



» extensometers

## Flexible Rod Extensometer



A low cost, convenient instrument for the monitoring of ground displacements. Designed to withstand severe field conditions and accommodate transverse shear. The unit is supplied completely assembled and sealed for grouting into the borehole. Rod displacement readings may be taken manually using a dial gauge or monitored continuously with a remote readout head.

The extensometer consists of a maximum of 6 or 10 carbon fiber, fiberglass, or spring steel rods, each sheathed in a neat fitting plastic tube. One end of each rod is connected to a ribbed steel anchor, grouted into the borehole. The other end is fitted with a brass cap which is the displacement surface with reference to the collar tube. The multiple rods are sheathed in a polyethylene tube, sealed at each anchor point. This construction provides a void for limited transverse shearing of the borehole without the rods being jammed. Before coiling of the extensometer, the ends of the rods are locked in position at the collar and are released only after the grout has hardened in the borehole.



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### applications

Monitoring roof and wall stability in mines and underground workings.

### features

Unit is supplied completely assembled and sealed, ready for installation.

Assembly is light in weight and easily handled, allowing for a quick and simple installation.

Compact design allows installation in boreholes of minimum size; up to 6 or 10 rods may be accommodated in a 60 mm borehole.

Limited transverse shear accommodated, without jamming of rods.



specifications + ordering info

# Flexible Rod Extensometer



## installation

The extensometer is supplied fully assembled in a 1.2 metre (4 foot) diameter coil. At the installation site, the unit is uncoiled, fitted with suitable grout tube and airbleed tube, and installed into the borehole. After grout has been injected and initial set has been reached, the protective cap is removed, the rods released, and the initial displacement recorded. All collar components are of brass or stainless steel and each rod is clearly identified.

## reference heads

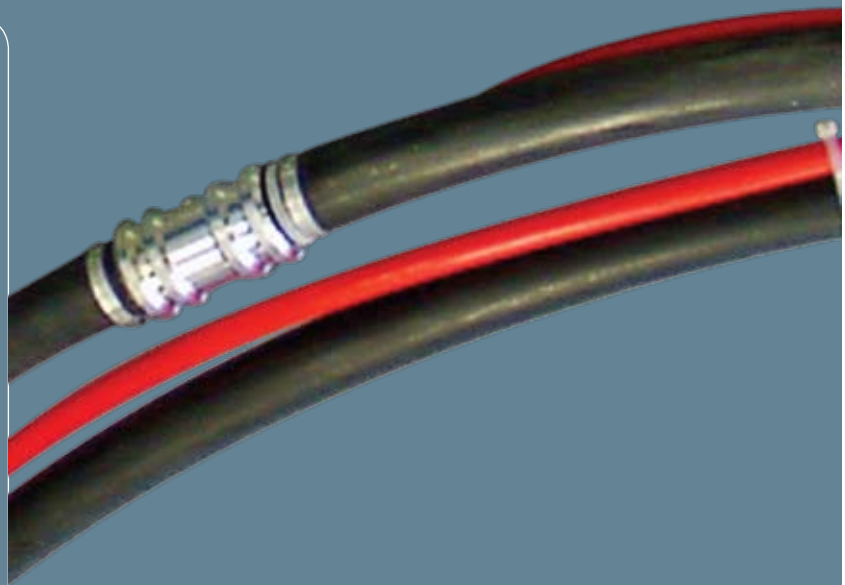
Reference heads are available in either mechanical or electrical types. When there is easy access to the extensometer, a mechanical reference head can be attached and displacement readings can be made with a dial indicator or a depth micrometer. If access to the borehole is difficult or if remote reading or datalogging is required, an electrical reference head may be attached. This allows displacement readings to be made with vibrating wire transducers, LVDT's or linear potentiometers. These can be read with manual read out devices, or can be connected to dataloggers for remote and continuous monitoring. A manual over-ride is available for electrical reference heads to allow manual readings to verify that the electrical system is functioning. All readouts have a standard range of 100 mm (4 in.), but alternate ranges are available as required. Standard cable for remote readouts is a direct burial rated, PVC jacketed type. Armored cable is available for mechanical protection as required.

## ordering info

Rod assembly type
Number of anchors and depths
Accessories required
Rod material type
Reference head type -if electrical, specify sensor type, range and accuracy.

## optional equipment

Grout and/or bleed tubes
Depth micrometer, dial indicator
Portable readouts
Terminal stations
Dataloggers



## specifications for rod assemblies

ROD ASSEMBLY TYPE	B		C		D	
Anchor Diameter	35 mm (1.375 in.)		41 mm (1.61 in.)		47 mm (1.88 in.)	
DESCRIPTION	NOMINAL BOREHOLE DIAMETER	MAXIMUM NUMBER OF RODS	NOMINAL BOREHOLE DIAMETER	MAXIMUM NUMBER OF RODS	NOMINAL BOREHOLE DIAMETER	MAXIMUM NUMBER OF RODS
Uphole: With external air bleed tube 10 mm (.39 in.) I.D.	54 mm (2.125 in.)	4	60 mm (2.36 in.)	6	85 mm (3.35 in.)	10
Downhole: With external grout tube 15 mm (.59 in.) I.D.**	57 mm (2.25 in.)	4	65 mm (2.56 in.)	6	90 mm (3.54 in.)	10
Uphole: With internal air bleed tube 12 mm (.50 in.) I.D.	39 mm (1.54 in.)	4	45 mm (1.77 in.)	6	75 mm (2.95 in.)	10

Note: \*\* Use 20 mm (3/4in.) grout tube if possible, particularly for extensometers longer than 30 meters (100 ft.)

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