GCTS is committed to designing accurate testing systems by integrating innovative software engineering with advanced hardware. GCTS systems perform at the highest levels of reliability, providing efficient systems that satisfy customer needs and expectations.

**HCA-100**
Dynamic Hollow Cylinder Testing System

- Standard systems to test 100 mm outside diameter (OD) & 63.5 mm inside diameter (ID) (18 mm wall thickness)
- Systems also available to test 100 mm OD 50 mm ID, 150 mm OD and 75 mm ID or 200 mm OD and 100 mm ID, 300 mm OD 150 mm ID.
- Optional unsaturated soils testing system package also available
- Internal high-speed torque motor for resonant column testing, ultrasonic platens, and temperature controller options also available
- Complete "turn-key" system
DESCRIPTION

Direct digital servo control of axial load, torque, confining pressure, internal pressure, and back pressure are achievable using the GCTS Dynamic Hollow Cylinder Testing System for performing "true triaxial" tests. This system is capable of simulating most field stress/strain path tests (static or dynamic) including plane strain, simple shear, and small shear strains. Other possible tests include, measurement of dynamic shear strength & deformation, liquefaction potential, shear modulus and damping ratio. The system is versatile in allowing the user to design custom procedures with operating frequencies of up to 50 Hz.

The system software advises the user on how to perform testing tasks and also reminds the user of important steps that may need to be executed (such as opening or closing a valve at required test stages). The program helps the user to select proper testing parameters and provides the necessary information to automatically execute the test. The Graphical User Interface with context sensitive on-line help and intuitive color windows help minimize the learning time and enables laboratory personnel to conduct more sophisticated testing programs at an economical price. The system manages all the instrumentation and continuously monitors sensor outputs to accurately account for uplift pressures acting on the loading piston, area changes, deformation and volume change sensor setup, re-positioning, etc.

This system includes a load frame that is relatively lightweight but highly stable and has a small tabletop footprint. The load frame consists of two large, stainless steel threaded columns with a hard-anodized aluminum cross head beam and a large, thick bottom plate for stability. The bottom plate is threaded for the two upright columns and for hold-down bolts to secure the triaxial cell. The stainless steel nuts on the frame columns can be used to easily adjust the height of the crosshead beam to accommodate variable specimen or cell heights. These frames can be configured with different flow capacity servo valves to obtain the required cyclic amplitudes. Performance charts printed below show the cyclic response of the standard and optional servo valves.

The triaxial cell included with the HCA-100 system is constructed of stainless steel. The standard unit features a see-through Plexiglas external cell wall. The advantages of the external cell wall (internal tie rods) are that after the specimen is completely ready for a test, the cell wall is lowered over the cell and fastened into place with minimum disturbance to the test sample. All the standard GCTS triaxial cells can accommodate smaller diameter specimens using optional platens. These triaxial cells accept specimens with a length of 2 to 2.5 times the diameter.

The standard HCA-100 includes three pressure/volume controllers for applying the outer cell, inner cell and back pressures. Each pressure/volume controller is housed inside a metal cabinet with casters that also include a 20 liter fluid reservoir, precise analog gages, automatic ball valves, flow indicators, etc. making them very convenient and easy to operate. Pressure gauges provide a visual verification of confining and pore pressures. Convenient “quick-connect” fittings allow for easy connection of pressure lines and filling/drain ing the fluid reservoirs. Sight tubes are also available to show the available amount of fluid in each fluid circuit.
Each pressure/volume controller intensifier has a pressure transducer and LVDT connected to them allowing for the servo control as a function of pressure, fluid volume control, or any other measured or calculated test parameter. With both pressure/volume controllers, advance tests such as stress/strain path, Ko, permeability, etc. can be easily performed. GCTS Pressure/Volume pumps use servo hydraulic controls that offer a fast reaction time and can apply synchronized cyclic axial and lateral stresses at high frequencies.

Our system includes a 150,000 per second sampling rate with 16-bit (0.0015%) resolution and “sample-and-hold” Digital-to-Analog (A/D) Converter. The sample-and-hold ensures that the converted values from all attached sensors (load cells, deformation, etc.) represent a single instant in time eliminating any data skew from delays in the A/D converter. GCTS hardware-software interface includes both an analog anti-alias filter for high frequencies and a digital filter for lower frequencies. This configuration produces a very stable and precise signal measurement and control system as required to perform dynamic torsional/triaxial tests.

Any desired unit can be used for display or report test parameters and even allowing combining different unit systems. GCTS software also offers compatibility with network systems for monitoring or sending your test data directly to any computer connected to your network. Using a Windows network system in your lab facilitates transferring of your test data directly into other Windows programs such as Word or Excel for report generation as well as to easily backup your important test results.

Together with GCTS excellent support from our highly qualified and experienced staff, we are sure to provide the best option and price-performance value.

* Specimen preparation equipment available for heights of 2 up to 2.5 times the specimen diameter.