Oedometer System

Automatic

(GDSAOS)

Sample size (max stress):

- 38mm (27000kPa)
- 50mm (5000kPa)
- 63.50mm (3000kPa)
- 71.40mm (2500kPa)
- 75mm (2200kPa)
- 100mm (1250kPa)
- 112.8mm (1000kPa)

Data acquisition:

• Load via built in load cell

Maximum Load:

• 10kN

Standards:

BS1377/5, ASTM-D2435,ASTM-D3877,ASTM-D4546,EN-ISO/TS17892/5, AASHTO-T216.

What is it?

The GDS Automatic Oedometer System (GDSAOS) is the modern replacement for a traditional hanging weight oedometer. The GDSAOS is a self contained stepper motor driven unit that can be controlled either manually using its Smart Keypad or from a PC using the USB interface. There is no requirement for compressed air or manually placed weights. When used with the GDSLAB control and data acquisition software, the GDSAOS can be used for a complete array of tests beyond those which a hanging weight oedometer can perform.

What are its uses?

The GDSAOS is a direct and convenient replacement for a hanging weight oedometer where its' small footprint significantly reduces the bench space required coupled with the additional advantage that loading weights are not required.

When using GDSLAB the GDSAOS can be preprogrammed to include numerous incremental loading stages which automatically move to the next stage via preprogrammed end of consolidation conditions.

What are the Benefits?

- No manual intervention to place weights required
- Automated logging of data (and optionally reporting)
- Stages can end at any time of day or night and the system will move directly to the next stage, increasing sample throughput
- Accurate throughout the load range, from 1N to 10kN (compared to pneumatic consolidation systems that are typically inaccurate at low loads).
- Stand-alone unit (no compressed air required).
- More repeatable loading conditions.
- Quicker test throughput due to automation.
- Pre-existing Oedometer cells and displacement transducers may be used.
- Increased accuracy.
- AOS Frame can be upgraded to become a full CRS system.
- Fast loading with low impact of the sample is possible due to the direct drive screw design.
- Small foot-print on the desk.

Technical Specification

- National/International standards: BS1377/5, ASTM D2435, ASTM D3877, ASTM D4546, EN ISO/TS 17892/5, AASHTO T216.
- Displacement resolution/accuracy: 0.0003mm, 0.15% (0.030mm),
- Load resolution/accuracy: 0.001kN / 0.15%FRO,
- Consolidation range: 19.5mm to 4.5mm (15mm),
- Compatible Cell Types: Fixed ring, floating ring, fixed ring permeability (register on platen is standard 40mm),
- Height from base to Top Plate: 180mm,
- Height from base to lift plate operating position: 225mm,
- Max height from base to top of columns: 408mm,
- Power supply: 110 to 240 AC Volt Input, 60Watts



Oedometer test setup

In its simplest form, the AOS frame with oedometer cell provides a force control unit with displacement measurements taken from the platen movement. In this way it can be used as a direct replacement for a traditional hanging weight oedometer frame. Loading can be applied directly through the keypad with measured load and measured displacement recorded manually as with a traditional oedometer frame. This simple method may be applicable to teaching laboratories and avoids students handling heavy weights and the associated Health and Safety implications.

The greatest benefits of the GDSAOS are realised when the AOS is fully automated for control and acquisition with the following options:

- GDSLAB with the Oedometer module -Automated testing (step loading) and data acquisition.
- External Displacement transducer Increases the accuracy of strain measurements (generally required to comply with national standards). The recommended transducer is a USB digital dial gauge for simplicity, ease of use, and the reassurance of a reading on the transducer.



GDSLAB Reports presents final result and reports directly from GDSLAB output files.

Note 1: If upgrading from a PC logged hanging weight system, it may be possible to utilise the current data logger and transducers as many data loggers, even those from other manufacturers, are compatible with the GDSLAB software.

Note 2, Multiple cell systems: The GDSAOS can be arranged in greater numbers connected to a single PC or to multiple PCs. Commonly oedometers are used in groups of 4-6 and these can all be connected to GDSLAB and controlled with tests starting at different times and differing load increments.



Constant Rate of Strain (CRS) Options

Constant rate of strain consolidation with pore pressure control (back pressure) and pore pressure measurement is possible allowing one dimensional consolidation to be achieved faster than using weights or stepped loading tests. CRS cannot be performed with hanging weight oedometers or with pneumatically actuated automated oedometer systems. Fast loading with low impact of the sample is possible due to the direct drive screw design.

Additional equipment is required to carry out CRS testing as follows:

- AOS frame upgrade to allow a larger CRS cell to fit. This can be done as a factory upgrade at time of purchase or a field upgrade later on. The factory upgrade is a lower cost because the oedometer parts are not required.
- A GDS CRS Cell
- A CRS Cell sample set (these are interchangeable to allow testing of different sample sizes within the same cell.
- Optional Internal Submersible loadcell (to remove seal friction effects on the loading ram)
- Back pressure controller
- Pore pressure transducer
- Data Acquisition device



Further Advanced Testing Options

Closed Loop Displacement Control

There are two different types of external displacement transducer available, Open Loop and Closed Loop. Open Loop transducers connect to the PC rather than directly to the GDSAOS and are generally used where logging of displacement, or strain, is required. Where **control** and logging of strain is required, for example in CRS or some advanced creep testing a Closed Loop transducer should be selected. Closed Loop transducers are connected directly to the GDSAOS frame via a Remote Feedback Module (RFM).

For Open Loop transducers there are two choices; a USB connected Standard resolution Digital Dial Gauge with a resolution of 0.015mm and Maximum Error of 0.02mm or a High resolution Digital Dial Gauge with a resolution of 0.001 and maximum error of 0.005mm.

For Closed Loop transducers a high accuracy (<0.1% FRO) LVDT is offered in either ±5mm or ±10mm ranges.

Permeability Testing

A Fixed ring permeability consolidation cell is available to fit the GDSAOS.

Additional equipment required to carry out Fixed Ring Permeability testing:

- A Fixed Ring Permeability Cell
- 2 off GDS Pressure Volume controllers
- GDSLAB Permeability Module