

Hollow Cylinder (Dynamic) System

Related Standards

Japanese JGS 0543-2020, JGS 0551-2020

The Hollow cylinder test involves four different applied stresses to the sample, Axial, Torsional, Inner and Outer confining stresses. This gives four degrees of freedom to the deformation of the specimen.

The sample is in the form of a thick hollow cylinder fixed between two rigid platens. The hollow cylinder test aims to study the behaviour of the application of three unequal principal stresses to the specimen and the impact of the stresses from rotation when the specimen is rotated.

The main purpose of this test is to study the impact of the principle stress rotation to the behaviour of the sample.

The system includes five different controllers. Two electro-mechanical actuators (controlled by Dynamic Servo Controllers) which are used to control the rotation and the axial load, while 3 pressure controllers are used to control the Inner, Outer and Back pressures. During the test, the following should be measured:

- Vertical load
- Torque
- Inner and Outer Cell pressure/volumes
- Sample volume change
- Vertical deformation (axial strain)
- Shear deformation (i.e. rotation)

Features

- Capable of Dynamic Hollow Cylinder tests (10 kN, 100 Nm and 5 Hz)
- Electro-mechanical control using the DSC3000MM for Vertical loading and Horizontal torque
- Data logging via the DSC3000MM (up to 8 Input Channels per Axis)
- Cell Top lift included as standard
- Balance Ram included as standard
- Load/Torque, 100 mm Displacement & 20 Bar Pressure sensors included, as well as brackets and de-airing block
- Can perform Dynamic Triaxial Tests (subject to additional hardware)
- Can accommodate on-sample sensors (subject to additional hardware)

Specification

Vertical Dynamic Actuator	0.0001 - 5 Hz, +/- 10 kN
Horizontal Dynamic Actuator (Torque)	0.0001 - 5 Hz, +/- 100 Nm
Confining Pressure	2000 kPa
Sample Size	Outer diameter 100 mm; Inner diameter 60 mm; Height 200 mm
Data Logging Rate	200 Points/Cycle or 500 Points/Sec
Electrical Reqt.	90-240VAC, 50-60 Hz, 1ph
PC Interface	Ethernet or USB
Dimensions (W x D x H)	910 x 722 x 2380 mm
Weight	390 kg



Ordering Information

Main System Components

VJT-HC-100-60 Hollow Cylinder (Dynamic) Apparatus (note: all Sensors included)

VJT-DSC3000MM Dual Axis Dynamic Servo Controller

Accessories

VJT2267D-P Dual Pressure Controller (3500 kPa)

VJT2260-P Single Pressure Controller (3500 kPa)

VJT-HC-100-60-KIT Top cap, Base Pedestal, Inner & Outer Sample Preparation Tools

MIS0166D Single Channel Signal Conditioning Card

VJT-PSU0015 Isolation Transformer 230VAC with Cables **OR**

VJT-PSU0015-110 Isolation Transformer 110VAC with Cables

Optional Accessories

VJT-PC-RACK Rack Mounted PC (Optional)

VJT-HC-CAL Calibration Kit

VJT-DSC3000MM dimensions and weight

Dims (W x D x H) 600 x 600 x 700 mm (without monitor)

Weight 85 (kg) (with DSCs)

Software

VJT-csHCT Clisp Studio Hollow Cylinder Software

Clisp Studio – csHCT Software (from csDYNA)

- B-Check Saturation
- Isotropic/Anisotropic Consolidation
- Stress Path Testing
- Independent Axis Cyclic Testing
- Dual Axis Cyclic Testing
- Up to 1000 points saved per cycle
- Sinusoidal, Triangular, Square, Haversine and User Defined Waveforms
- Transducer Configuration and Calibration
- Live views, graphs & tables of logged & calculated data