



LEA\_IT\_LPC2301000



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# Shotcrete Pressure Cell NATM

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Instruments and Systems for Geotechnical and Structural Monitoring

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## Shorcrete Pressure Cell NATM



### Description

To monitor the tensional states of concrete tunnel linings, hydraulic cells of rectangular or square shape are used, also called NATM, associated with New Austrian Tunneling Method, often known as Sprayed Concrete Lining (SCL) and Sequential Excavation Method (SEM) .

This pressure cell is used both for the measurement of tangential pressures in the coatings of tunnels and radial pressures in rock structures.

### Applications

The main fields of application are: Surveying total pressures in tunnel linings, monitoring of overload caused by foundation work, monitoring of overload induced by special works such as dams, embankments, etc., monitoring of contact pressure between supporting structures and land masses.

- **Dams**
- **Bridges**
- **Tunnels**
- **Landslides**
- **Piles**
- **Diaphragms**
- **Geotechnical and structural monitoring in general**

## Measure principle

The two plates are soldered together at the rim and filled with oil. They transmit the force they perceive from the ground or structure, via a stainless steel tube connected to the pressure cell. The cell consists of two rectangular stainless steel plates, soldered at the edge to form an iron interspace, which is filled with a special oil and connected by stainless steel tube to an electric pressure transducer, which measures the pressure on the cell itself, providing an output signal 4-20 mA or digital sensor signal (piezoresistive sensor or vibrating wire sensor), proportional to it.

The cell is filled under vacuum with deaerated oil in order to avoid effects caused by air compression. To ensure good adhesion of the cell plates to the contrast walls, a

pressurization group with compensation valve can be provided; this allows the introduction of more oil into the cell through an appropriate manual pump, increasing its volume and therefore the space occupied (thickness). The valve is applied via a second tube connected to the cell, with an appendix in a 1.5m long Rislan tube.

Pressurization is particularly necessary for concrete applications, where the shrinkage of concrete can cause separation from the cell.

## Features and benefits

- High resolution and sensitivity
- Excellent sensor response speed
- Stainless steel
- Fully waterproof
- Various choice of ranges (customizable on request)
- High reliability over time; ideal for long term monitoring and installation in places not easily accessible
- Sensor and cell fully welded



Designed in several versions, making it highly versatile and suitable for all locations, it comes in different forms and combinations:

- Without hydraulic tube and with transmitter mounted directly on the cell, horizontally or vertically.
- With hydraulic tube for pressurization, with the transmitter mounted directly on the cell or tube.
- With analog (piezoresistive) sensor or vibrating wire sensor.

Reading of the electrical transducer data is possible via a portable readout unit or by means of an automatic data acquisition system for continuous monitoring.

## Technical specifications

### Sensor

Material of the cell	Stainless Steel AISI 316
Dimensions	Width 110 mm, length 220 mm (available with dimensions of 200mmx200mm )
Type of sensor	Piezoresistive or vibrating wire
Body of the sensor	Stainless steel AISI 303
Range	From 10 to 60 bar
Supply voltage	8-33 Vdc for analogue sensors; from vibrating wire datalogger.
Output	Analogue: 4-20 mA 2 wires C.V.: frequency or period
Total accuracy	Analogue +/- 0.5% F.S. C.V.: 0,2% f.s.
Operating temperature	-10 ..... +60 °C

## Technical assistance

If you have any requests or questions about our instruments or if you have special needs that require different solutions from the standard, please contact us. Our team will provide all the necessary information and will be very happy to work with you to study, develop and customize instruments and solutions suitable for your specific needs.

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The product information may be subject to variations at any time.  
Please carefully check the release and contact Pizzi Instruments for further details.

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