

FCC Riser: Introduction

CPFD Software

www.cpfd-software.com

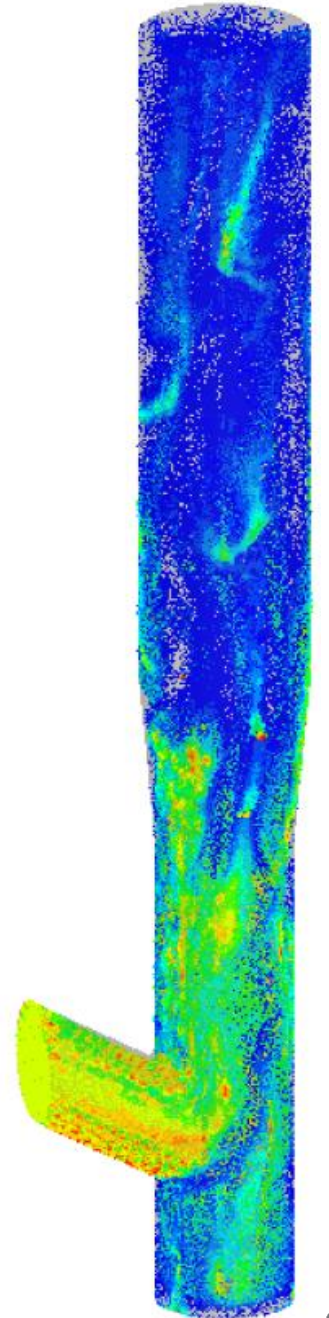
Overview

A Fluid Catalytic Cracking (FCC) riser is used to “crack” large hydrocarbon molecules into smaller molecules suitable for use in fuels. This reaction occurs on the surface of solid catalyst particles that flow through the riser.

The cracking reaction scheme is a four-lump model in which the hydrocarbons present are divided into groups:

- Gas oil
- Gasoline
- Gas
- Coke

Heat transfer coefficients are important and the single particle Nusselt number correlation for Fluid-particle heat transfer recommended by Kunii and Levenspiel in [Fluidization Engineering](#) is used.



Overview

A generic riser geometry is used with uniform steam inlet at the bottom, catalyst side entry, and chemistry based on [Nayak et al. 2005](#).

Particles and gases are allowed to exit at the top.

Three sets of injection BCs are used to model:

- Feed Oil – liquid droplets of heavy gas with steam and gasoline gas
- Mixed Temperature Control – liquid droplets of heavy gas with gasoline gas
- Slurry back wash - liquid droplets of heavy gas with steam

Liquid droplets of Gas Oil vaporize using the evaporation model in Barracuda.

