



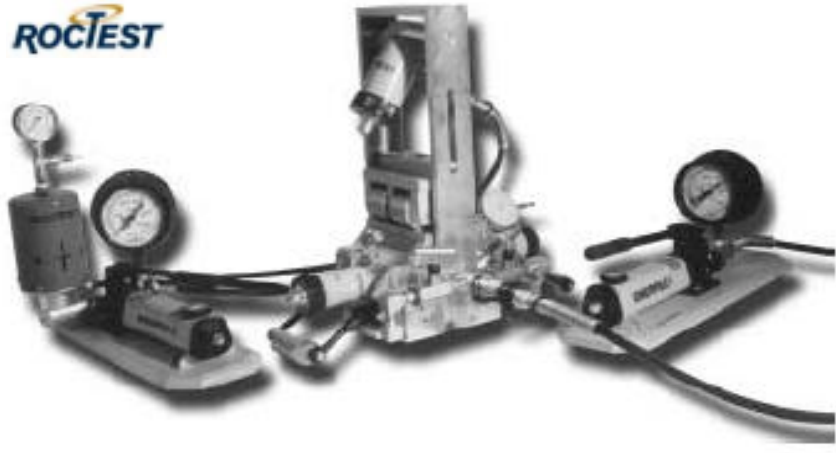
## Portable Shear Box Model 7275-RT-PHI-10

### GENERAL

The study of rock slope stability necessitates, among other things, the determination of the shear strength parameters of discontinuities related to potential sliding planes. In doing so, the test must comply with the in-situ loading conditions and must be run on discontinuities representative of those involved in the potential failure plane.

The portable shear box, Model PHI-10 was developed to determine the joint shear strength of rock samples or of borehole cores. Its design is inspired by the ISRM "Suggested Method for in-situ Determination of Direct Shear Strength".

The main feature of the PHI-10 shear box design is its normal loading system. It incorporates a pressure maintainer to keep the normal load constant throughout the duration of the test and is built in such a way that overturning of the sample is prevented even at small normal loads. These characteristics ensure the user that the shear strength developed by a particular discontinuity is really the result of the application of a shear system of forces, and not of an unknown combination of modes of loading.



### Description

The PHI-10 portable shear box consists of the following:

- A loading rig assembly
- A pumping and pressure-maintaining system
- A set of 2 moulds with 2 sample locating clamps

### Loading Rig Assembly

As shown on the illustration and on Figure 1, the loading rig assembly includes the upper and lower parts of the shear box. The upper part together with the roller carriage sitting on its top surface and the normal load application plate are demountable. The vertical U-shaped frame and the two horizontal hydraulic rams are solidly fixed to the lower part of the shear box. The vertical hydraulic ram mounted on the U-shaped frame pivots laterally to facilitate mounting of the sample. Reversible shearing can be easily performed by operating the two valves mounted on a high pressure manifold which connects the two horizontal rams. A dial indicator mount is provided on both sides of the

box to measure its horizontal displacement during shearing. The two halves of the shear box correspond to a half-cylinder with a diameter and thickness of 148 and 140 mm respectively. The geometry can handle rock samples with a face area of 115 x 115 mm or rock cores of 115 mm in diameter.

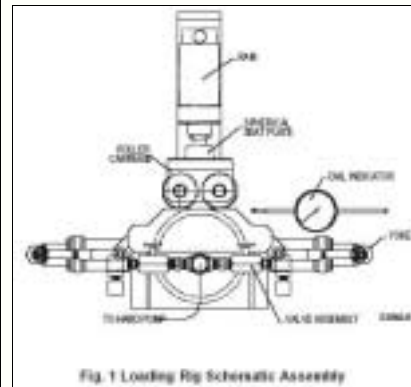


Fig. 1 Loading Rig Schematic Assembly

### Pumping and Pressure Maintaining System

The horizontal and vertical rams of the rig assembly are operated independently by two manual hydraulic pumps of equal capacity. Pressure gauges mounted on the pumps indicate the pressures applied

Portable Shear Box Model 7275-RT-PHI-10



### FOR FURTHER INFORMATION

environmental systems & services | 8 River Street, Richmond VIC 3121 Australia  
T + 61 3 8420 8999 | F + 61 3 8420 8900 | geotechnical@esands.com | [www.geosystems.com.au](http://www.geosystems.com.au)

in S.I. and Imperial units and incorporate a maximum auxiliary pointer.

An easy-to-use pressure maintainer equipped with its own pressure gauge is mounted on the vertical loading system. Through a simple procedure, the user is assured of the normal load constancy throughout the shearing test.

### Moulds and Sample Locating Clamp

A kit of two moulds and two sample locating clamps is supplied with the PHI-10 portable shear box. The cylindrical mould is made of aluminium with sides in acrylic, to allow sample inspection for proper alignment. It is completely demountable and split in two halves to properly execute the casting procedure.

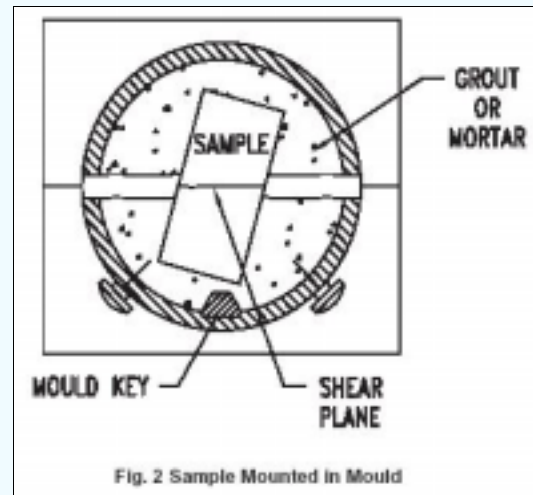


Fig. 2 Sample Mounted in Mould

The components of the PHI-10 portable shear box are chosen to comply with a maximum working load of 45 kN (10,000 lbf) in the horizontal and vertical directions. The list of components and their specifications is given below:

## Specifications

QUANTITY	DESCRIPTION	SPECIFICATION
2	Horizontal hydraulic ram	Capacity: 89 kN (10 tons)
1	Vertical hydraulic ram	Capacity: 133.5 kN (15 tons)
2	Pressure gauge (gauges with lower range are available on request)	Dual scale reading: 0-35,000 kPa 0-5000 psi
2	Hand pump	Capacity: 69,000 kPa (10,000 psi)
1	Pressure maintainer	Working pressure: 860 kPa (125 psi)
1	Pressure gauge (for maintainer)	Dual scale reading: 1,100 kPa (160 psi)
1	Dial indicator	Range: 25 mm (0.1 mm graduations)
1	Moulding kit including: - 2 steel moulds with acrylic side plates - 2 sample locating slams	
2	Hydraulic hose assembly	
1	Header and valve assembly	

Due to on-going design improvements and reviews, we reserve the right to amend product and specifications without prior notice