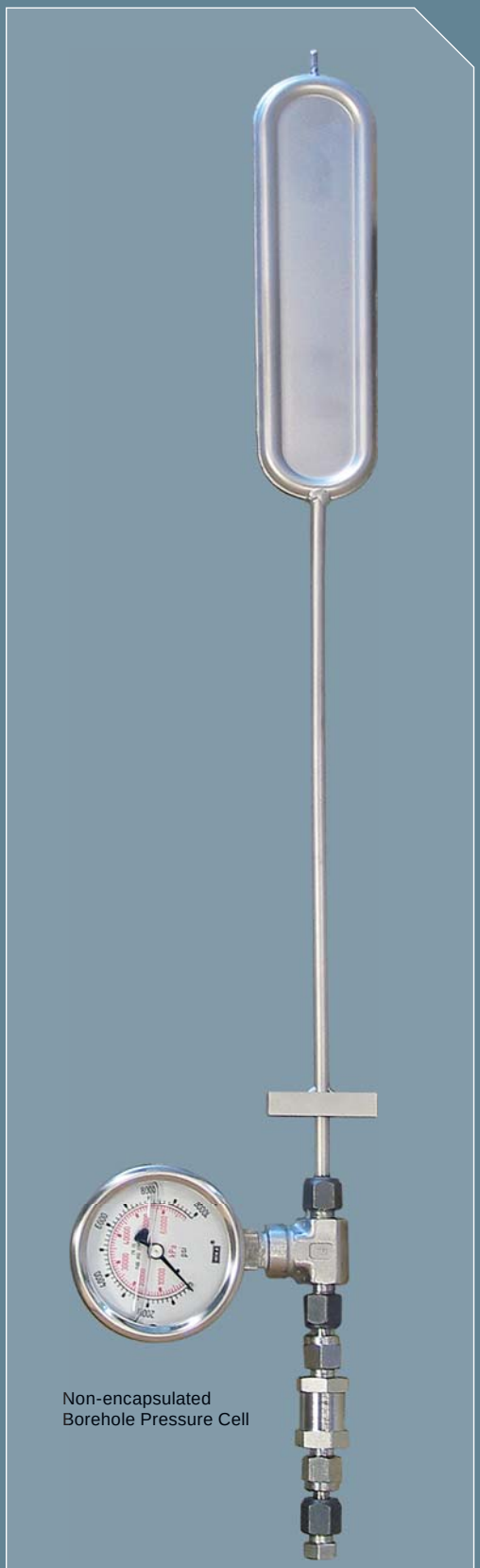
Borehole Pressure Cells



Non-encapsulated
Borehole Pressure Cell

Borehole Pressure Cells have a long term track record of stress monitoring in both elastic and viscoelastic rock. While typically classified as a soft inclusion, the cell may be filled with mercury to gain stiffness for use as a rigid inclusion in low modulus rock. Product development is largely the result of research done by the U.S. Bureau of Mines (Panek & Stock 1964, and Smith 1972).

Cells are available in two basic configurations, a miniature flatjack version (BPC) and a cylindrical pressure cell (CPC). Due to the flat design, the BPC responds primarily to the stress in the plane perpendicular to the cell, and is only slightly affected by stress in the same plane. Two BPC's mounted at right angles to each other in the same borehole therefore will monitor the principal stresses in the plane perpendicular to the borehole. Biaxial stress measurement will require three BPC's in the same borehole.

While not appropriate for anisotropic stress conditions, the CPC will measure the average change in the principal stresses in the plane perpendicular to the borehole.

operating principle

Both the BPC and CPC are two, either stainless or copper plates, welded together around their periphery. The space between the plates is filled with deaired fluid, and leads to the borehole collar via a high-pressure stainless tube. Attached to this tube is a check valve and hydraulic coupler to facilitate pumping up the cell, and either a gauge or pressure transducer type readout.

In a typical installation, the BPC is grouted into the borehole. Once the grout has set, the cell is pressurized to slightly over the estimated stress. The hydraulic pump is then disconnected, with the pressure being held by the integral check valve. The system is then allowed to stabilize. In elastic rocks, given the modulus of the rock, the stress change may be determined by the corresponding change in hydraulic pressure.

In rocks that exhibit plastic creep, the cell will not only measure stress change, but the final equilibrium pressure approximates the insitu stress.

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applications

Monitor stress in elastic and viscoelastic rock.

features

- Low cost
- Stainless or copper construction
- Simplicity of operation
- Remote readout available
- Field rugged and reliable
- Data logger compatible

specifications + ordering info

Borehole Pressure Cells

specifications

ITEM	DESCRIPTION
Material	Copper or stainless steel
Range	0 – 10,000 PSI (0 – 70 Mpa)
Sensitivity with Gauge Readout	40 PSI (300 kPa)
Accuracy with Gauge Readout	1%
Dimensions	Contact RST for available sizes.

optional equipment

Vibrating wire or strain gauge transducers in place of a Bourdon tube gauge.
Readout instruments for above equipment.
Data logger systems.
Hydraulic hand pump comes with hoses.
Installation tools.

ordering info

ITEM	PART #
Borehole Pressure Cell Encapsulation	BPC0001-E
Hydraulic Borehole Pressure Cell	BPC0001-G
Borehole Pressure Cell with Vibrating Wire Transducer	BPC0001-VW
1/8" diameter High Pressure SS Tube	BPC0001-T

Encapsulated Borehole Pressure Cell

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