Hydraulic Pressure Cell

date: 03/2008

HIGHLIGHTS

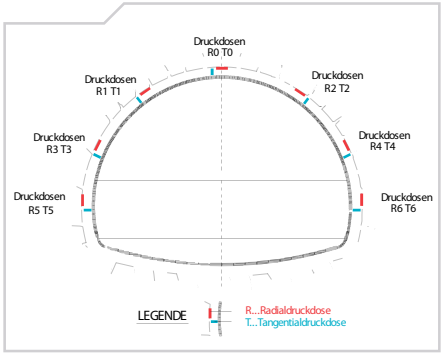
- Stresses are displayed directly without conversions
- Different arrangements for adaptation to the specific technical and geometric requirements
- Model that can be re-tensioned and re-injected to overcome the shrinkage gap in concrete and shotcrete
- Electrical read-out only – human error excluded
- Suitable for automatic data acquisition

Pressure cell for determining the contact stress between ground and shotcrete-shell (in combination with strain meters)

Field of Application

Pressure cells are deployed where stress must be measured inside concrete or shotcrete parts, in embankments and dams and also at contact surfaces such as between embankments and subsoil or shotcrete and rock surface. The results show the stress on the construction components, or forces acting at the contact surfaces between different materials.

When measuring inside concrete or shotcrete, it must be ensured that shrinkage or creep does not introduce errors in the measurement. “Re-tensioning” the transducers or applying pressure afterwards to eliminate the shrinkage gap are effective methods for largely compensating for these errors.



Arrangement of tangential and radial pressure cells in tunnel construction

Principle of Operation

The pressure cell comprises two metal plates, generally rectangular, which are welded together at the edges. The pressure on the cell is transmitted to an electrical pressure sensor via the fluid in the cell. The shrinkage behaviour of concrete can cause a fitted cell to lose contact with the concrete. This introduces errors in the measurement results, making the results unreliable. To overcome a shrinkage gap which may have formed, enabling the force to be transmitted

once more from concrete to load cell, the cell can be retroactively "pumped up" again. This so-called re-tensioning is possible via an oil-filled re-tensioning tube that is pressed together in sections from outside to inside. This presses additional oil into the cell, increasing the cell volume and closing the shrinkage gap again.

A system for pressing the shrinkage gap closed again retroactively is optionally available.

Collecting box in the sidewall for comfortable taking of readings

Data Acquisition

Data read-out can be done using our MINOS data reader or by automatic data acquisition. Our KRONOS software package is available for visualisation.

Technical Specification

<u>Hydraulic pressure pad</u>	
Standard size	150 x 250 mm, 70 x 140 mm, 100 x 200 mm (effective surface)
Material	steel
Sheet thickness:	2 - 4 mm
Stress range (standard)	5 bar, 50 bar, 100 bar or 200 bar
Fluid	degassed hydraulic oil
posttensioning tube (Valve transmitter)	50 cm (standard)

<u>Electrical pressure transducer</u>	
Measuring range (standard)	0-5, 0-50 or 0-200bar
Supply voltage	15 to 30 VDC
Output signal	4 to 20 mA
Linearity	type ± 0.2 % FS max. ± 0.3 % at 20° C
Application temperature	standard - 10° to + 55° C optional - 10° to + 70° C

The following other datasheets are assosiated with this datasheet:

<u>Services:</u>	*Geotechnical Monitoring - Installation, Data Acquisition and Evaluation*
<u>Systems:</u>	*DAMOS - Automatic Data Acquisition System*
<u>Software:</u>	*KRONOS Tunnel Information System*