

Rock Compressibility

RCA-841

This system is designed to measure the pore, bulk volume, and permeability of a core sample under varying conditions of axial pressure, radial pressure, and temperature. The core sample is mounted into a tri-axial core holder so that independent axial and radial pressure can be applied to the sample. The initial bulk volume and pore volume are measured prior to installing the core sample into the core holder. As the axial and radial pressure are applied, the pore pressure will increase. The pore pressure is attached to a metering pump which is set in constant pressure mode. As the radial and axial pressure increases, the change in the pore volume is measured by the volume the pump changes to maintain the constant pressure. Once the measurement has been performed, the metering pump can be used to inject fluids through the core sample and measure the liquid permeability.

System Functions

The overall system is designed for the measurement of the following processes on reservoir core samples:

- Liquid Permeability
- Liquid Permeability as a function of radial and axial pressure
- Pore and Bulk Volume Compressibility as a function of radial and axial pressure

System Main Specifications

Flowing Pressure	69 MPa (10,000 psig)
Axial & Radial Confining Pressure	69 MPa (10,000 psig)
Temperature	Room Temperature to 150°C (302°F) ¹
Liquid Permeability Range	0.1 to 3,000 md
Wetted Material	316 Stainless Steel
Electrical	220 VAC 50 Hz 1 Phase and 380 VAC 50 Hz 3 Phase

Major Components within the System and their Specifications

The system is comprised of numerous, high technology components. The following will be a brief review or description of how each component is used within the system, its requirements for accurate measurements within the system, and its technical specifications. From this information, the end user can evaluate the system and components to insure that the system provided will meet or exceed their expectations.



Air Bath

The air bath is designed to contain and heat the core holder and fluid lines to the test conditions. The air bath is provided with a single opening doors for easy access to the components within the air bath. Each air bath has a stainless steel tray to catch any fluids that can leak during installation and testing. The air bath has an integral microprocessor controller for the control of the test temperature.

Specifications

Model No.	AB-80
Forced Air Type Circulation System	
Working Dimensions (minimum)	18" wide by 18" deep by 18" high
Stainless Steel Interior	
Fluid Catch Tray	
Microprocessor Controller	
Resolution	1 C
Electrical	220 VAC 50 Hz 1 Phase or 380 VAC 50 Hz 3 Phase

Metering Pumps

The test system is provided with three, single cylinder positive displacement metering pumps for the injection of the test fluid when testing liquid permeability, for applying the axial pressure, and for applying the radial confining pressure. The metering pumps can be used for either constant pressure or constant flow rate injection. The metering pumps can also be programmed for continuous injection for the injection of volumes of fluid in excess of a single cylinder stroke. The Smart Series software allows the end user to set the flow rate of the fluid injected or the pressure of the fluid injected, the cylinder from which to inject the fluid, and the volume of fluid injected, for a particular injection cycle. The change in pore volume of the rock sample, the change in core length, and the change in the core sample diameter can all be determined.