



**RELIABLE  
HIGH RESOLUTION  
RUGGED**

Accurate, robust and corrosion resistant, the C-110 Strain Gauge is built with electro-magnetic excitation and pick-up coils

#### Description

The **C-110** strain gauge consists of a thin-wall steel tube with two steel heads soldered to its extremities using solder with a low modulus of deformation. The distance between flanges of the heads determines the gauge length. A small rectangular housing at the gauge midsection encloses the electro-magnetic excitation and pick-up coils.

The electrical resistance of one of the electromagnetic coils provides temperature data, in which case the gauges are delivered with a 5-conductor cable. A 4-conductor cable is used when temperature measurements are not required.

Unless specified, gauges are factory-set at mid-range, allowing one half of the range for measurement of tensile strain, and the other half for compressive strain.

The **C-110** strain gauge is designed for embedment in fine aggregate concrete to measure strain caused by variations in stress. If the modulus of elasticity of the material is known, the magnitude of the strain (other than that induced by loading) can be evaluated. In the case of concrete, the effects of temperature, creep, and the autogenous reaction must be known.

#### Key Features

- Long-term reliability
- High resolution and accuracy
- Rugged: housing resistant to impact and corrosion
- Easy to install and use
- No maintenance needed
- Frequency signal output easy to process and transmit over long distances
- Integrated temperature gauge
- Watertight to 1500 kPa standard
- Frequency measured in sustained or dampened mode

#### Applications

- Dams
- Nuclear power stations
- Bridges and viaducts
- Large buildings
- Tunnel linings



## C-110 - Embedded Vibrating Wire Strain Gauge

Vibrating Wire

### Specifications

Range	2900 $\mu\epsilon$
Average resolution using PC readout	0.35 $\mu\epsilon$
K strain gauge coefficient	0.3
Resistance of each coil	90 $\Omega$
Signal specifications	
Input signal	Sinusoidal, 150 to 170 mV rms
Output signal	Sinusoidal, 10 to 30 mV rms
Total Length	144 mm
Gauge length	110 mm
Tube diameter	6 mm
Flange diameter	20 mm
Weight (without cable)	85 g

### Readings & Interpretation

Readings on this and all Roctest Telemac vibrating wire transducers may be taken with a Telemac PC series readout or SENSLOG automated data acquisition system.

As with all vibrating wire instruments, the readings may be recorded in the sustained or dampened excitation mode using either one or both of the coils. The dual-coil circuit ensures the maximum longevity of the instrument. Deformations in the concrete between the flanges induce variations in the length and vibration frequency of the gauge wire. The relationship between frequency and wire length, a characteristic of each gauge, allows for strain calculation using the gauge factor K and the following formula:

$$\frac{\Delta L}{L} = K \times 625 \times 10^{-5} \times (N^2 - N_0^2) \text{ where: } \frac{\Delta L}{L} = \text{strain}$$

K = gauge factor  
N<sub>0</sub> = initial frequency  
N = current frequency

### Ordering information

- Cable length
- Setting, if other than standard

Roctest Ltd,  
680 Birch Street  
St-Lambert, Quebec  
Canada J4P 2N3

E5062D-160209

Phone +1 450 465 1113  
Fax. +1 450 465 1938

Email info@roctest.com  
Web www.roctest.com

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