Options available for GDSVIS

Axial load ranges:

100kN ✓ **250kN** ✓

400kN ✓ **500kN** ✓

Custom on request ✓

Daylight clearance for test cell

100kN
Max width = 500 mm
Max height = 735 mm

250kN
Max width = 750 mm
Max height = 1050 mm

400kN
Max width = 750 mm
Max height = 1050 mm

500kN
Max width = 750 mm
Max height = 1050 mm

GDS Virtual Infinite Stiffness Loading System (GDSVIS)

What is it?

The GDS Virtual Infinite Stiffness Loading System (GDSVIS) is the loading frame/compression machine that you would expect from GDS. It has feedback control and continuous displays of axial load and platen displacement, USB computer interface and, exclusive to GDS, Virtual Infinite Stiffness (VIS).

These outstanding features, coupled with GDSLAB software, GDS digital pressure controllers, and the GDS Data Acquisition System, give you unlimited possibilities in conventional and advanced PC-controlled triaxial testing of soil and rock.

What is VIS?

VIS (Virtual Infinite Stiffness) is a unique GDS development. To the observer, and in terms of the test specimen, it allows the axial loading system to operate as though to have infinite stiffness.

Technical specification

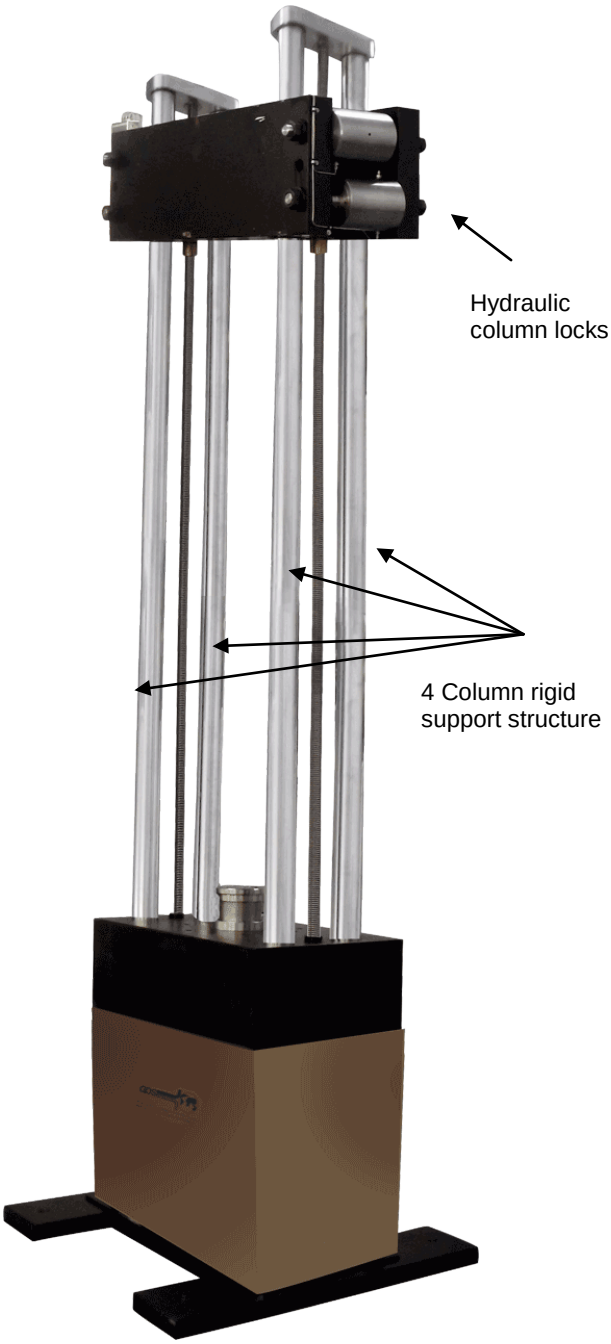
- **Load ranges**: 100kN (10ton), 250kN (25ton), 400kN (40ton) and 500kN (50ton). Custom ranges available on request.
- **Load resolution**: +/- 1 in 10,000
- **Load cell accuracy:** non-linearity +/- 0.03%, hysteresis and non repeatability +/- 0.05%
- **Displacement range:** 100mm
- **Displacement resolution:** 0.1micrometre
- **Displacement accuracy:** 0.05% of full range
- **Max displacement rate:** TARGET: 3.75mm/min, RAMP: 1.20mm/mm, UP/DOWN: 6mm/min, RAMPTARGET LOAD control: 1.0mm/min
- **Min displacement rate:** there is no minimum rate
- **Platen diameter:** 100kN = 140mm, 250kN = 145mm, 400kN = 145mm, 500kN=145mm
- **Weight*:*** approx. 800 kgf to 2000 kgf (depending on model)
- **Nominal Size*:*** 2.3m x 1.0m x 0.96m
- **Resolution of measurement and control**: pressure = <0.1% full range, displacement = 0.1micrometre
- **Power**: 92-265v, A.C. 48-440Hz, 65w maximum, single phase three wire earthed supply, 2A fuse x 2
- **Control panel**: 16 keypad membrane touch panel with audio feedback. Functions include zero pressure, target pressure, zero volume, target volume, fill, empty, test, ramp, stop, continue, reset, enter, +, -, >, <, yes, no
- **User interface:** 40 character, 1-line liquid crystal display
- **Computer interface**: USB

GDS 500kN Virtual Infinite Stiffness Load Frame.

The premier load frame in the VIS range is the 500kN VIS.

The load frame has been built with 4 columns for extra strength and rigidity and can hold a cell size with a 700mm outer cell diameter. Extra tall columns allow heavy cell tops to be raised from their boxes using the automatic cross beam raising and lowering mechanism, making sample preparation quick and easy for a single operator.

Hydraulic column locks replace the standard torque wrench's tightened locks, allowing the user to quickly exert clamping forces when adjusting the height of the frame.



High Pressure Testing

The GDS 500kN VIS is just part of the high pressure testing equipment available from GDS. GDS have a range of triaxial cells, pressure controllers and software to create a fully automated testing solution.

GDS produce an extensive range of triaxial cells in order to satisfy the complex range of tests required by today's modern geotechnical laboratories. The traditional passive triaxial cells which fit the VIS load frame are available from 1- 100MPa and can be supplied with or without a balanced ram.

Pressure / Volume controllers used to regulate cell and back pressure are available from 1-150MPa.

GDSLAB is the control and acquisition software from GDS. The flexible software platform is based on a modular system whereby, product specific test modules are available to for your exact testing requirements.

How does VIS (Virtual Infinite Stiffness) work?

VIS is a unique GDS development. To the observer, and in terms of the test specimen, it allows the axial loading system to appear to have infinite stiffness.

For the entire loading range, both the measurement and control of platen displacement is automatically corrected so that it corresponds to the deformation that occurs between the platen and the load button of the load cell. In this way, the platen displacement is corrected for strain in the load cell and side columns, bending flexure of the cross beams, and distortion within the motorised mechanical transmission.

The GDSVIS is computer calibrated to provide precise data on the load-deformation relationship of the entire load application and load measuring system. These measurements are made with the adjustable upper cross beam in the maximum and minimum positions. For each position, measurements are made with the platen at each end of its travel.

The calibration data is loaded into the read only memory (ROM) of the system which constantly monitors the axial load and uses the calibration to apply a correction to the platen displacement. Therefore, it appears to the observer (or controlling computer) that the measurement of platen displacement (resolved to 0.1 micrometre) is derived from a machine with infinite stiffness. In this way the system has the characteristic of Virtual Infinite Stiffness.

Measurement of stiffness in the triaxial test

Accurate determination of soil and rock stiffness is difficult to achieve in routine laboratory testing. Conventionally, the determination of axial stiffness of a triaxial test specimen is based on external measurements of displacement which include a number of extraneous movements. For example, the true strains developed in triaxial tests can be masked by deflections which originate in the compliances of the loading system and load measuring system. Such equipment compliance errors add to a variety of sample bedding effects to give a poor definition of the stress-strain behaviour of the material under test, particularly over the small strain range. Therefore, most triaxial tests tend to give apparent material stiffnesses far lower than those inferred from field behaviour (Jardine, Symes & Burland, 1984).

System Features

- Simple to use under either load or displacement control,
- Microprocessor controlled with built-in feedback of axial load and platen displacement,
- VIS provides automatic correction for system compliance stored in ROM,
- USB computer interface,
- 100kN (10ton), 250kN (25ton), 400kN (40ton) and 500kN (50tons) capacities,
- Continuous displays of axial load and platen displacement,
- Resolution of axial force +/- 1 in 10,000,
- Resolution of platen displacement 0.1 micrometre,
- Ramp and cycle axial load or platen displacement through function keys on the control panel,
- Supported by GDS GDSLAB software.

Applications in the geotechnical laboratory

Through the control panel (stand alone) or through the computer interface, you can enter either targets or linear time ramps of load or platen displacement. These RAMP functions can also be used to cycle load or displacement in a low frequency triangular wave form. Of course, via the computer interface, any wave form is possible.

All GDSVIS machines are fully compatible with GDSLAB control and data acquisition software. Conventional and advanced tests can be carried out including:

- classic compression and extension
- creep (constant axial total stress)
- stress paths defined in terms of the stress invariants p and q, or s and t
- cyclic stress paths
- low frequency cyclic loading

(Please refer to the GDSLAB dedicated datasheet for more details on control software).

Why buy GDSVIS?

- VIS (Virtual Infinite Stiffness) system is unique to GDS,
- Load control as well as the more standard displacement control functions,
- In addition to the VIS system, GDS load frames are extremely stiff and designed principally for rock testing to allow minimum backlash at the point of sample shearing (other, less stiff, load frames do not give good results at this critical point in the test due to the stretch of the load frame under high load),
- May be used stand-alone or under computer control,
- Compatible with the well-developed GDSLAB software which provides a consistent interface across all of your geotechnical laboratory testing.

Due to continued development specifications may change without notice