

# NATM Pressure cells



## Applications

The NATM pressure cells are designed to detect the state of stress of the concrete lining of tunnels in a radial or tangential position. They are used for monitoring:

- Radial and tangential stresses in the lining of tunnels and underground excavations
- Stress in rock masses
- Pressures under foundations
- Contact pressures on the surface of diaphragm and retaining walls, piers and abutments of viaducts.

## Technical features

Cells are made of 2 stainless steel (AISI316) plates welded together and are filled up with de-aired oil. The transducer is covered by a thick and resistant external steel protection and is directly connected to the pressure cell. As the shotcrete hardens, a rise of the concrete temperature may cause a dilatation of oil in the cell. The following temperature drop will therefore result in a detachment of the cell plate from the surrounding concrete.

In order to restore the former contact between the plate and the concrete, a steel pipe (standard length 60cm) is linked to the cell and allows an oil repressurization by a simple crimping.

## Installation

The radial cell is installed between the rock and the centering so as to detect the pressure exerted radially. The tangential cell is positioned in the concrete so as to detect the internal pressure in parallel to the tangent of the arc.



The load can be measured by a portable readout unit or by a datalogger.

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Technical specifications

Code	O0CPR0R0001	O0CPR0T0002
		
<b>Description</b>	Cella di Pressione Radiale	Cella di Pressione Tangenziale
<b>Type of sensor</b>	Estensimetrico con membrana in Inox	
<b>Range</b>	0.5-1-5 MPa (5-10-50 bar)	0-20 MPa (0..200 bar)
<b>Resolution</b>	0.02% F.S.	
<b>No linearity (transducer)</b>	0.3% F.S.	
<b>Output signal</b>	4-20 mA	
<b>Over load</b>	120% F.S.	
<b>Temperature operating range</b>	from -20°C to +50°C	
<b>Dimension (*)</b>	150x150x5 mm	100x200x5 mm
<b>Material</b>	Stainless steel	
<b>Cable connection</b>	Code OCABLE00000 2x2x0.35 Cable, pur, shielded 7 mm	

(\*) Cells of different sizes can be supplied on request.

Accessories



Portable readout unit  
(Codice O001800001)



Watertight connector  
(Codice OCONST00000)



Datalogger D800  
(Code OD800C008)

Details

Repressurization cell procedure

During the taking of the cast concrete it is possible that the increase in temperature causes the oil expansion of the cell. The subsequent lowering of the temperature will cause a gap between the membrane of the cell and the concrete. The hand pump pressurization (Code O0CPMP00000) allows the increase of the hydraulic pressure within the cell in order to restore the contact between the outer surface of the cell and the concrete.



Terminal fitting T