Passive Triaxial Cells

Sample size range:

25 mm ✓ to 500 mm ✓

Pressure range:

1 MPa ✓ to 100 MPa ✓

Active (Stress Path) Cells

Sample size range:

25 mm ✓ to 100 mm ✓

Pressure range:

1 MPa ✓ to 20 MPa ✓

Balanced Ram Options: ✓

GDS Triaxial Cell Range

What is it?

GDS produce an extensive range of triaxial cells in order to satisfy the complex range of tests required by today's modern geotechnical laboratories (see Fig. 1 for a typical triaxial cell schematic). Traditional passive triaxial cells (known as passive due to the fact that they are used with an external actuator such as a load frame to apply axial loads), large diameter triaxial cells (up to 500mm sample diameter), active triaxial cells (based on Bishops and Wesley's original hydraulic stress path apparatus and include an actuator 'built in'), as well as cells specifically designed for dynamic triaxial testing with low friction bearings and seals are available from GDS. In addition, there are a number of features such as balanced ram triaxial cells, access ports and access rings for internal transducers that are offered.

In summary, the cells are grouped into the following categories:-

- Traditional Passive Triaxial Cells
  - Low Pressure (< 5 MPa)
  - High Pressure (> 5MPa with balanced ram)
  - High Pressure (> 5MPa without balanced ram)
- Active Triaxial Cells (Hydraulically Actuated Triaxial)

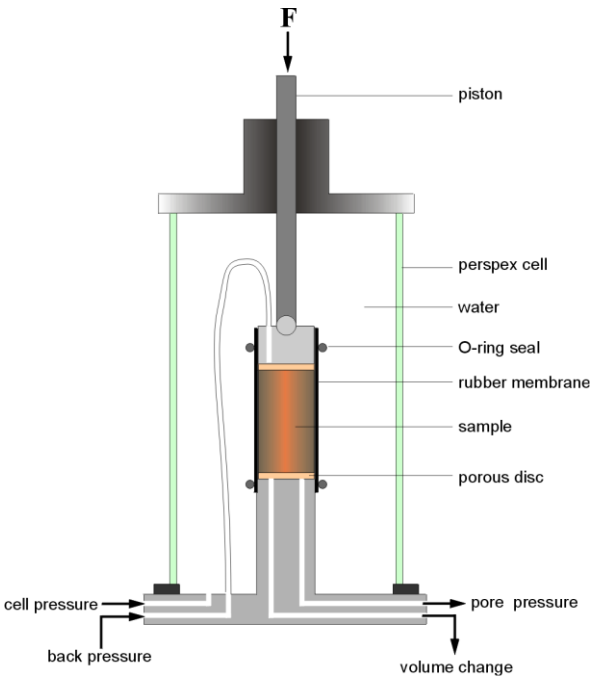

Fig. 1: Typical triaxial cell arrangement

Technical specification

- **Low Pressure (<5MPa) Passive cells; max sample size/pressure range:**
  50mm/1.7MPa, 70mm/2MPa, 76mm/3.4MPa, 100mm/1.7MPa, 100mm/2MPa, 150mm/1.7MPa, 200mm/1MPa, 250mm/1MPa, 300mm/1MPa,
- **High Pressure (>5MPa) Passive cells with balanced ram; max sample size/pressure range:**
  54mm/64MPa, 100mm/64MPa,
- **High Pressure (>5MPa) Passive cells without balanced ram; max sample size /pressure range:**
  50mm/14MPa, 50mm/64MPa, 70mm/100MPa, 10mm/14MPa, 10mm/20MPa
- **Hydraulically Actuated cells pressure max sample size /pressure range:**
  50mm/2MPa, 100mm/2MPa, 50mm/10MPa

Traditional Passive Triaxial Cells *(Low Pressure <5MPa)*

The Traditional Passive Triaxial Cells range in sample size from 50mm (see Fig. 2) through to 500mm, as used in our Large Diameter Cyclic Triaxial Testing System (see Fig. 3). All passive triaxial cells have ports to enable the measurement of cell, back and pore pressure, specimen volume change and a top entry ram for application of axial stress and displacement.

Fig. 2, 50mm Triaxial Cell

Fig. 3, 500mm Triaxial Cell

Product Code	Max Sample Diameter	Max Pressure Rating	Cell Height	Max Sample Height	Outer Cell Diameter	Ram Diameter	Max Sample Diameter with Hall Effects	Max Sample Diameter with LVDT	Cell Description
371	**50 mm**	1.7MPa	228 mm	100 mm	86 mm	25 mm	-	-	The smallest triaxial cell in the GDS range.
70TC62*	**70 mm**	2MPa	610 mm	140 mm	270 mm	25 mm	-	-	Hybrid Triaxial Cell with fixed cell top, base and overcell.
76TC35*	**76 mm**	3.4MPa	530 mm	152 mm	230 mm	25 mm	Up to 50mm	Up to 50mm	One of the most commonly used triaxial cells within a load frame for samples up to 76mm.
100TC2*	**100 mm**	2MPa	610 mm	200 mm	270 mm	25 mm	Up to 70mm	Up to 76mm	100mm Hall Effects will fit a 100mm cell but it is tight, strain will be limited

Product Code	Max Sample Diameter	Max Pressure Rating	Cell Height	Max Sample Height	Outer Cell Diameter	Ram Diameter	Max Sample Diameter with Hall Effects	Max Sample Diameter with LVDT	Cell Description
150TC2*	**150 mm**	1.7MPa	725 mm	300 mm	330 mm	25 mm	Up to 100mm	Up to 150mm	Complete with five hydraulic ports and valves. Supplied complete with load ram and pillar for connection of displacement Gauge. Excludes Pedestal and top cap set.
200TC1*	**200 mm**	1MPa	910 mm	400 mm	410 mm	25 mm	Up to 200mm	Up to 200mm	Complete with five hydraulic ports and valves. Supplied complete with load ram and pillar for connection of displacement Gauge. Excludes Pedestal and top cap set.
200TC2*	**250 mm**	1MPa	910 mm	500 mm	500 mm	25 mm	Up to 200mm	Up to 200mm	Complete with five hydraulic ports and valves. Supplied complete with load ram and pillar for connection of displacement Gauge. Excludes Pedestal and top cap set. (No upward movement)
300TC1*	**300 mm**	1MPa	1200 mm	600 mm	575 mm	25 mm	Up to 300mm	Up to 300mm	Complete with five hydraulic ports and valves. Supplied complete with load ram and pillar for connection of displacement Gauge. Excludes Pedestal and top cap set.
300TC1/T*	**300 mm**	1MPa	1330 mm	600 mm	575 mm	25 mm	Up to 300mm	Up to 300mm	Taller version of the 300TC1.

* All cells with a star next to them can be modified to a Dynamic Triaxial Cell. These cells have low friction seals and linear ball bearing for dynamic testing.

Traditional Passive Triaxial Cells *(High Pressure >5MPa with balanced ram)*

The difference between active and passive triaxial cells is in the manner in which the axial load is applied. Active cells have a built in system (usually hydraulic or electro-mechanical) to apply the axial loads, passive cells derive their axial loads from being placed into load frames.

What is a Balanced Ram?

The balanced ram is a system that compensates for the up thrust on the ram exerted by the cell pressure. Our system utilises a secondary chamber around the ram that balances the pressure in the cell against a second piston seal such that the pressure load is not exerted onto the loadframe. This system usually means that a smaller range loadframe can be used to achieve the same deviator loadings on the sample. For example if a cell has a 50mm diameter ram and a cell pressure of 32MPa the up thrust would be approximately 63kN on the frame. This would have to be deducted from the maximum achievable deviator loading that a given frame can apply. With a balanced ram, the full load frame capacity may be used to apply axial force on the sample as there is zero ram upthrust. In addition, a balanced ram within a high pressure passive cell eliminates disturbance to constant cell pressure during axial loading.

Fig. 4, 64MPa Triaxial Cell with balanced ram (HP64CL)

Product Code	Max Sample Diameter	Max Pressure Rating	Cell Height	Max Sample Height	Outer Cell Diameter	Ram Diameter	Cell Description
Code: HP64CL	**100 mm**	64MPa	1048 mm	200 mm	382 mm	25 mm	High pressure cell for samples up to 100mm diameter. Includes balanced ram and feedthrough ports for electrical connections.

Traditional Passive Triaxial Cells (High Pressure >5MPa without balanced ram)

For triaxial cells that do not have balanced rams, accommodation needs to be made for the potential maximum ram upthrust (in particular high pressure triaxial cells). The load frame that the cell is being used in must be capable of taking the maximum ram upthrust. If this is not the case, a balanced ram solution can be considered. Porting is provided for local instrumentation.

Fig. 5, 14MPa Passive Triaxial Cell

Fig. 6, 100MPa Triaxial Cell

Fig. 7, 14MPa Triaxial Cell with 80mm sample height

Fig. 8, 14MPa Triaxial Cell with 300mm sample height

	Max Sample Diameter	Max Pressure Rating	Cell Height	Max Sample Height	Outer Cell Diameter	Ram Diameter	Cell Description
Code: HP64CL/50	**50mm**	32Mpa	1048 mm	100 mm	375 mm	25 mm	32MPa cell for samples up to 50mm diameter. Includes feed through ports for electrical connections.
Code: HP64CL/54	**54 mm**	64Mpa	1048 mm	108 mm	382 mm	25 mm	64MPa cell for samples up to 54mm diameter. Includes feedthrough ports for electrical connections.
Code: HP100MPA	**50 mm**	100MPa	760 mm	100 mm	400 mm	50 mm	100MPa cell for samples up to 50mm diameter. Includes feedthrough ports for electrical connections.
Code: HP14CL	**100 mm**	14MPa	560 mm	200 mm	266 mm	25 mm	14MPa cell for samples up to 100mm diameter. Includes feedthrough ports for electrical connections.
Code: HP20CL	**100 mm**	20MPa	1048 mm	200 mm	290 mm	25 mm	20MPa cell for samples up to 100mm diameter. Includes feedthrough ports for electrical connections.
Code: 14MPAC/GA2	**150mm**	14MPa	735 mm	80 mm	480 mm	50 mm	Cell top weight approximately 130kg, see fig 7.
Code: 14MPAC/GA1	**150mm**	14MPa	1015 mm	300 mm	480 mm	50 mm	Cell top weight approximately 205kg, see fig 8.

Hydraulically Actuated Triaxial Cells (No Load Frame)

GDS manufactures 3 hydraulically actuated (Bishop and Wesley) stress path cells as follows:

- 7kN/2000kPa, for specimens up to 50mm (38mm and 50mm as standard). See Fig. 9.
- 25kN/2000kPa, for specimens up to 101.8mm (38, 50, 70 and 100mm as standard).
- 20kN/10MPa, for specimens up to 50mm (38mm and 50mm as standard). See Fig. 10.

Fig. 9 GDS 38/50mm
Bishop and Wesley Cell

Fig. 10 GDS 10MPa
Bishop and Wesley Cell

Product Code	Max Sample Diameter	Max Pressure Rating	Max Axial Load	Max Sample Diameter with Hall Effects	Max Sample Diameter with LVDT	Cell Description
Code: BW038	**50 mm**	2MPa	7kN	Up to 50mm	Up to 50mm	Complete with four hydraulic ports and valves. Supplied complete with load ram and pillar for connection of displacement Gauge.
Code: BWHTCL	**50 mm**	10MPa	128kN	Up to 50mm	Up to 50mm	High Temperature Bishop & Wesley Triaxial Cell, with porting for heating coil.
Code: BW7010	**100 mm**	2MPa	20kN	Up to 70mm	Up to 76mm	Includes access ports for internal instrumentation as standard.

Why buy GDS Triaxial Cells?

- GDS is the leading supplier of stress path systems for research and commercial testing apparatus.
- New improved GDS designed triaxial cells based on the original Bishop and Wesley concept.
- Flexibility in the capacity of the system (specimen size, load, pressures etc) ensures a system is created to specifically suit the testing required and the budget
- May be upgraded at any time for additional transducers, software modules, bender element testing, unsaturated testing and more – i.e. future proof!
- Peace of mind with GDS worldwide technical support,
- **Note: Due to continued developments specifications are subject to change without notice. Please contact us direct, if you have a requirement that is not shown above.**