

# Optical Strain Gage | os3150

## Description

The **os3150** is a rugged, spot-weldable strain gage based on fiber Bragg grating (FBG) technology.

Optimized for outdoor installations on steel structures, the os3150'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. For temperature compensation, the os3150 may be connected in series with an FBG temperature gage like the os4350. Alternately, the very rugged os3155 strain gage offers a strain measurement approach similar to the os3150, but also includes built-in temperature compensation. For some applications, combining both os3150s and os3155s is an optimal solution.

Installation is easy and requires just a few minutes. Since the gages are welded in place, they can be used immediately after attachment without waiting for adhesives to cure. Armored cables lead to and from each gage, making both installation and fiber protection fast and easy. The armored cable is compatible with connector protection fittings (see below) that protect splice-free series connections to strain, temperature, acceleration and other types of optical sensors. The entire strain gage package is typically covered with a protective material to complete installation for long term protection.

In side by side comparisons with foil strain gages, the os3150 is equally sensitive and accurate, while providing for greater strain range and 100 times more fatigue life. The os3150 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.



## Key Features

**Rugged, permanent** weldable package.

**Armored 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

**Qualified** to same rigorous standards used for comparable electronic gages.

**Gage installation and protection** achieved with same methods as conventional electronic gages.

**Micron Optics'** patented micro opto-mechanical technology.

**Included in ENLIGHT's sensor templates** - allows for quick and easy optical to mechanical conversions.



## Deployments

**Structures** (bridges, dams, tunnels, mines, buildings, oil platforms)

**Energy** (wind turbines, oil wells, pipelines, nuclear reactors, generators)

**Transportation** (railways, trains, roadways, specialty vehicles, cranes)

**Marine vessels** (hull, deck, cargo containers)

**Aerospace** (airframes, composite structures, wind tunnels, static and dynamic tests).

**Homeland security** (perimeter intrusion, heat detection, security gate monitoring)



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## Performance Properties

Strain Sensitivity<sup>1</sup> **os3150** ~ 1.4 pm/ $\mu\epsilon$

Gage Length 75 mm

Operating Temperature Range -40 to 80°C

Strain Limits  $\pm 2,500 \mu\epsilon$

Fatigue Life 100 x 10<sup>6</sup> cycles,  $\pm 2,000 \mu\epsilon$

## Physical Properties

Dimensions, Weight (Without Cable) See diagram below, 15 g

Carrier Material 302 stainless steel

Cable Length 1 m ( $\pm 10$  cm), each end

Fiber Type SMF28-Compatible

Cable Type 3 mm armored cable

Connectors Optional

Cable Bend Radius  $\geq 17$  mm

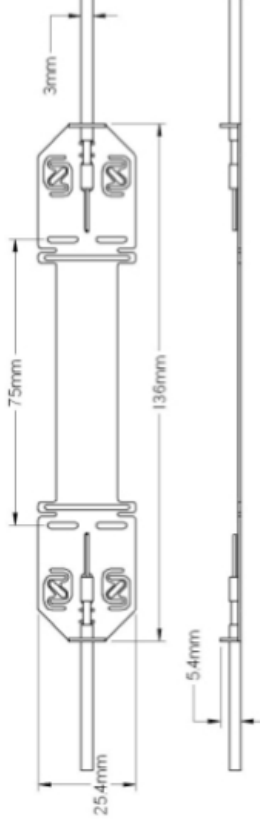
Fastening Methods<sup>2</sup> Spot weld

## Optical Properties

Peak Reflectivity (R<sub>max</sub>)  $> 70\%$

FWHM (-3 dB point) 0.25 nm ( $\pm .05$  nm; apodized grating)

Isolation  $> 15$  dB (@  $\pm 0.4$  nm around center wavelength)



## Ordering Information

os3150-**www**-1xx-1yy

**www** Wavelengths for (+/- 1nm) Standard - 1460 nm in 4 nm intervals

**xx** Termination type  
 1xx Cable 1, Length & Connector  
 1 m Standard, Cable Length  
 UT Unterminated  
 FC FC/APC Connector  
 PF FC/APC Connector with Protection Fitting

**yy** Termination type  
 1yy Cable 2, Length & Connector  
 1 m Standard, Cable Length  
 UT Unterminated  
 FC FC/APC Connector  
 PF FC/APC Connector with Protection Fitting

## Ordering Information Example

o3150-1552-1FC-1FC

## Notes

- 1 Actual gage factor provided with gage.
- 2 See [http://www.micronoptics.com/support\\_downloads/](http://www.micronoptics.com/support_downloads/) Sensors/ for installation details.