

os3600 | Long Gage Strain Sensor

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|---|--------------------------------|
| Part # | os3600-ggg-tttt/ssss-1xx-1yy-z |
| Serial # | |
| Nominal Wavelength, $\lambda_{0,Temp}$ (nm) @22°C | 0000.0 |
| Nominal Wavelength, $\lambda_{0,Strain}$ (nm) @22°C | 0000.0 |
| Certified by: | |

| Variable | Description | Value | Units |
|--------------------------|---------------------------|--------------|--------------------------------------|
| $F_{G, Strain}$ | Gage Factor | @22°C | - |
| C_1 | Gage Constant 1 | 0.796 @22°C | - |
| C_2 | Gage Constant 2 | 10.1 | $\mu\text{m}/\text{m}^\circ\text{C}$ |
| CTE_5 | CTE of Test Specimen | User Defined | $\mu\text{m}/\text{m}^\circ\text{C}$ |
| $\Delta\lambda_{Strain}$ | Wavelength Shift (Strain) | Interrogated | nm |
| $\Delta\lambda_{Temp}$ | Wavelength Shift (Temp) | Interrogated | nm |
| S_T | Temperature Sensitivity | ~23.8 | $\text{pm}/^\circ\text{C}$ |

Strain (mechanically induced $\mu\text{m}/\text{m}$):

$$\epsilon = [(\Delta\lambda/\lambda_0)(1 \times 10^6)/F_G]_{Strain} - \epsilon_{TO}$$

Thermal Output (thermally induced apparent strain, $\mu\text{m}/\text{m}$):

$$\epsilon_{TO} = [(\Delta\lambda/\lambda_0)(1 \times 10^6)/C_1]_{Temp} + (CTE_5 - C_2)(1 \times 10^3)(\Delta\lambda_{Temp}/S_T)$$

Thermal Output and Temperature Compensation

Fiber Bragg grating (FBG) based strain gages respond to both strain and temperature. Temperature induced strain results from a combination of two factors.

- 1) Thermal expansion of the substrate on which the gage is mounted.
- 2) Thermally induced index of refraction changes in the FBG.

Both factors affect the FBG’s center wavelength.

Several methods are available to decouple strain and temperature components in measurements using this gage. Popular methods involve using FBGs to measure change in temperature or employing dummy FBG strain gages (as with conventional electronic strain gages).

The os3600 gage is self compensating. That is, a second FBG is built in for temperature compensation.

For additional information about temperature compensation techniques and converting wavelength values to strain and temperature, see:

http://www.micronoptics.com/support_downloads/Sensors/

Qualification Statement



This sensor has been manufactured using procedures and materials documented under Micron Optics, Inc’s ISO 9001:2000 qualification process. This Sensor Information Sheet is verification of conformance.

Patent Certification



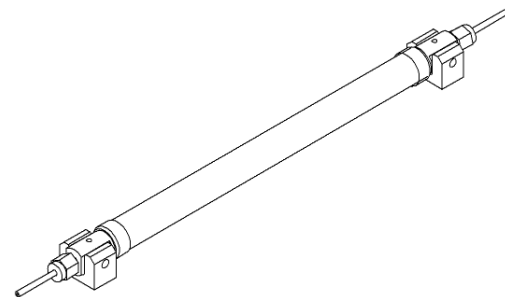
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Installation Information

The os3600 strain gage may be mounted to a variety of surfaces, such as structural steel or concrete, by selecting the appropriate mounting bracket. Mounting brackets are typically welded to the surface of steel or grouted into boreholes in concrete or rock. Brackets are also available for screw attachment to a variety of surfaces, or embedding in concrete as it is poured. The os3600 strain gage measures the relative movement of the two mounting brackets along the axis of the gage. It is important that the mounting brackets be securely attached to the specimen if accurate results are to be obtained.

Installation instructions are available at:

http://www.micronoptics.com/support_downloads/Sensors/



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