

HID76 CELL

Digital Hollow Inclusion Stress Cell



APPLICATIONS

The HID Cell is a proven, reliable and accurate instrument to determine triaxial stress in rock or concrete.

HID Cells are used for monitoring stress changes over time or determining orientation and magnitude of stress changes due to mining, and stress effects on mine pillars.

HID Cells are installed in metalliferous mines, coal mines, dams, tunnels, bridges, underground caverns, storage facilities and other civil engineering projects.

The recent development of HID76 gives clients the ability to install sensors in pre-existing or freshly drilled production holes, something that wasn't possible with HID38

FEATURES

- Triaxial stress management in rock or concrete
- Recommended by the ISRM for stress determination
- Short or long term monitoring of triaxial stress
- Complete 3D stress tensor from one measurement
- Fully encapsulated electronics
- Range of grouts for specific application temperatures
- Digital sensor with embedded micro-controller
- Narrow cable for easy insertion through drill string

GEOTECHNICAL SOLUTIONS

TECHNICAL SPECIFICATIONS

STRESS RANGE	up to 100 MPa
TEMPERATURE RANGE	0° to 60°C
GAUGE RESISTANCE	120 ohms
CIRCUIT CONFIGURATION	Three wire, quarter bridge
ACCURACY	Standard error of stress +/- 10 ppm
STRAIN GAUGES	Gauge length 10mm
BOREHOLE SIZE	76 mm
POWER SUPPLY	5-15VDC at 55mA during measurement, 5mA during dwell
COMMUNICATIONS	RS-232 serial at 9600 baud
DATA FORMAT	NMEA 0138, comma separated
PROTECTION	Over voltage, reverse polarity, ESD
RESOLUTION	+/- 0.1 microstrain
ADVANTAGES	No signal losses due to cable Narrow and cheaper four conductor cable Higher accuracy Turn key solution Easy data download and analysis Eliminates problems associated with readout drift Compatible with any low cost datalogger that accepts RS232 comms

OPERATING PRINCIPLE

The Digital HI-Cell is a very low power, high-precision instrument purposely designed for in-situ monitoring of rock stress. The unit is designed to be permanently fixed within a bore-hole, and provides an immediate indication of strain and temperature.

The unit contains precision strain gauges along with an embedded micro-controller which continually monitors the strain, and reports the values via a serial link. Strain values are digitised directly at the gauges, essentially removing the common problems of noise and signal degradation due to long cables. Power is only applied to the gauges when a value is read, removing any issues associated with long-term heating.

The HID Cell consists of an array of strain gauges that are encapsulated in the wall of a hollow pipe with known Elastic Modulus. The cell is epoxy grouted into a borehole and left permanently installed for measuring relative stress over time.

HID76 Cell is installed into a 76mm hole by filling the hollow body of the cell with a pre-formulated epoxy cement. Cement is extruded by the piston when the cell reaches target depth. Pushing the body of the cell, via installation rods activates the piston and a trip wire within the cell registers completion of extrusion.

Multiple rubber seals confine the grout flow to around the cell. Prior to installation, the hole is cleaned with compressed air and the walls of the hole prepared for the HID76 Cell. Once the grout has cured, the strain gauges are fully bonded 1.5 to 2.0 mm from the borehole wall, for which allowance is made during data reduction.

Long term stress change monitoring is possible with the HID Cell and is best suited to monitoring compressive or tensile stress changes in the long term. The standard HID Cell has twelve strain gauges and is suitable for measuring both isotropic and anisotropic rock. A standard temperature measuring thermistor is included to provide a check of possible temperature changes at the HID Cell site.

