil fractions upgrading process. Thus, the transition velocities and flow regimes in a dual circulating fluidized bed reactor is determined.

Keywords: Extra-heavy oil fractions upgrading process; Dual circulating fluidized bed reactor; Temperature; Minimum fluidization velocity (U_{mf}); Transport velocity (U_{tr}).

Download English Version:

<https://daneshyari.com/en/article/6677496>

Download Persian Version:

<https://daneshyari.com/article/6677496>

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