

Strain Gage Installation Kit

Description

The Strain Gage Installation Kit allows a fast, easy and reproducible way of installing the fibre optic Strain Gages SG-01 to various surfaces. Installation of the optical gages happens using a patented methodology which makes use of a specially designed mounting tool called a sensor pad. After installation, the pad is removed from the sensor so that it does not interfere with the strain measurement during operation. This also makes that the pad can be reused for the installation of other sensors afterwards.

The used adhesive is UV-curable, which makes that installation is fast and easy. Curing of the adhesive happens in two steps:

(1) a fast pre-cure (typically 30 s with a 100 W mercury lamp) through the sensor pad and (2) a longer final cure after removal of the sensor pad to fully cure the adhesive (typically 5 to 10 minutes with a 100 W mercury lamp).



Features

- Fast, easy and reproducible installation of the SG-01 optical Strain Gages thanks to the sensor pad and a UV-curable adhesive. For an experienced worker, installation takes roughly 10 to 20 minutes.
- Applicable on various metallic and composite surfaces. Performances were validated on steel, stainless steel, aluminum, inconel, titanium, glass composite and carbon composite.
- Almost negligible transverse sensitivity and fatigue shifts (for up to 2 million cycles).

Applications

The Strain Gage Installation Kit can be used to install the optical strain gages SG-01 on various surfaces so that stress and strain analysis of the structures to which they are attached can be performed.

Standard specifications

The Installation Kit contains all the necessary materials and tools for proper installation of the gages. It also includes a detailed instruction manual which guides the user through all the necessary steps during installation. The items contained in the Kit are listed in the table below.

Item	Quantity
Instruction manual	1
Data sheets and safety forms	1
Sensor pads	2
NOA61 UV-curable adhesive	1 oz. bottle
Abrasive paper (grade 120)	1 m ribbon
Cleaning tissues	100
ISOPROPANOL	250 ml bottle
Teflon patches	20
Rectangular glass piece	1
Rapid Adhesive X60 component A	1
Rapid Adhesive X60 component B	2
Mixing cups	10
Spoons	2
Wooden stirring sticks	50
Tweezers	1
Scalpel	1
RTV 3145 (MIL-A-46146) mechanical protection	1 tube

The optical Strain Gages SG-01 which are installed by means of the Installation Kit exhibit the following characteristics:

Parameter	Unit	Value
Total sensor length	mm	45
Temperature operating range	°C	-50 to 70 (long term) 70 to 90 (short term; < 1 h)
Thermal stability	µε / h	≤ -0.026 @ 70°C ≤ -5 @ 90°C
Strain range (tension / compression)	%	> 0.5
Gage factor (S_ϵ)	µε ⁻¹	7.88 x 10 ⁻⁷ (typical)
Relative statistical error on S_ϵ	%	0.5
Temperature coefficient ¹ on S_ϵ	°C ⁻¹	2.7 10 ⁻⁴
Transverse strain sensitivity ²	-	< 2.1 10 ⁻³
Fatigue shift ³	µε / 10 ⁶ cycles	≤ 4

¹ The temperature coefficient of the gage factor S_ϵ expresses the relative variation of S_ϵ per degree Celsius.

² According to ASTM E 251-92. The transverse strain sensitivity is the ratio of the gage factor of a strain gage mounted perpendicular to a uniaxial strain field (transverse gage) to the gage factor of a similar gage mounted parallel to the same strain field (longitudinal gage).

³ The bonding during fatigue cycling was tested by mounting gages on unidirectional glass composite material that was strained from -0.24 % to +0.24 % up to 2 million cycles.

Optional Accessories

- UV-lamp
- Optical Strain Gages SG-01