



20 MPa
pressure cell
in loadframe

Constant Rate of Strain Cell (CRS)

The GDS Constant Rate of Strain Cell (CRS) is a load frame based one dimensional consolidation cell capable of applying back pressure and measuring pore pressures up to 1MPa (low pressure version), 3MPa (medium pressure version), or 20MPa (high pressure version). Coupled with GDS Controllers and software, the system will run the entire test from start to finish through a loading path specified by the user using constant rate of strain loading.

Key Features:

Benefits to the User:

Stress control:	As well as constant rate of strain, stress may be applied on a constant (creep tests) or incremental basis identical to a traditional oedometer.
Constant rate of strain with controlled back pressure:	Drainage is through the base of the apparatus meaning excess pore pressure can be monitored and controlled. Tests can run whilst maintaining a specified maximum excess pore pressure, therefore increasing specimen throughput due to faster testing times.
Program the entire test from start to finish with multiple test stages:	More efficient testing as no waiting for user inputs.
Interchangeable range submersible loadcell:	Enables the user to run tests on soils of significantly different stiffness, and match the load transducers accordingly, giving greater accuracy of results, plus seal friction does not effect load readings.
Construction material:	Anodised aluminium with perspex outer cell wall for long life (1MPa and 3MPa versions), or full stainless steel (20MPa version).
Integral cutter/sample ring:	Disturbance on samples is reduced by having a cutting edge integrated into the sample confinement ring.

Tests that can be Performed:

Constant rate of Loading (CRL) Consolidation, Constant rate of strain (CRS) Consolidation, Consolidation Testing, K0 (K-Zero), Multi-stage Testing, Oedometer/Consolidation, Constant Head Permeability, Pore Water Volume Change, Quasi-Static (low speed/creep) Tests, RAMP and CYCLE pressure or volume change (Saturation Ramp), Axial Compression, Load Control (Static), Static Displacement, Static Load, Stepped Loading.

Upgrade Options:

Unsaturated Testing, Bender Element Testing.

Technical Specification:

Load Range (kN):	High Pressure: 100, Medium and Low Pressure: 50
Pressure Range (MPa):	High Pressure: 20, Medium Pressure: 3, Low Pressure: 1
Sample Sizes (mm):	High Pressure: 38, 50, Low Pressure: 38-100
Construction Material:	High Pressure: All stainless steel, Medium and Low Pressure: Anodised aluminium with perspex outer cell.

How does it work?

Instead of applying stress increments in stages as in a typical oedometer consolidation test, the load can be gradually applied to the sample by increasing the axial strain at a constant rate. Controlled back pressure (water) is applied to the sample and drainage is allowed through the base of the apparatus. The advantage of this method is that the time required to complete a consolidation test can be reduced significantly by maintaining close control of the excess pore pressures generated.

System Elements

A GDS pressure controller is used to apply the back pressure. A standard load frame controls the vertical stress and strain, with strain rates typically up to 100mm/min. A force transducer placed at the end of a piston measures the force, and pore pressure is measured by a transducer connected to the base filter stone. The sample itself is confined between two porous plates in a steel ring, which prevents horizontal deformation and reduces friction. The low/medium pressure cells (see Fig.1 below) are designed to be used with an internal submersible load cell, whereas the high pressure version (see Fig.2 below) is used with an external load cell only. GDS also have the option for an open-topped CRS cell see Fig 3. This is like a traditional oedometer cell but has a sealed lower porous disc allowing pore pressure measurements to be taken at the base of the specimen.



Fig 1. Low/Medium pressure cell
(1 and 3MPa)



Fig 2. High pressure cell (20MPa)



Fig 3. Open-topped CRS

Temperature Control:

GDS' Constant Rate of Strain cell is available with temperature control. The cell shown on the right is for heating only, its temperature ranges from ambient to 80°C. This cell is of high pressure up to 20MPa and can accommodate sample sizes up to 50mm.

The load frame actuated cell can fit a number of different load frames. Other temperature ranges including heating and cooling are available upon request.



Why Buy GDS?

GDS have supplied equipment to over 86% of the world's top 50 Universities:

GDS have supplied equipment to over 86% of the world's top 50 Universities who specialise in Civil & Structural Engineering, according to the "QS World University Ranking 2020" report.

GDS also work with many commercial laboratories including BGC Canada, Fugro, GEO, Geolabs, Geoteko, Golder Associates, Inpijn Blokpoel, Klohn Crippen, MEG Consulting, Multiconsult, Statens Vegvesen, NGI, Ramboll, Russell Geotechnical Innovations Ltd, SA Geolabs, SGS, Wiertsema and Partners to name a few.

**TOP
50**

Would you recommend GDS equipment to your colleague, friend or associate?

100% of our customers answered "YES"

Results from our post-delivery survey asked customers for feedback on their delivery, installation (if applicable), supporting documentation, apparatus and overall satisfaction with GDS. The survey ran for two years.



Made in the UK:

All GDS products are designed, manufactured and assembled in the UK at our offices in Hook. All products are quality assured before they are dispatched.

GDS are an ISO9001:2015 accredited company. The scope of this certificate applies to the approved quality administration systems relating to the "Manufacture of Laboratory and Field Testing Equipment".

**40 YEARS OF
BRITISH
INNOVATION**



Extended Warranties:

All GDS apparatus are covered by a 12 month manufacturers warranty. In addition to the standard warranty, GDS offer comprehensive extended warranties for 12, 24 and 36 months, for peace of mind against any repairs in the future. The extended warranties can be purchased at any time during the first 12 months of ownership.



GDS Training & Installation:

All installations & training are carried out by qualified engineers. A GDS engineer is assigned to each order throughout the sales process. They will quality assure the apparatus prior to shipping, if installation has been purchased, install the apparatus on the customers site & provide the training.



Technical Support:

GDS understand the need for ongoing after sales support, so much so that they have their own dedicated customer support centre. Alongside their support centre GDS use a variety of additional support methods including remote PC support, product helpsheets, video tutorials, email and telephone support.

