# VIBRATING WIRE PRESSURE CELL

Soil Instruments Ltd

## DATASHEET P6

## PRODUCTS

## FEATURES

- Low, medium and high pressure ranges available.
- Transducer design prevents case stresses from affecting readings.
- Low volume change and slender profile. Arching and stress concentrations are minimised.
- Over voltage surge arrestor fitted to protect against electrical damage.
- Suitable for remote reading and data logging.

The P6 Vibrating Wire Pressure Cell is designed to measure total pressures in earth or rockfill structures.

Manufactured incorporating our 30 years of expertise in Vibrating Wire instrument technology, the P6 consists of a circular flat cell formed from 2 plates of stainless steel welded together around their periphery.

The narrow gap between the plates is filled with hydraulic oil and a Vibrating Wire pressure transducer is connected to the cell by a short length of steel tubing forming a closed hydraulic system.

Both cell and transducer are embedded in the medium to be monitored and an armoured cable connects the instrument to a terminal unit, portable readout unit or datalogger.

Robust and reliable with excellent long term stability. Readings are unaffected by cable length.

# TECHNICAL APPLICATIONS

## THE SOIL INSTRUMENTS VIBRATING WIRE PRESSURE CELL

The Vibrating Wire (VW) Pressure Cell consists of a circular flat cell formed from two sheets of stainless steel welded around their periphery. The narrow gap between plates is filled with hydraulic oil. A vibrating wire transducer is connected to the cell by a short length of stainless steel tubing, forming a closed hydraulic system.

An armoured cable connects the transducer to a terminal unit or direct to the readout unit.

The pressure cell works on the vibrating wire principle where by a tesioned wire is attached to a diaphragm. Cell pressure acts on one side of the diaphragm, a direct relationship exists between the pressure on the diphragm and the tension of the wire. The wire may be excited by either plucking or sweeping via a coil adjacent to the wire. The resulting resonant frequency is then recorded by the same coil and displayed by an instrument readout.

The readout displays either frequency based units or, by inputting the instrument calibration factor, engineering based units.

The instrument is embedded in the medium to be monitored.

## APPLICATIONS

Vibrating Wire Pressure Cells measure combined effective stress and pore-water pressure.

They are normally used to validate design assumptions and to give adequate warning of soil pressures in excess of those a structure is designed to withstand.

VW Pressure Cells are installed within fills to determine the distribution, magnitude and directions of total stresses. They can also be installed with one surface against a structure to measure total stresses acting on retaining walls, against piles, pipes, and slurry trench walls.

## TYPICAL APPLICATIONS INCLUDE:

CONCRETE DAMS

- Measure contact pressures in abutments and foundation.
- Measure the total stress acting on foundation.

EMBANKMENT DAMS

- Determine the stresses within the clay core.

TAILINGS DAM

- Confirm tailings material is densifying at the assumed rate.
- Help determine the total over burden pressure acting on the foundations.
- Establish the total stresses in the dyke.

DIAPHRAGM OR SHEET PILE WALL

- Confirm active pressures are within design assumptions.
- Confirm passive pressures.
- Measure uplift pressure.

BURIED STRUCTURES

- Provide estimate of total horizontal pressures.
- Provide estimate of total uplift forces acting on structure.
- Measure arching of topsoil over structure.

RETAINING WALL

- Confirming design assumptions of active pressures.

FOR DETAILS ON:
Concrete Stress Cell, see data sheet: P10.
Push-in VW Pressure Cell, see data sheet: P9.
Heavy Duty Piezometers, see data sheet: W4.
Standard Piezometer, see data sheet: W9.
VW Logger, see data sheet: R0-1-VW-1.

## SPECIFICATIONS

| | |
|---|---|
| STD Ranges (kPa) | 300; 500; 700; 1000; 1500; 2000; 3000; 4000; 6000; (other ranges available) |
| Resolution[1] | 0.025% FS (minimum) |
| Accuracy[2] | 0.1% FS |
| Linearity[2] | 0.1% FS |
| Temperature Range | -20 to 80° C |
| Over Range | 150% Of Full Scale |
| Material | Stainless Steel or Powder Coated Steel |
| Excitation Method | Pluck or Sweep |

## THERMISTOR

| | |
|---|---|
| Type | NTC 3K |
| Accuracy | 0.5° C |
| Resolution[1] | 0.1° C |

## WEIGHTS & DIMENSIONS

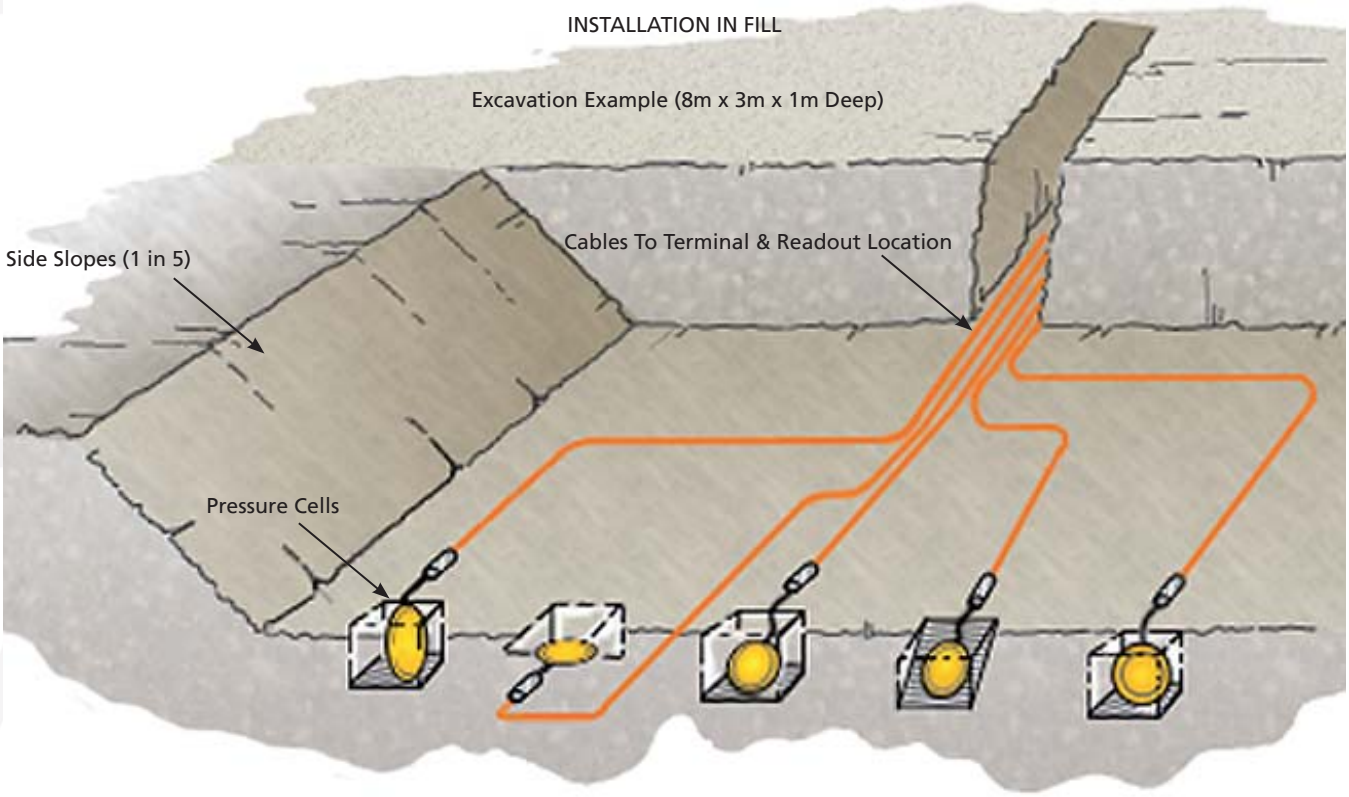
| | | | | |
|---|---|---|---|---|
| Size Diameter | 200 | 240 | 300 | 345 |
| Active Face Diameter | Double 176 | Single 176 | Double 276 | Single 276 |
| Length Excluding cable | 670mm | 670mm | 770mm | 765mm |
| Weight Excluding cable | 2.7kg | 5.4kg | 4.5kg | 9.1kg |

## CABLES

| | | |
|---|---|---|
| Type | 2 Core Armoured PVC Outer Sheath | 4 Core Armoured PVC Outer Sheath |
| Diameter | 12mm | 13mm |
| Weight /m | 220g | 336g |

[1]Dependant On Readout

[2]Of The Pressure Transducer



## ORDERING INFORMATION

| WITH THERMISTOR | WITHOUT THERMISTOR | TWO ACTIVE FACES, Ø200MM, VIBRATING WIRE PRESSURE CELL |
|---|---|---|
| P6-1.1-SS-3-T | P6-1.1-SS-3 | 300 kPa pressure range |
| P6-1.1-SS-5-T | P6-1.1-SS-5 | 500 kPa pressure range |
| P6-1.1-SS-7-T | P6-1.1-SS-7 | 700 kPa pressure range |
| P6-1.1-SS-10-T | P6-1.1-SS-10 | 1000 kPa pressure range |
| P6-1.1-SS-15-T | P6-1.1-SS-15 | 1500 kPa pressure range |
| P6-1.1-SS-20-T | P6-1.1-SS-20 | 2000 kPa pressure range |
| P6-1.1-SS-30-T | P6-1.1-SS-30 | 3000 kPa pressure range |
| P6-1.1-SS-40-T | P6-1.1-SS-40 | 4000 kPa pressure range |
| P6-1.1-SS-60-T | P6-1.1-SS-60 | 6000 kPa pressure range |
| WITH THERMISTOR | WITHOUT THERMISTOR | TWO ACTIVE FACES, Ø300MM, VIBRATING WIRE PRESSURE CELL |
| P6-1.2-SS-3-T | P6-1.2-SS-3 | 300 kPa pressure range |
| P6-1.2-SS-5-T | P6-1.2-SS-5 | 500 kPa pressure range |
| P6-1.2-SS-7-T | P6-1.2-SS-7 | 700 kPa pressure range |
| P6-1.2-SS-10-T | P6-1.2-SS-10 | 1000 kPa pressure range |
| P6-1.2-SS-15-T | P6-1.2-SS-15 | 1500 kPa pressure range |
| P6-1.2-SS-20-T | P6-1.2-SS-20 | 2000 kPa pressure range |
| P6-1.2-SS-30-T | P6-1.2-SS-30 | 3000 kPa pressure range |
| P6-1.2-SS-40-T | P6-1.2-SS-40 | 4000 kPa pressure range |
| P6-1.2-SS-60-T | P6-1.2-SS-60 | 6000 kPa pressure range |
| WITH THERMISTOR | WITHOUT THERMISTOR | OIL FILLED PRESSURE CELL Ø240mm INTERFACE MILD STEEL |
| P6-2.1-MS-3-T | P6-2.1-MS-3 | 300 kPa pressure range |
| P6-2.1-MS-5-T | P6-2.1-MS-5 | 500 kPa pressure range |
| P6-2.1-MS-7-T | P6-2.1-MS-7 | 700 kPa pressure range |
| P6-2.1-MS-10-T | P6-2.1-MS-10 | 1000 kPa pressure range |
| P6-2.1-MS-15-T | P6-2.1-MS-15 | 1500 kPa pressure range |
| P6-2.1-MS-20-T | P6-2.1-MS-20 | 2000 kPa pressure range |
| P6-2.1-MS-30-T | P6-2.1-MS-30 | 3000 kPa pressure range |
| P6-2.1-MS-40-T | P6-2.1-MS-40 | 4000 kPa pressure range |
| P6-2.1-MS-60-T | P6-2.1-MS-60 | 6000 kPa pressure range |
| WITH THERMISTOR | WITHOUT THERMISTOR | OIL FILLED PRESSURE CELL Ø345mm INTERFACE MILD STEEL |
| P6-2.2-MS-3-T | P6-2.2-MS-3 | 300 kPa pressure range |
| P6-2.2-MS-5-T | P6-2.2-MS-5 | 500 kPa pressure range |
| P6-2.2-MS-7-T | P6-2.2-MS-7 | 700 kPa pressure range |
| P6-2.2-MS-10-T | P6-2.2-MS-10 | 1000 kPa pressure range |
| P6-2.2-MS-15-T | P6-2.2-MS-15 | 1500 kPa pressure range |
| P6-2.2-MS-20-T | P6-2.2-MS-20 | 2000 kPa pressure range |
| P6-2.2-MS-30-T | P6-2.2-MS-30 | 3000 kPa pressure range |
| P6-2.2-MS-40-T | P6-2.2-MS-40 | 4000 kPa pressure range |
| P6-2.2-MS-60-T | P6-2.2-MS-60 | 6000 kPa pressure range |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