

# Optical Strain Gage | os3100

## Applications

- Continuous lifetime health monitoring of bridges, dams, buildings, tunnels, ships, aircraft, trains, and other complex structures.
- Core building block for fiber optic transducers for strain, temperature, displacement, pressure, and acceleration.
- Measurement of strain on a structure's surface.
- Experimental mechanics evaluations requiring many sensors.

## Features

- Rugged, permanent weldable package (os3110).
- Rugged package fastens with same epoxy as conventional foil strain gage (os3120).
- Qualified to same rigorous standards used for comparable electronic gages.
- Cable integrated with sensor package for fiber protection and strain relief.
- Fast, simple, repeatable installation.
- Double ended design supports multiplexing of many sensors on one fiber.
- Gage installation and protection achieved with same methods as conventional electronic gages.
- Micron Optics' patented micro opto-mechanical technology.

## Description

The os3100 Optical Strain Gage is designed to make fiber handling easy and sensor installation fast and repeatable. It is based on fiber Bragg grating (FBG) technology. The os3100's stainless steel carrier holds the FBG in tension and protects the fiber during installation. Since there are no epoxies holding the fiber to the carrier, long term stability is ensured by design.

Two packaging options provide for either weld or epoxy attachment to a structure's surface. Installation time is just a few minutes. Welded gages can be used immediately after attachment. Epoxy gages typically cure in less than 24 hours at room temperature, similar to electronic foil strain gages.

In side by side comparisons with foil strain gages, the os3100 is equally sensitive and accurate, while providing for greater strain range and 100 times more fatigue life. The os3100 strain gage is qualified for use in harsh environments and delivers the many advantages inherent to all FBG based sensors.

This sensor can be used alone or in series as a part of an FBG sensor array. Installation and cabling for such arrays is much less expensive and cumbersome than comparable electronic gage networks. Multiple optical strain gages can be arranged in close proximity at 0, 45 and 90 degrees for strain rosette measurements.



With each sensor, Micron Optics provides a Sensor Information Sheet listing the gage factor and calibration coefficients needed to convert wavelength information into engineering units. Micron Optics' ENLIGHT Sensing Software provides a utility to calculate and then record, display, and transmit data for large networks of sensors. Installation, qualification and other sensor information is available at: [http://www.micronoptics.com/support\\_downloads/Sensors/](http://www.micronoptics.com/support_downloads/Sensors/).

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## Specifications <sup>β</sup> 1

os3110  
Spot Weld

os3120  
Epoxy Mount

### Performance Properties

Strain Sensitivity <sup>2</sup>	~ 1.4 pm/με
Gage Length	22 mm
Operating Temperature Range	-40 to 120° C (150° C short-term)
Strain Limits	± 2,500 με
Fatigue Life	100 x 10 <sup>6</sup> cycles, ± 2,000 με

### Physical Properties

Dimensions	See Diagram Below
Weight	2.6 g
Carrier Material	302 Stainless Steel
Cable Length	1 m (± 10 cm), each end
Fiber Type	SMF28-Compatible
Cable Type	1 mm Fiberglass Braid
Connectors	FC/APC optional
Cable Bend Radius	≥ 17 mm

### Fastening Methods <sup>3</sup>

Spot Weld

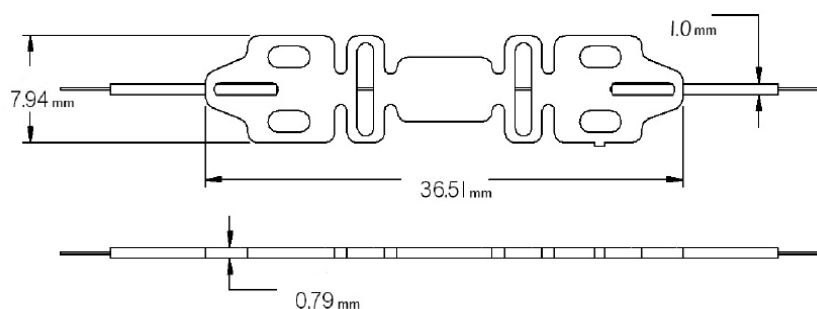
Epoxy Mount

### Optical Properties

Peak Reflectivity (R <sub>max</sub> )	> 70%
FWHM (-3 dB point)	0.25 nm (± .05 nm; apodized grating)
Isolation	> 15 dB (@ ± 0.4 nm around center wavelength)

#### Notes:

1. Denotes Beta product. For more details see [www.micronoptics.com/product\\_designation.php](http://www.micronoptics.com/product_designation.php).
2. Actual gage factor provided with gage. Note: F<sub>G</sub> is different for os3110 and os3120.
3. See [http://www.micronoptics.com/support\\_downloads/Sensors/](http://www.micronoptics.com/support_downloads/Sensors/) for installation details.



## Ordering Information

os31aa-**www**-1xx-1yy

(Example: os3110-1564-1FC-1FC)

<b>aa:</b> Model	<b>www:</b> Wavelength (±1nm)	<b>1xx:</b> Cable 1, Length & Connector	<b>1yy:</b> Cable 2, Length & Connector
10 Spot Weldable	Standard: 1516 to 1588nm in 4nm intervals.	1 1 m Standard, Cable Length	1 1 m Standard, Cable Length
20 Epoxy Mount	Extended: 1460 to 1620nm	UT Underterminated FC FC/APC Connector	UT Underterminated FC FC/APC Connector



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