

# RESONANT COLUMN

## TORSIONAL SHEAR

The basic principle of the resonant column device is to excite one end of a confined cylindrical soil specimen in a fundamental mode of vibration by means of torsional or longitudinal excitation. Once the fundamental mode of resonance frequency is established, measurements are made of the resonance frequency amplitude of vibration from which wave propagation velocities and strain amplitudes are calculated using the theory of elasticity. The shear modulus is determined from the derived velocity and the density of the specimen. The resonant column test is used to measure shear modulus ( $G$ ) and the damping ratio ( $D$ ) as small shear strains. These values are a function of strain level.

- Built in safety features
- Smart and sophisticated technologies to simplify testing
- Repeatable, reliable, and accurate results you can trust
- Real-time and remote test parameter changes for quality control
- Convenient reporting and data export
- Faster, smarter, better: designed with full automation and manual control options
- Easy upgrade to perform additional test types
- Designed and manufactured in the USA

### Applicable Test Standards

- ASTM D4015, D4767
- AASHTO T297



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## TECHNICAL SPECIFICATIONS

### LOAD CAPACITY

22.5 kN (5 klbf)

### MOTORS

Micro-stepper system with built-in controls

### RATE OF DISPLACEMENT

0.00003 to 35 mm per minute  
(0.000001 to 0.6 in per minute)

### FLOW RATE

0.000006 cc/sec to 3 cc/sec

### TRAVEL

Built-in displacement transducer with 76 mm (3 in) range and 0.0013 mm (0.00005 in) resolution

### POWER

110/220 V, 50/60 Hz, 1 phase

### DIMENSIONS

LoadTrac II 464 x 546 x 1206 mm (18 x 21.5 x 47.5 in)	FlowTrac II 203 x 546 x 470 mm (8 x 16 x 18.5 in)
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### WEIGHT

LoadTrac II 55 kg (120 lbs)	FlowTrac II 14 kg (30 lbs)
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### INCLUDED

- GeoNet-U USB 2.0 network adapter and cable to link to PC/laptop
- TRIAXIAL software module to automatically run and report tests

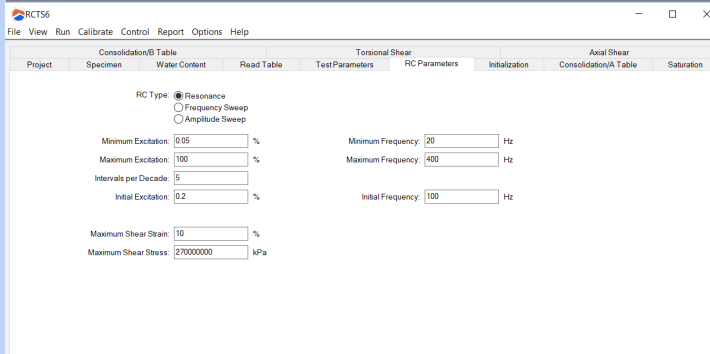
### ACCESSORIES

- FlowTrac II models available
  - 200 psi (1400 kPa) 250-750 cc
  - 500 psi (3500 kPa)
- 71 mm (2.8 in) diameter sample preparation accessories
- Membranes, porous stones, and sample preparation accessories upon request
- RCTS.REPORT: editing/reporting software for multiple tests

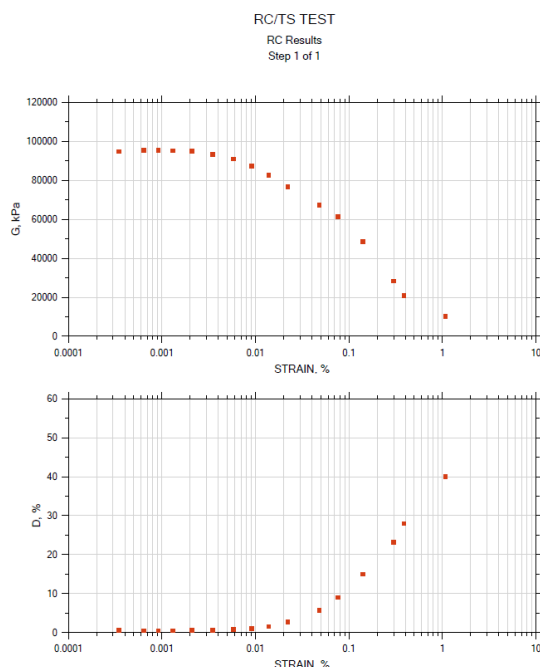
### WARRANTY

12 month warranty; extended warranties available

## User Friendly Interface



## Typical Test Output (example)



Project: RCTS-1	Location: Anywhere, USA	Project No.: RC123
Boring No.: 3A	Tested By: fm	Checked By: kzjg
Sample No.: 3A-1	Test Date: 02/18/2018	Depth: 10 ft.
Test No.: 1	Sample Type:	Elevation: --
Description: Ottawa F-65 Fine Sand		
Remarks:		

## Typical Test Output (example)

Excitation %	Excitation Frequency Hz	Active Rotation deg	Estimated Active Torque N-m	Estimated Passive Rotation deg	Passive Torque N-m	Estimated Resonant Frequency Hz	Average Shear Strain %	Shear Modulus kPa	Damping Ratio	MFC
0.063889	143.41	0.0010996	0.00034773	3.7945e-05	0.051745	143.56	0.00034760	94739.	0.60789	0.001687
0.10141	143.88	0.0020156	0.00043973	7.0038e-05	0.058584	144.03	0.00063706	95404.	0.40655	0.0058440
0.16070	143.99	0.0028943	0.00071382	0.00010054	0.053700	143.97	0.00094478	95361.	0.47594	0.0083782
0.25496	143.94	0.0041370	0.00094703	0.00014350	0.11914	143.92	0.0013076	95218.	0.44102	0.011962
0.40409	143.70	0.0065935	0.0017868	0.00022786	0.18878	143.62	0.002843	94857.	0.52319	0.019003
0.64058	142.76	0.011883	0.0024146	0.00037633	0.30868	142.51	0.004967	93350.	0.58342	0.031380
1.0148	141.17	0.018383	0.0034301	0.00069038	0.45024	140.69	0.0059198	90908.	0.74784	0.050806
1.6088	138.61	0.028736	0.015872	0.00091509	0.73316	138.00	0.0091088	87276.	1.0592	0.078934
2.5503	135.21	0.043613	0.032890	0.0013157	1.0404	134.37	0.013854	82582.	1.5390	0.11103
4.0441	130.84	0.069702	0.082434	0.0019597	1.5249	128.74	0.022116	76747.	2.6702	0.16706
6.4166	122.76	0.105018	0.123449	0.0037464	2.3906	122.18	0.044319	67356.	5.7507	0.32316
10.173	118.19	0.23374	0.27829	0.0053931	4.1445	117.08	0.078831	61326.	9.0100	0.46321
16.142	106.28	0.42233	1.1705	0.0080330	6.2000	105.24	0.13982	48524.	14.984	0.68890
25.629	82.804	0.67271	3.4386	0.010433	7.8093	81.689	0.22609	28303.	23.165	0.86563
40.668	70.388	1.1040	3.9604	0.010298	9.2754	71.084	0.38713	20855.	27.943	0.84821
64.509	51.528	2.8631	7.6670	0.015345	10.450	51.073	0.61937	10114.	40.013	1.0969

Project: RCTS-1	Location: Anywhere, USA	Project No.: RC123
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