



SOUTHWEST RESEARCH INSTITUTE



Circulating Fluidized Bed Operation and Optimization Testing

The Chemical Engineering Department at Southwest Research Institute® (SwRI®) designs, constructs and operates fluidized bed processes and applies this expertise to help our clients develop, optimize, or troubleshoot their new and existing processes. In its simplest operating mode, SwRI's circulating fluidized bed (CFB) provides process-variable histories and small quantities of product liquids for testing (FCC analog), or it can be easily reconfigured for unique ebullating or circulating fluidized bed operation. The design assures that results reflect practical conditions as well as special operating modes.

Features

SwRI's lab-scale CFB reactor system has the following specifications (dependent on circulating solid particle type):

- Solid, liquid, or high-viscosity feedstocks
- Steam, inert, or other fluidizing gas options
- Reactor/riser superficial velocities from 4–1000 feet per second
- Reactor/riser residence times of <0.01 to 6 seconds
- Feed flow rates ranging from <1–200 mL/min
- Temperature range up to 1200°F (649°C)
- Pressure up to 30 psig (2 bar, 207 kPa)
- Process control system for various modes of system automation
- Process data acquisition system
- Sampling and analytical capabilities for most needs

SwRI's responsive staff can support your work for concept development, process selection, bench-scale and pilot-plant testing, optimization, and engineering package preparation. Using commercial process simulation programs, we can help with design reviews, process hazards assessments, and development of piping and instrumentation diagrams (P&ID).

Applications

CFB can be used for a wide variety of applications including:

- Pyrolysis of biomass, plastics, residuum, heavy oils, and organics
- Fluid catalytic cracking (FCC) analog to produce test quantities of products
- Co-processing of biomass and petroleum feedstocks
- Catalytic pyrolysis
- Gasification
- Catalytic and feedstock evaluations

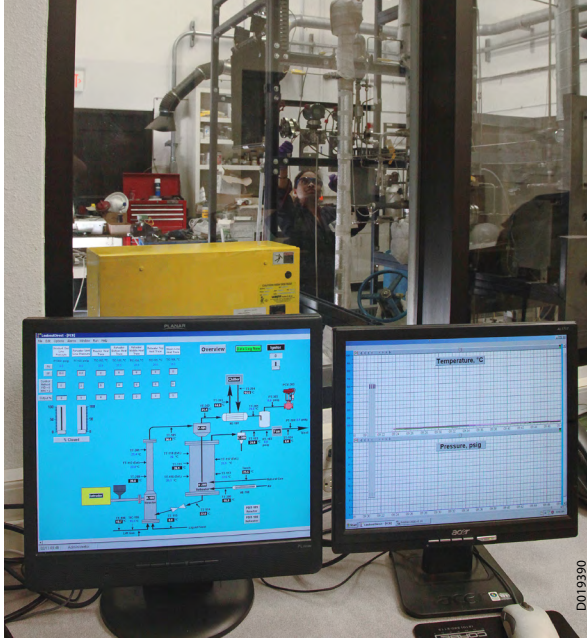


The catalyst regenerator is ignited at the start of the process.



The CFB and analytical staff constantly handle high-viscosity feedstocks.

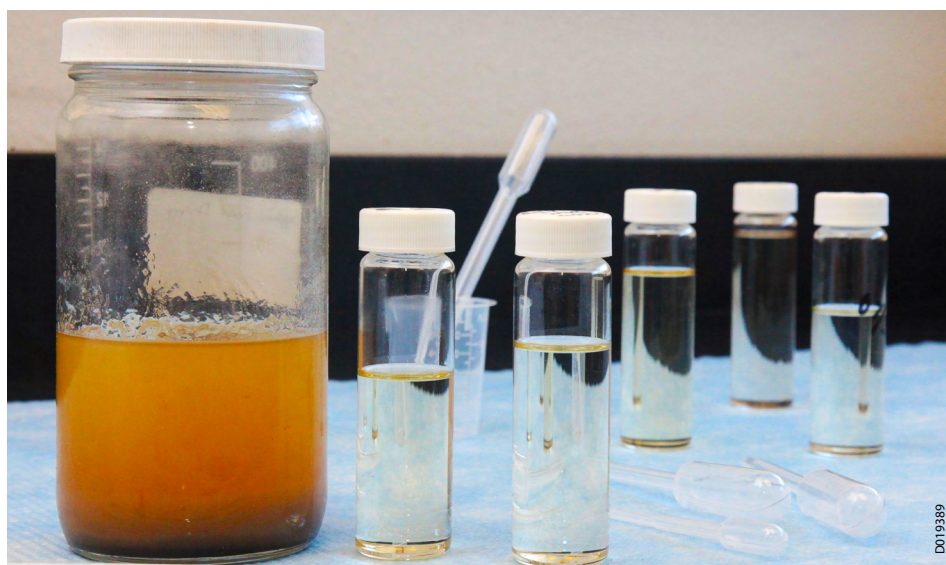
SwRI's scientific and analytical staff has significant knowledge across a full range of both organic and inorganic analytical services for petroleum-based and aqueous samples. These services include standard and non-standard American Society for Testing and Materials (ASTM) procedures and custom method development.



The CFB's process controls allow for safe operation in a range of different process conditions.



The reactor/riser is capable of processing diverse feed types such as solids, liquids, or highly viscous feeds.



SwRI can process and upgrade a variety of biocrude and unconventional feedstocks, such as the biofeed shown here on the left with processed products in the other vials.

We welcome your inquiries.

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SOUTHWEST RESEARCH INSTITUTE

Southwest Research Institute is a premier independent, nonprofit research and development organization using multidisciplinary services to provide solutions to some of the world's most challenging scientific and engineering problems. Headquartered in San Antonio, Texas, our client-focused, client-funded organization occupies 1,500 acres, providing more than 2.3 million square feet of laboratories, test facilities, workshops, and offices for more than 2,700 employees who perform contract work for government and industry clients.

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