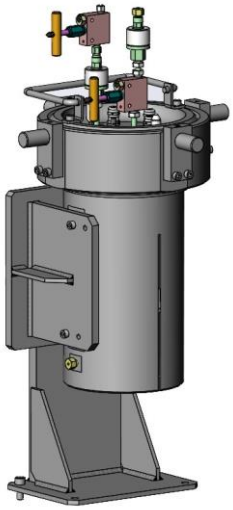
UEC-series ACOUSTIC & ELECTRICAL CELL

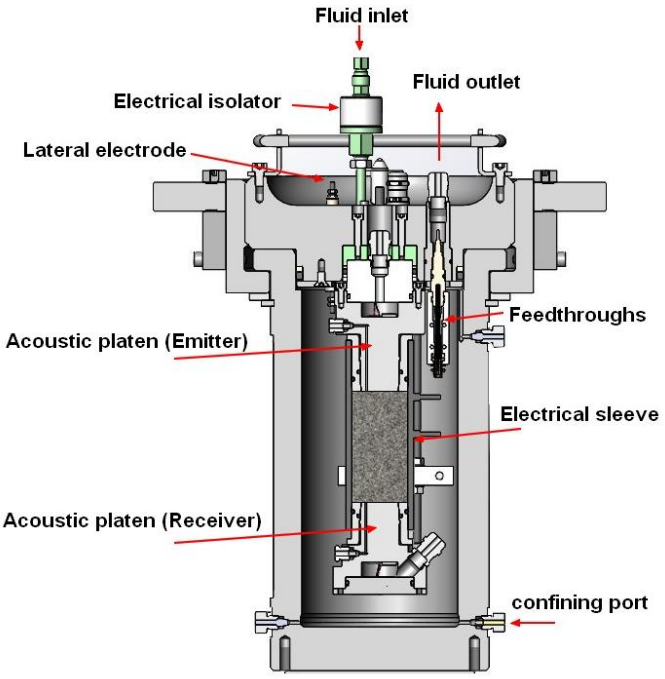
APPLICATIONS

Tests performed on a series of rock specimens under different pressures and temperatures allow the user to determine:

- Compression and two orthogonal shear wave velocities
- Dynamic elastic constants
- Rock resistivities



DESCRIPTION



The UEC Series consists of hydrostatic core holders integrated with acoustic sensors and electrodes, making them ideal for ultrasonic and resistivity studies involving fluid displacement in porous media. A key feature of these core holders is their ability to apply equal radial and axial confining pressures. The cell can be optionally equipped with a built-in hydraulic deviator chamber to apply an axial load on the specimen, enabling the application of distinct radial and axial confining pressures to generate deviatoric stress on the sample. The cell assembly includes specialized acoustic platens designed to facilitate the transmission of compressional (P) and shear (S1/S2) waves through rock specimens under controlled overburden pressure and temperature conditions. The cell is equipped with four electrodes designed for 2-point and 4-point electrical resistivity measurements. Two of these electrodes are in contact with the acoustic platens, which are electrically isolated from the rest of the system. The other two are circumferential electrodes embedded within the Viton electrical sleeve, positioned at the longitudinal midsection of the sleeve and spaced one inch apart. These coreholders are critical for understanding how fluid saturations, pressure, and temperature affect the mechanical (compressional and orthogonal shear wave velocities, dynamic elastic constants) and electrical properties of rocks, especially in applications like CO2 sequestration, hydrocarbon recovery, and reservoir characterization.

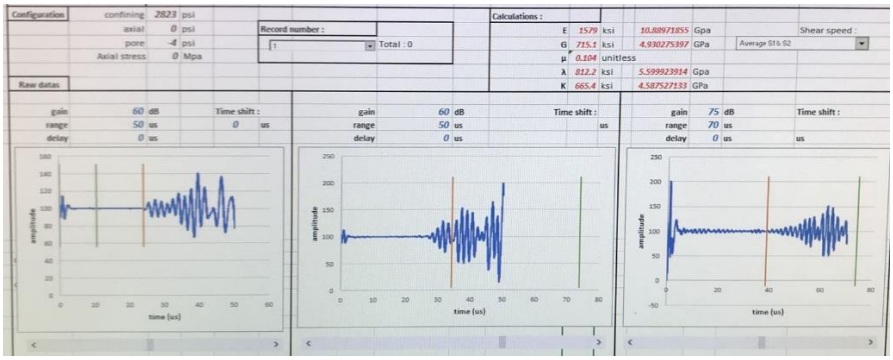
TEST PROCEDURE

A cylindrical core sample is placed inside a Viton electrical sleeve and positioned between two acoustic platens. Confining pressure is applied using an external pump to ensure firm contact between the core sample and the acoustic platens. Pore fluids enter through the acoustic emitter platen, flow across the core sample, and exit via a ¼" diameter tubing connected to the acoustic receiver platen. Coaxial and electrical feedthroughs facilitate the monitoring of acoustic and electrical signals. The four electrodes are then connected to a resistivity meter: two electrodes are used to inject a low-frequency electrical current through the rock, while the other two measure the resulting voltage drop. This setup allows for the calculation of the rock's resistivity. The acoustic platens are also connected to a pulser-receiver, which generates an electrical pulse to excite a piezoelectric transducer, emitting an acoustic wave. This wave propagates through the core sample to a second transducer acting as a receiver. The receiver transducer converts the wave into an electrical signal, which is subsequently amplified and processed. Compressional and shear acoustic velocities are then calculated from the resulting compressional (P) and shear (S1 and S2) waveforms.

FEATURES

Confining pressure:	70 MPa (10,000 psi)
Temperature:	Ambient to 120°C
Waves:	P, S1 & S2
Frequency:	1 Mhz
Resistivity:	2 and 4 points
Specimen diameter:	1 and 1.5 inches
Specimen length:	up to 3 inches
Wetted part material:	stainless steel / Hastelloy
Loading:	Hydrostatic or triaxial
Pore inlet:	1
Pore outlet:	1
Port fittings:	1/8 inch

TEST RESULTS



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