



RST INSTRUMENTS LTD.

Total Earth Pressure
Cell
Instruction Manual

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Total Earth Pressure Cell

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Product: Total Earth Pressure Cell
Installation Manual

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Table of Contents

1	GENERAL DESCRIPTION:	1
2	FEATURES:	1
3	ANCILLARY EQUIPMENT:	2
4	APPLICATIONS:	2
5	INSTALLATION:	2

Figures

Figure 1 – RST Total Earth Pressure Cell	1
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1 GENERAL DESCRIPTION:

Total Earth Pressure Cells are constructed from two circular stainless steel plates, welded together around their periphery. An annulus exists between the plates, which is filled with de-aired glycol. The cell is connected via a stainless tube to a transducer forming a closed hydraulic system. As stress is exerted on the surface of the cell, it pressurizes the fluid within the cell, which in turn is measured by the pressure transducer. The output of the transducer can then be read remotely, or on a variety of portable readout units or data loggers.

Various types of transducers are employed dependent on site requirements.

2 FEATURES:

- Long term stability
- High accuracy and sensitivity
- Constant monitoring capability
- Ease of data logging
- Either **pneumatic**, **strain gauge** or **vibrating wire** transducers
- Due to the inherent high sensitivity, it is not necessary to produce a large strain in the area monitored to measure stress
- The transducer is located 46 cm (18 in) from the cell to avoid any influence from the transducer housing
- Stainless steel construction

Using a large height to diameter ratio minimizes the effects of stress distribution on the mean plane.



Figure 1 – RST Total Earth Pressure Cell

3 ANCILLARY EQUIPMENT:

- Portable readout instruments
- Single channel data acquisition systems
- Multi channel data acquisition systems
- Readout terminal stations

4 APPLICATIONS:

Total Earth Pressure Cells are designed to measure stress acting on plane surfaces and typically installed in:

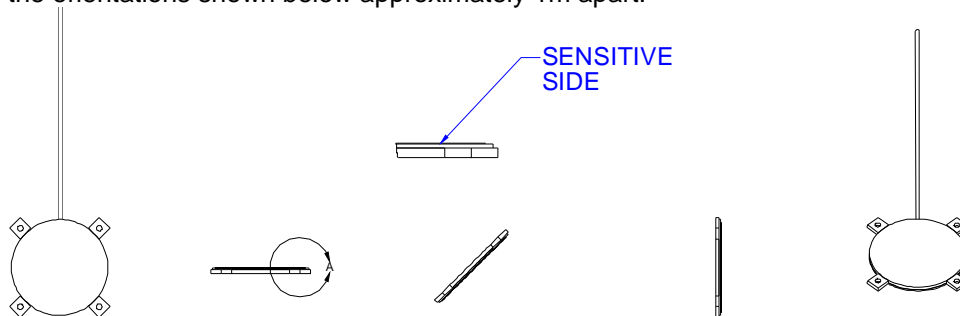
- Earth embankments
- Dams
- Foundation, retaining walls, and piles
- Against pipelines and culverts
- In railroad bases
- Beneath raft foundations
- Tunnel linings
- Mine backfill monitoring

5 INSTALLATION:

To prevent point loading, Total Earth Pressure Cells are installed with the sensitive side (raised surface) protected by a barrier of select (300-400mm thick) hand compacted fill.

When installing on a structure, it is a common practice to install the cell in a recess to position the sensitive side of the cell flush with the structures surface.

When installing Cells in the bulk of fill, it is a common practice to install cells in an array of 5, aligning the cells in the orientations shown below approximately 1m apart.



Note: fundamental conformance issues arise due to the differences in the Elastic Modulus of the cell and the surrounding fill, which alters the stress fields in the fill. However, having a large diameter to thickness ratio minimizes this effect.

	4" Cell	6" Cell	9" Cell	12" Cell
Thickness Ratio	8:1	12.5:1	20:1	25:1