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Cold Flow Verification Test Facility

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CRADA facts

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

COLD FLOW VERIFICATION TEST FACILITY

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Capabilities

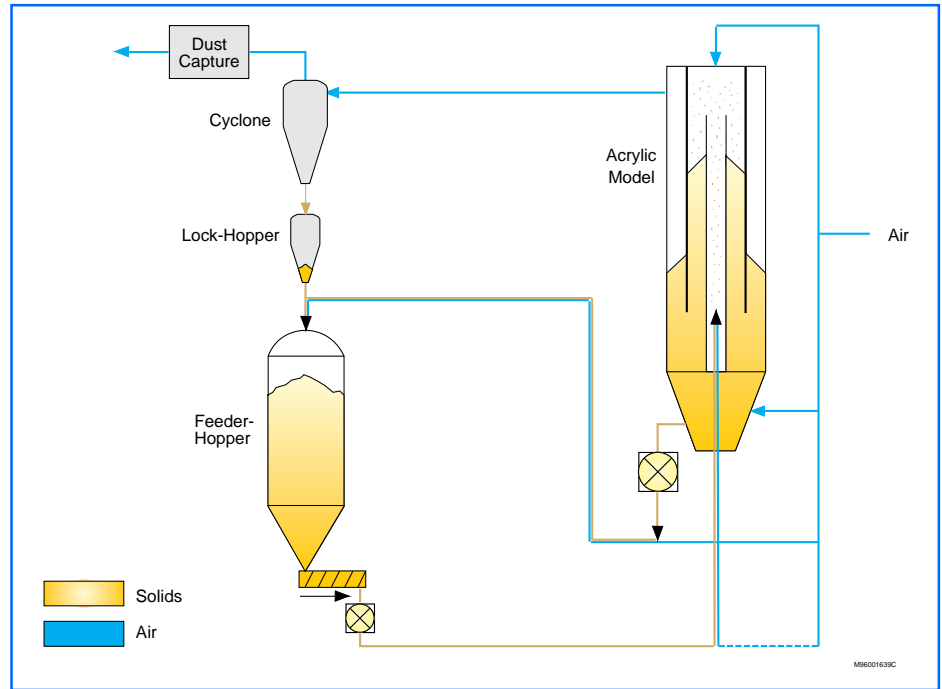
The cold flow verification test facility consists of a 15-foot high, 3-foot diameter, domed vessel made of clear acrylic in two flanged sections. The unit can operate up to pressures of 14 psig. The internals include a 10-foot high jetting fluidized bed, a cylindrical baffle that hangs from the dome, and a rotating grate for control of continuous solids removal. The fluid bed is continuously fed solids (20 to 150 lb/hr) through a central nozzle made up of concentric pipes. It can either be configured as a half or full cylinder of various dimensions. The fluid bed has flow loops for separate air flow control for conveying solids (inner jet, 500 to 10000 scfh), make-up into the jet (outer jet, 500 to 8000 scfh), spargers in the solids removal annulus (100 to 2000 scfh), and 6 air jets (20 to 200 scfh) on the sloping conical grid. Additional air (500 to 10000 scfh) can be added to the top of the dome and under the rotating grate.

The outer vessel, the hanging cylindrical baffles or skirt, and the rotating grate can be used to study issues concerning moving bed reactors. There is ample allowance for access and instrumentation in the outer shell. Furthermore, this facility is available for future Cooperative Research and Development Agreements (CRADA) to study issues and problems associated with fluid- and fixed-bed reactors. The design allows testing of different dimensions and geometries.

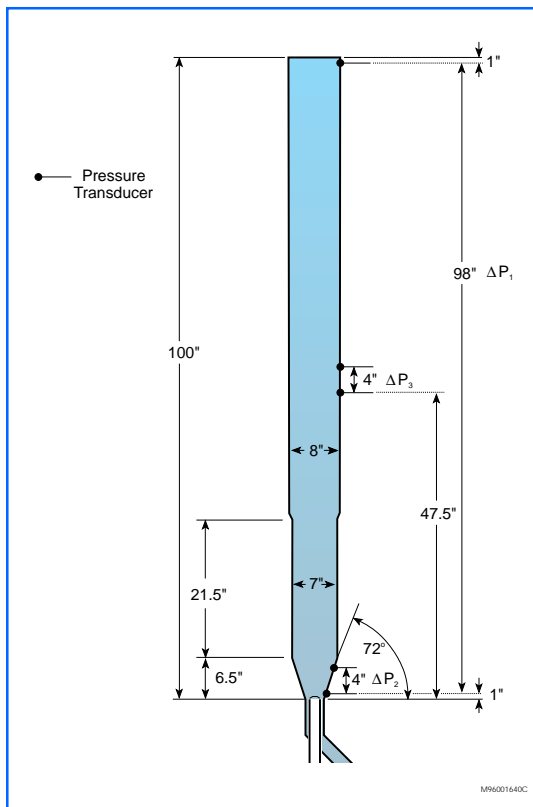
Opportunities

- Testing of jetting fluid bed in either half or full cylindrical configuration
- Development of rapid sensors and control systems for hydrodynamic instabilities/disturbances in jetting fluid bed
- Particulate control device visualization and testing
- Obtain data to determine operating conditions and design criteria necessary for jetting fluidized bed to avoid problems such as
 - carry over sticky coal and of tar vapor from the fluid-bed pyrolyzer
 - formation of ash-bonded clinkers around the feed jet
 - formation of coal agglomerates in the bed

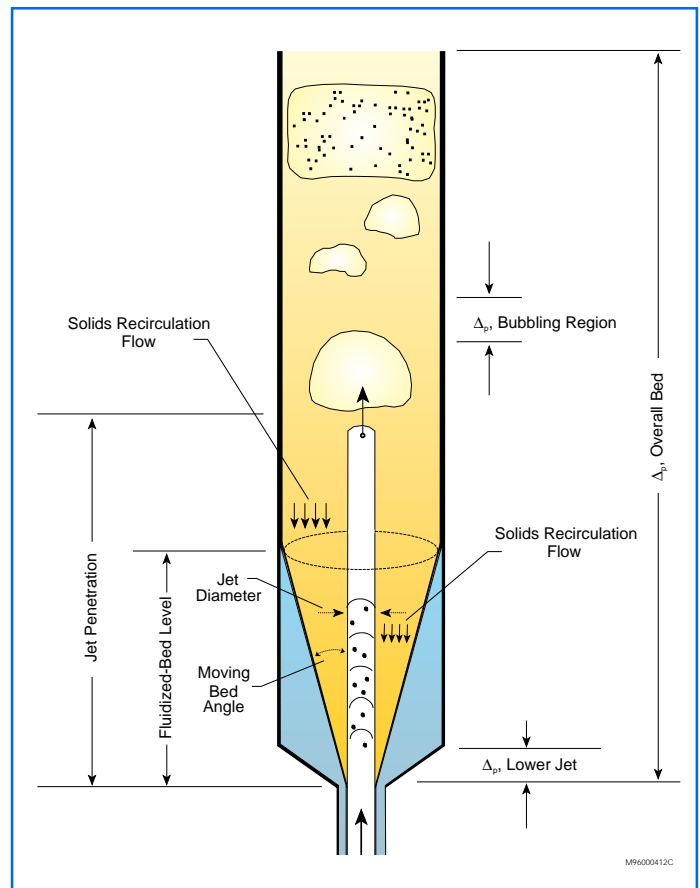
COLD FLOW VERIFICATION TEST FACILITY



Cold Flow Model Process



Configurations and Dimensions



Cold Jet Fed Fluidized-Bed Measurements