SOIL > CYCLIC

MULTI-DIRECTIONAL CYCLIC DIRECT SIMPLE SHEAR TESTING MACHINE

Code : T828

- Designed for advanced characterization of soils under multi-directional cyclic loading, the MD-CSS replicates plane-strain simple shear while maintaining constant volume (undrained) conditions to evaluate liquefaction resistance, cyclic strength, modulus reduction, and damping.
- Performs consolidation followed by static or cyclic simple shear with active/passive height control to enforce constant-specimen height and constant diameter using stacked rings or wire-reinforced membrane confinement.
- Supports stress- or displacement-controlled cyclic shearing, enabling strain- or stress-path testing with user-defined amplitudes, cycle counts, and termination criteria for research and QC workflows.
- Provides a broad deformation window from very small to large shear strains, suitable for modulus/damping curves and liquefaction studies under earthquake-like load histories.
- Integrates vertical and horizontal force/displacement transducers for real-time closed-loop control and precise logging throughout consolidation and cyclic shearing.

- Optimized for ALFA Cloud workflows (test parameters, time histories, peak/DA/SA strain measures), supporting traceable, standards-aligned reporting for laboratories and consultants.

STANDARDS

ASTM D6528 • ASTM D8296 • ASTM D2435 • AASHTO T216 • ASTM D4186 • ASTM D4546 • BS 1377-5 • BS 1377-6 • EN ISO 17892-5

TECHNICAL SPECIFICATIONS

- Vertical Load Capacity: 12 kN (customized up to 300 kN)
- Shear load capacity (X & Y, orthogonal): ±12 kN (customized up to 300 kN)
- Shear Displacement Range: ±25 mm (larger on request)
- Frequency Range: 0.001–10 Hz (higher on request, actuator-dependent)
- Control Modes: Stress control, strain/displacement control, mixed control; monotonic and cyclic
- Constant-Volume Control: Active Height Control with closed-loop vertical actuator
- Consolidation: Automatic staged 1-D consolidation with creep/hold timing and end-of-primary detection
- Specimen Size: Ø38–100 mm (standard Ø67.5 mm)
- Transducers: 6-axis load cell (to reduce system compliance); horizontal LVDT (≤0.001 mm resolution); vertical LVDT for AHC (≤0.001 mm); optional pore pressure transducer
- Data & Results: τ–γ loops; G and D vs γ; CSR and Nliq; consolidation curves; cycle counters; peak/valley detection
- Software: Template-based test setup; waveform editor; real-time multi-channel plotting; CSV/PDF reporting; calibration utilities
- Safety: Soft/hard limits; overload/overtravel protection; emergency stop; safe-start interlocks
- Optional ALFA Cloud integration for secure, real-time data upload, centralized storage, and web access to results.

EQUIPPED WITH

- Dual orthogonal servo actuators (X & Y) with closed-loop control
- Multi-directional Load cell
- Vertical and horizontal LVDTs for displacement/strain feedback
- Constant-height (active/passive) control assembly
- DSS ring stack with pedestal and top cap (Ø63.5 mm standard)
- Advacned PC software for control,c and data acquisition
- Safety interlocks and emergency stop circuitry

SUPPLIED WITH

- Specimen preparation kit for DSS (membranes/rings and O-rings)
- Alignment and assembly tools
- Cabling and interface accessories for DAQ/control