



NCUT

National Centre for Upgrading Technology

'a Canada-Alberta alliance for bitumen and heavy oil research'

Batch Autoclaves

PP-7, 8, & 9

The three batch autoclaves that NCUT has in service range in size from 300 mL to 1000 mL. (PP-10 and -11, the 2000-mL semi-continuous autoclaves, can also be run in a batch mode.) These units are attended full time while in operation. Any one of these units is ideal for preliminary experiments or subjecting materials to various process conditions.

Table 1. Autoclave capabilities at a glance

Maximum temperature	500°C	932°F
Maximum pressure	4000 psig	275 bar
Mixer RPM	100 to 1500	

Design Features

Each autoclave is a stainless steel vessel equipped with a stirrer that can be run at any RPM required. The mixer itself can be changed to meet program needs. Each autoclave is provided with a complete set of utilities: hydrogen, hydrogen sulfide, ammonia, nitrogen, water and air. Other specialty gases can be provided as required. Temperature control is achieved by either one or two electric heating zones. The units are normally depressurized slowly and all the gas from the run is collected.

Stream Analysis

The products are typically analyzed for density on an Anton Par automated densitometer and characterized by boiling range on a Hewlett Packard 5890 SimDis gas chromatograph. The gas is analyzed on an MTI GC.

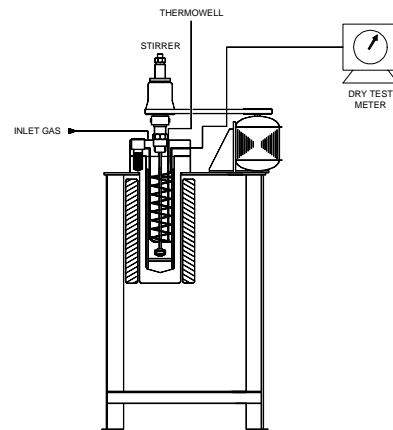


Figure 1. Configuration of PP-7, 8, & 9

Data Work-up

Data reconciliation and mass balance calculations are performed in a customized Microsoft Excel spreadsheet developed at NCUT. The spreadsheet automatically generates trend plots of the key operating conditions, raw analytical results, and calculated data to facilitate quality monitoring of the data generated. This spreadsheet application is used throughout the program to monitor performance of the unit, to facilitate communications between project staff, to store and manipulate program data, and to communicate with the client. Printouts of this spreadsheet, including tables and figures, form part of the final report prepared for the client at the end of each program.

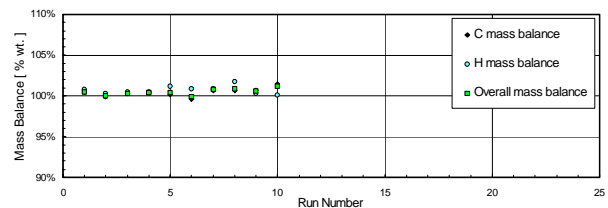


Figure 2. Mass balance data in a typical program

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