



### 1.5 MN Hydraulic Loadframe (HLF1500)

**Overview:** The HLF1500 is a dynamic hydraulically actuated loadframe which can apply loads up to 1.5MN. Specifically designed for efficient and effective testing of stiff geomaterials the HLF1500 has a high axial stiffness, user safety and operability at the core of its design.

The triaxial cell is designed as a cowl-type cell, where the cell wall can be lifted without the need to remove clamps. All lifting and handling is designed into the system. The cell is capable of heating the internal volume of oil up to 150°C whilst under the working pressure of 150MPa.

Pressure is supplied to the cell by optional integrated high pressure intensifiers.

#### Key Features:

#### Benefits to User:

Ease of sample preparation:	In order to ease sample and instrumentation preparation and setup, a pneumatic lifting carriage has been added. The carriage slides the cell base out of the load frame to bring it closer to the operator.
GDS load frames are extremely stiff and are designed to allow minimum backlash and recovery at the point of sample shearing:	At this critical point in the test, under high loads, as the sample instantly fails mechanical recovery of the frame can mask the data being derived from the sample.
The system is capable of both monotonic (static) and dynamic triaxial tests:	As well as other advanced triaxial tests usually expected from a GDS system, the system is able to perform static testing, allowing for a single system to perform a wider range of tests.
Dynamic control of axial displacement or axial force up to 20Hz (frame dependant), sinusoidal waveform:	Highly dynamic control of the frame allows precise testing to be carried out to higher frequencies.
Closed loop control of axial displacement, axial force and cell pressure:	Provides constantly monitored loading from the frame allowing for well defined, accurate load, pressure and displacement paths.
Optional dynamic control of radial stress up to 20Hz, sinusoidal waveform:	The dynamic control of cell pressure means that for those tests where the cell pressure is constant but the axial actuator is moving dynamically, the cell pressure actuator automatically adjusts the volume of oil in the cell to maintain a constant cell pressure or it can be used to cycle the cell pressure.
Cell Wall Lifting Mechanism:	Allows the cell to be lifted such that the cell interior can be accessed for sample and instrumentation setup, as well as seal pack replacement.
Advanced Transducers Available:	Acoustic Velocity Transducers in the top cap and pedestals, Radial and Axial strain measurement with strain gauge arrangement, axial and radial local displacement with LVDT's arrangements and acoustic emission measurements are also available.

#### Technical Specification:

<b>Cell Pressure (MPa):</b>	150
<b>Frequency (Hz):</b>	5 standard, (optionally up to 20)
<b>Sample Size (mm):</b>	up to 70 diameter x 140 height
<b>Weight Approx (kg):</b>	7000
<b>Temperature Control:</b>	Heater bands up to 150°C
<b>Computer Interface:</b>	USB
<b>Machine Stiffness:</b>	10kN/mm

## Features of Dynamic Servo-hydraulic Load frame

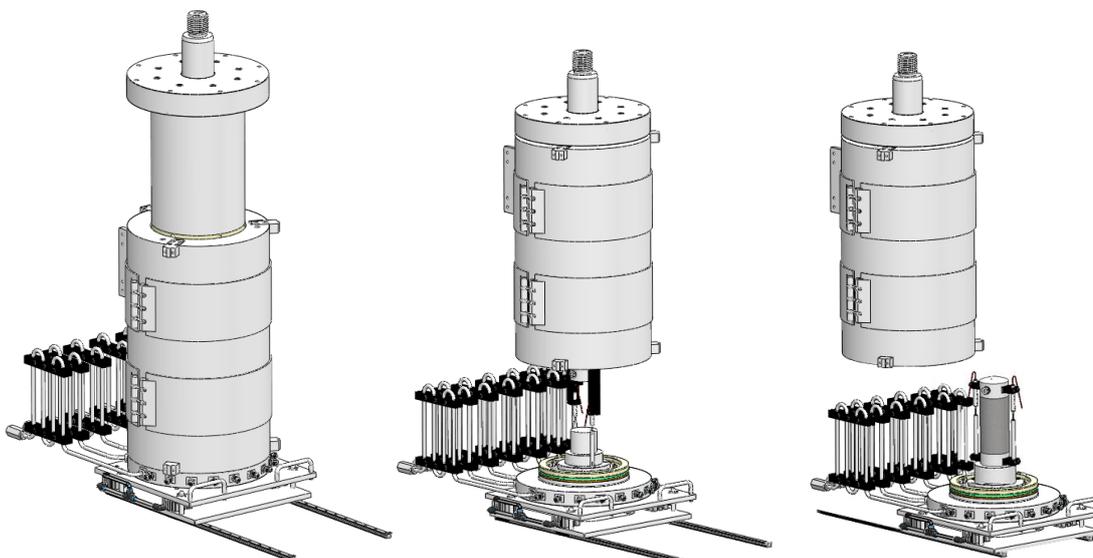
(See following page for descriptions)



1.5MN, 150MPa, 150°C HLF

## 1.5MN / 150MPa / 150°C Rock Triaxial System

1. Double acting servo-hydraulic actuator, maximum static load of +1500kN and maximum dynamic load of  $\pm 1200$ kN with frequencies up to 20Hz.
2. Full stroke in bore non-contact position sensor with 0.2% non-linearity. Includes piston anti-rotation feature and mechanical feed back servo valve.
3. Optional 150MPa cell and back pressure controllers, 600cc volume with better than 0.25% pressure accuracy and 0.006cc volume resolution.
4. The cell is based on a cowl-type triaxial cell, where the cell wall is able to be lifted without the need for removing clamps. The cell is capable of heating the internal volume of oil up to 150°C whilst under the working pressure of 150MPa.
5. In order to ease sample and instrumentation preparation and setup, a lifting carriage has been added. The carriage slides out of the load frame to bring the cell base closer to the operator.
6. High wear-resistance, low friction rod seals for 20Hz/0.2mm performance or 10Hz/1mm or 5Hz/5mm. Static monotonic velocity range: 0.0001mm/sec to 1mm/sec.
7. 150MPa Hardened Stainless Steel cell construction. For samples up to 70mm diameter x 140mm height (with top bolting pedestals for easy handling).
8. Optional Acoustic Velocity Transducers in the top cap and pedestal, axial and radial local displacement with LVDTs and acoustic emission measurements are also available.
9. Access ports for high pressure connections.
10. The cell base has ten off 5 pin glass-to-metal feedthroughs capable of operating at pressures up to 150MPa.
11. High stiffness load frame construction using high modulus of elasticity materials achieving overall stiffness in excess of 10MN/mm.



Sliding / lifting mechanism ensures easier and safer sample preparation.

## GDSLAB Control Software

GDSLAB is the control and data acquisition software for geotechnical laboratory applications. GDSLAB starts with a core application known as the kernel. The GDSLAB kernel allows for data acquisition from your hardware, but no test control. Simply add the appropriate module or modules to complete the test suite functionality you require. GDSLAB is compatible with all existing GDS equipment and furthermore key hardware from other manufacturers.

GDSLAB has the ability to be configured to your hardware of choice, no matter how unique the arrangement. A text file (\*.ini) or initialisation file is created that describes the hardware connectivity to the PC. The hardware layout is available in graphical format via the GDSLAB 'object display'. This makes setting up the devices and checking the connectivity extremely simple.

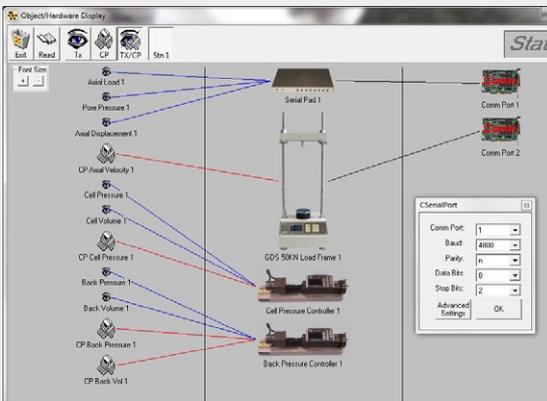


Fig 4. Show a typical set-up screen in GDSLAB

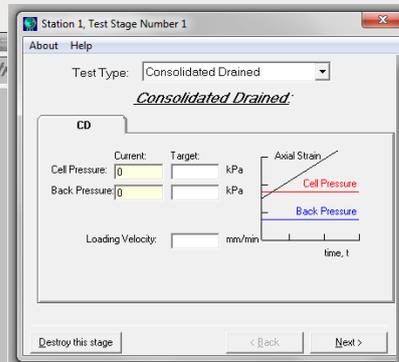


Fig 5. Show a typical station test stage set-up in GDSLAB

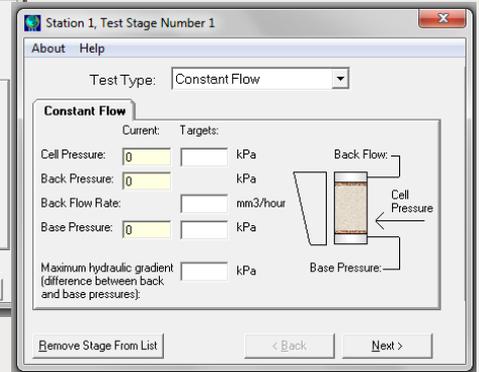


Fig 6. Show a typical station test stage set-up in GDSLAB

*Required Operating System: Windows 7 SP1 or higher (We strongly recommend that Windows is fully up to date and running the latest Service Pack/Version available). Recommended PC Specification: 2GHz processor, 4GB Ram, 64Bit Operating System and USB connectivity. Note: GDS software can run on lower spec PC's however; performance and processing of data may be affected.*