Gage Technique International Ltd.
GEOTECHNICAL & STRUCTURAL INSTRUMENTATION

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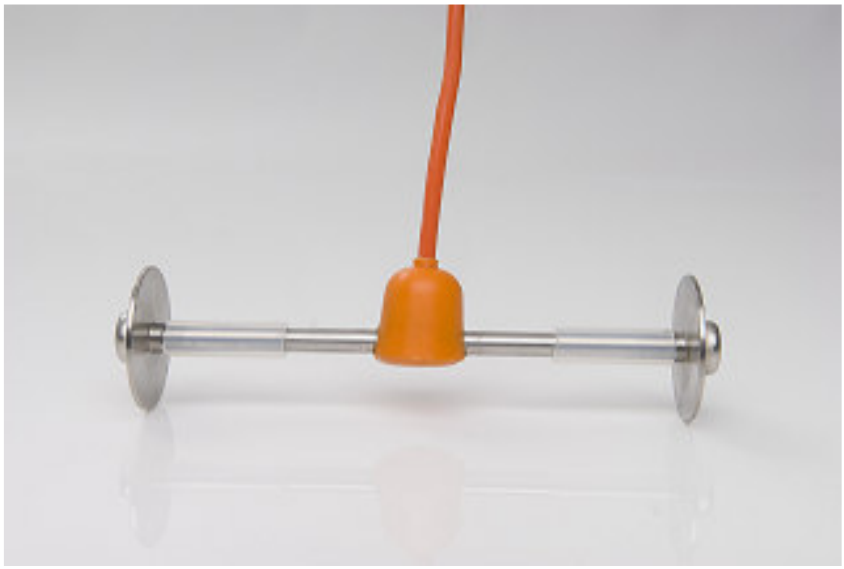
VIBRATING WIRE EMBEDMENT STRAIN GAUGE.



TECHNICAL SPECIFICATION

Gauge Type :	TES/5.5/T embedment strain gauge.
Gauge Length :	5.5 inches.
Gauge factor :	3.025 x 10^{-3} microstrain per frequency squared.
Measurement range :	Greater than 3000 microstrain.
Resolution :	Better than 1 microstrain.
Coil Resistance :	Approximately 100 ohms.
Operating temperature range :	From -20^{0}C to 80^{0}C.
Thermal coefficient of vibrating wire :	11 ppm per 0C.
Thermistor temperature sensor :	Optional
Cable diameter :	4.5 millimetres.
Cable colour code – Brown :	Coil +ve.
Blue :	Coil -ve.
Yellow :	Thermistor (optional).
Green :	Thermistor (optional).

The type TES/5.5/T embedment vibrating wire strain gauge for concrete is based on a design by the Road Research Laboratory (now known as the Transport Research Laboratory), that was initially developed in 1969. Gauges of this type have been used successfully, worldwide, for the past 40 years, in major Civil Engineering projects such as the Channel Tunnel Rail Link in the UK & Storæbelt Crossing in Denmark.

Typical applications include pre-cast tunnel linings, concrete bridge sections, dams and concrete creep tests.

The gauges are suitable for long term use, the oldest working examples still in operation are over 30 years old and still providing reliable data!

THE VIBRATING WIRE EQUATION

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The change in engineering units, microstrain (με), is given by the following expression :-

$$\mu\varepsilon = (F_1^2 - F_2^2) \times GF$$

where: -

F_1 = the initial or Datum frequency reading

F_2 = a subsequent measured frequency

GF = the appropriate Gauge Factor for the gauge.

This equation may be expressed in terms of period reading (T), as displayed by the GT1174 Miniature Strain Meter:

$$\mu\varepsilon = \left(\frac{10^{14}}{T_1^2} - \frac{10^{14}}{T_2^2} \right) \times GF$$

T_1 = the initial or Datum period reading

T_2 = a subsequent measured period reading.

Note: A positive change in microstrain indicates a compressive strain change.

MEASUREMENT RANGE AND RESOLUTION

The following table gives typical upper limit, lower limit, mid range values to 5 significant figures, and resolutions in microstrain, for all strain gauges of the same gauge length:

TES/5.5/T
Gauge Length (GL), 5.5 inches
Gauge Factor (GF), $3.025e^{-3}$ Microstrain per Frequency squared

	T	F	Lin	Change με	GT1174	GT1192
Upper Limit	08500	1176.5	1384.1	-1489.5	0.98	0.71
Mid Range	10590	944.29	891.68	0.0	0.51	0.06
Lower Limite	16000	625.00	390.63	1515.7	0.15	0.04

NOTES

- *The Period (T) is the reading as displayed by the GT1174 Miniature Strain Meter in seconds x 10^{-7}.*
- *The Frequency (F) is the reading as displayed by the GT1192/615 Geologger in hertz and is equivalent to $10^7/T$.*
- *The Linear value (Lin.) is $F^2/1000$ and is equivalent to $10^{11}/T^2$.*
- *The microstrain Change (με) is derived from the Vibrating Wire Equation.*
- *The Resolution is given in microstrain. It is the resulting change in microstrain for a least significant digit change in the reading as displayed by the GT1174 or GT1192. Resolution varies over the frequency range of the gauge, and is related to the parameter being measured by the readout unit (period, frequency or linear value).*