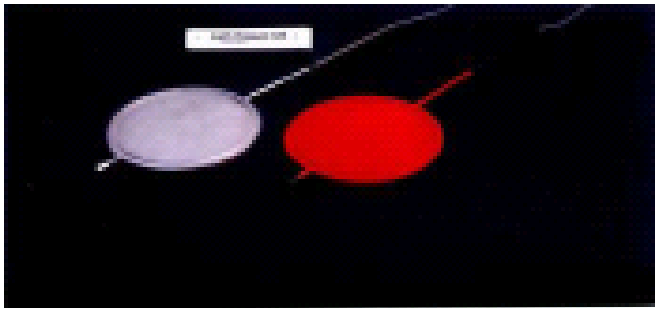
Vibrating Wire Total Pressure Cell



Features

- Low volumetric displacement
- Sensor with unique integral magnet design
- Accurate, highly sensitive and reliable
- In-built thermistor and gas discharge tube
- Extremely stable for long term operations
- Frequency output for transmission over long distances
- Suitable for remote reading, scanning and data logging
- Unprecedented sensitivity
- Long term stability and reliability
- Isolation of the sensor from the effects of total stresses acting on the body of the diaphragm
- Robust and sturdy construction
- Slim-line design

Applications

ES&S' Total Pressure cells are used to measure total pressure in soils, embankments and stress in concrete. Pressure cells are usually implemented at the interface between two different materials. Other common applications are for measurements of contact pressures on retaining walls, buildings, bridge abutments, sheet piling, tunnel linings, etc.

The cell is used to assess changes in stress distribution within embankments of earth or concrete dams. Cells are capable of measuring stress at the interface of soil and concrete.

The cells are installed on or within linings of tunnels or similar infrastructure that include concrete linings. The resultant pressure is the sum of the pore pressure and the stress.

es&s environmental systems & services

MET SEIS ENV GEO

Technical Specifications

Standard Ranges	5, 10, 20, 35, 50, 100 kg/cm^2 (Higher ranges on request)
Over Range	1.5 x Range
Sensitivity	0.01% of Full Scale
Accuracy	0.5% Full Scale
Thermal Zero Shift	±0.1% FS/°C
Material	Stainless Steel
Operating Temperature	-20°C to plus 80°C
Coil Resistance	120-140 ohm nominal
Thermistor 3k ohm	Included
Electrical Surge Protection	Optional
	Pressure Pads 200 mm Ø Connecting Tubes 6 mm Ø Pressure Transducer 20 mm Ø
Electrical Cable	4-conductor, shielded
Wiring Code	V/W sensor Red & Black Thermistor White & Green

Note: Products and Specifications are subject to change without notice.

Operating Principle

The pressure cell consists of two circular stainless steel plates welded together around their periphery leaving a narrow cavity between them. The cavity is filled with fluid. During installation, care has to be taken to see that the cavity lies perpendicular to the stress to be measured. A small length of high pressure stainless steel tubing connects the cavity to a pressure transducer.

The vibrating wire sensor is secured inside the rigid cylindrical housing. It comprises of a small stainless steel enclosure having a high tensile strength, heat treated and tempered steel wire. The wire is anchored at one end to the enclosure and to a small diaphragm at the other. A miniature magnet coiled assembly is precisely located at the center of the wire inside the same enclosure. This greatly enhances the response characteristics of the vibrating wire. The vibrating wire sensor is self-compensated against temperature variations.

The small stainless steel enclosure housing the vibrating wire sensor assembly is fixed inside the rigid cylindrical housing of the transducer. The 'O' ring seal provides complete waterproofing and a high degree of protection from humid and corrosive environment conditions. The vibrating wire sensor is completely isolated from the total stresses acting on the body of the transducer. Any change in the pressure on the pressure pad has to be balanced by a corresponding change in the pressure of the internal fluid. The latter is communicated to the pressure transducer and changes the tension of the vibrating wire. The wire is plucked by energizing the miniature coil magnet so that it vibrates at its natural frequency. The resonant frequency is proportional to the square root of the tension in the wire. A conventional readout unit can accurately measure the resonant frequency of the wire. A microprocessor based readout unit can display the frequency as well as the value of the measured parameter directly in engineering units.

The pressure transducer consists of a rigid cylindrical housing having inside it the vibrating wire sensor with unique integrated magnet design. A miniature magnet coil assembly is located inside the small stainless enclosure of the sensor at a very close proximity to the vibrating wire. The design contributes to the outstanding features and performances over conventional vibrating wire transducers.

Environmental Systems & Services Pty Ltd.
8 River Street, Richmond, VIC, 3121 Australia
PO Box 939, Hawthorn, VIC, 3122 Australia
Telephone: + 61 3 8420 8999
Facsimile: + 61 3 8420 8900
Email: geotechnical@esands.com
Web: www.esands.com