HUC-series HYDROSTATIC ACOUSTIC COREHOLDER

APPLICATIONS

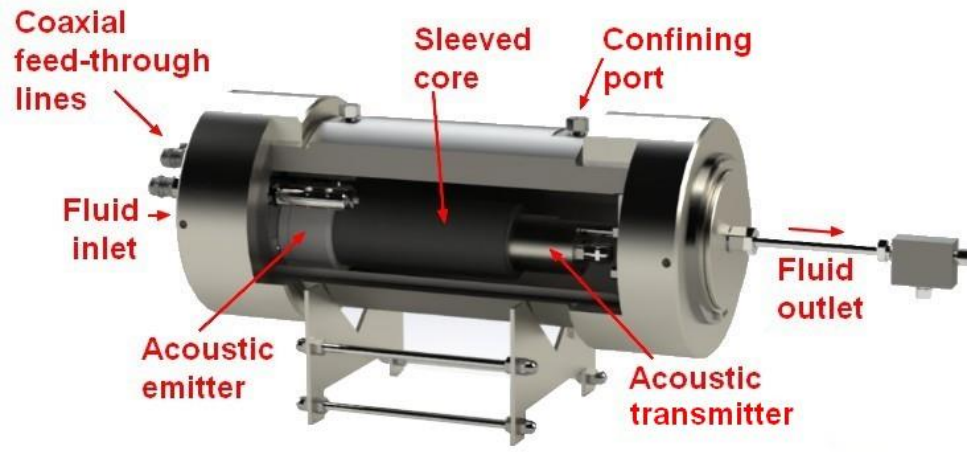
Tests performed on a series of rock specimens under different pressures and temperatures allow the user to determine:

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

DESCRIPTION

The HUC Series consists of hydrostatic core holders integrated with acoustic sensors, making them ideal for ultrasonic 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 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. Measurements performed on rock samples at varying confining pressures allow for the determination of compressional and orthogonal shear wave velocities, dynamic elastic constants, and simultaneous assessment of rock permeability. A cylindrical core sample is placed inside a Viton sleeve and positioned between a fixed acoustic platen at one end and a floating acoustic platen at the other.

Confining pressure is applied using an external pump to ensure firm contact between the core sample and the acoustic platens, accommodating a variety of core lengths. Coaxial feedthroughs facilitate the monitoring of acoustic signals from the acoustic floating platen. Pore fluids enter through the fixed acoustic platen, flow across the core sample, and exit via a ¼" diameter tubing connected to the floating acoustic platen. To replace the core sample, the confining fluid must first be drained, and the end plugs unscrewed by rotating it counter clockwise. This action removes the entire assembly—fixed acoustic platen, sleeve, core, and floating acoustic platen—allowing the core to be extracted from the sleeve. A new core can then be loaded by reversing the process.



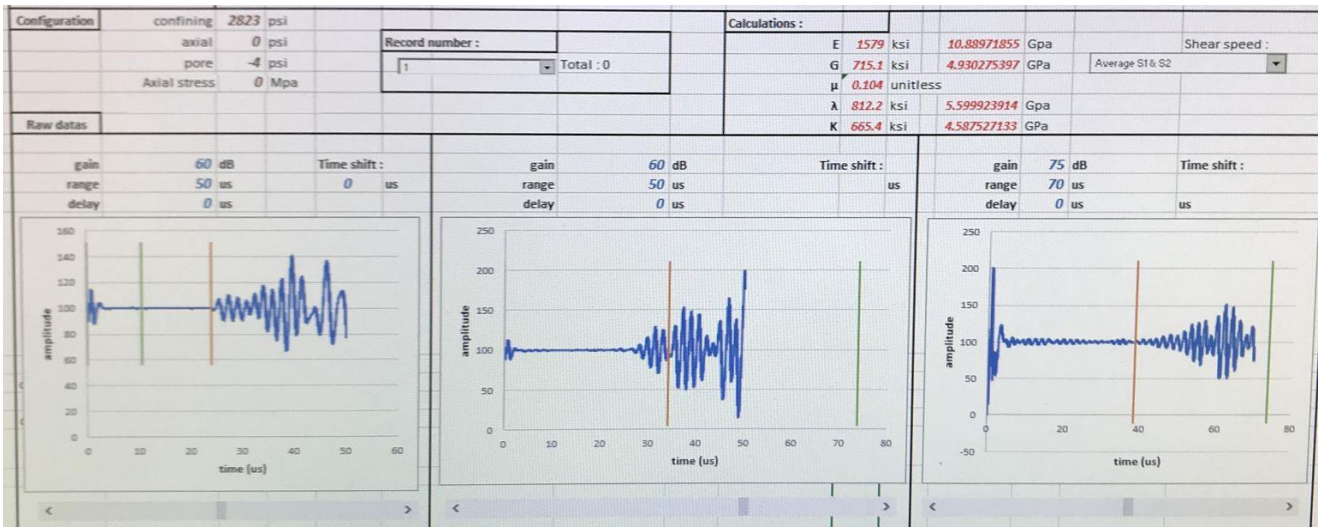
TEST PROCEDURE

The sample, along with the fixed acoustic platen (emitter) and floating platen (receiver), is encased in a Viton sleeve. A confining pressure is then applied to secure the sleeve tightly against the rock. The acoustic platens are linked to a pulser-receiver system. This system generates an electrical pulse that stimulates a piezoelectric transducer, resulting in the emission of an acoustic pulse. This acoustic pulse journeys through the rock core to a second transducer, which serves as a receiver. The received pulse is converted back into an electrical signal, which is subsequently amplified and conditioned by the receiver unit. Acoustic signals are then automatically captured by a computer, displaying both compressional (P) and shear (S1 & S2) waveforms. From these readings, both compressional and shear acoustic velocities are calculated, along with dynamic elastic constants. To measure rock permeability, fluid is injected at a constant flow rate into the core, while the pressure gradient across the sample is monitored. Permeability is then calculated using the Darcy method.

FEATURES

Standard:	ASTM (D2845)
Confining pressure:	70 MPa (10,000 psi)
Temperature:	Ambient to 120°C
Waves:	P, S1 & S2
Frequency:	1 Mhz
Specimen diameter:	1.5 inches
Specimen length:	3 inches (other upon request)
Wetted part material:	stainless steel / Hastelloy
Pore inlet:	1
Pore outlet:	1
Pore fittings:	1/8 inch

TEST RESULTS



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