

os3155 | Compensated Optical Strain Gage

Part # os3155- tttt-ssss-1UT-1UT

Serial #

Nominal Wavelength,  $\lambda_{0Temp}$  (nm) @22°C (Temp FBG) 0000.0

Nominal Wavelength,  $\lambda_{0Strain}$  (nm) @22°C (Strain FBG) 0000.0

Certified by: \_\_\_\_\_

Variable	Description	Value	Units
$F_G$	Gage Factor @22°C	0.000	-
$\Delta\lambda_S$	Wavelength Shift (Strain)	Interrogated	nm
$\lambda_{0S}$	Nominal Wavelength (Strain)	Initial Value	nm
$S_T$	Temp. Sensitivity @22°C	$1.833 \times 10^{-5}$	-
$\Delta\lambda_T$	Wavelength Shift (Temp)	Interrogated	nm
$\lambda_{0T}$	Nominal Wavelength (Temp)	Initial Value	nm
$CTE_S$	CTE of Test Specimen	User Defined	$\mu\text{m}/\text{m}^\circ\text{C}$
$CTE_T$	CTE of Temperature Probe	16.6	$\mu\text{m}/\text{m}^\circ\text{C}$

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

$$\varepsilon = 10^6 \left[ \frac{(\Delta\lambda/\lambda_0)_S - (\Delta\lambda/\lambda_0)_T}{F_G} \right] - \frac{(\Delta\lambda/\lambda_0)_T}{S_T} (CTE_S - CTE_T)$$

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).

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

[http://www.micronoptics.com/support\\_downloads/Sensors/](http://www.micronoptics.com/support_downloads/Sensors/)

Micron Optics Quality and Performance



Products displaying the “Micron Optics Tuned” logo include Micron Optics tunable technologies thus ensuring high quality and performance. Certified sensors have been tested and qualified for use with Micron Optics Sensing Instruments.

Qualification Statement

This sensor has been manufactured using procedures and materials documented under Micron Optics, Inc’s ISO 9001:2008 quality management system.

Patent Certification



Micron Optics sensors and sensor interrogation instruments are covered under a US and International Patent Licensing Agreement between Micron Optics, Inc. and United Technologies Corporation. This license transfers to the users of Micron Optics sensor products and ensures that Micron Optics products are authorized for use in sensing applications. Certificates are available upon request.

Installation Information

The os3155 Strain Gage is designed to be spot welded to steel using a capacitive-discharge spot welder having 50-150 watt-seconds of energy. The spot welder should be equipped with a spherical tip electrode with a diameter of approximately 0.03 inches (0.76 mm). Practice welds using a blank os3155 gage may be helpful in developing proper technique.

Use firm pressure on the electrode. After making a practice weld, pull the gage off of the surface. A properly formed weld will result in a small piece of the specimen or gage surface to break away. If needed, adjust the weld energy and electrode pressure until a satisfactory weld is obtained.

Detailed installation instructions and welder recommendations are available at:

[http://www.micronoptics.com/support\\_downloads/Sensors/](http://www.micronoptics.com/support_downloads/Sensors/)