KFRP FOIL STRAIN GAGE FOR COMPOSITE MATERIALS

OPERATION MANUAL

1. Specifications

Resistor	Special alloy foil
Gage base	Polyimide
Operating temperature range	−196 to 200°C (−10 to 80°C, with vinyl leadwires)
Temperature compensating range	0 to 150°C (0 to 80°C, with vinyl leadwires)
Applicable adhesive	EP-34B(−55 to 200°C) CC-33A(−196 to 120°C)

2. Operating instructions

2.1 Treatment of the surface of a measurement object

Using sandpaper (#1000), lightly polish the cementing area of a composite material. Carefully avoid damage to the cementing area.

Then, remove fat and foreign matters from the cementing area using acetone or other solvent.

2.2 How to cement

For cementing of the KFRP strain gage, use of the EP-34B adhesive is recommended. Observe the following instructions for gage cementing.

(For details, refer to the instruction manual of the EP-34B adhesive.)

a. Form a thin coat of EP-34B over the gage base and gage cementing area of a measurement object.

b. To squeeze excessive cement from the strain gage installation, press it via a polyethylene sheet.

c. Give a continued pressure of 30 to 50kPa (0.3 to 0.5kgf/cm² in conventional unit) to the strain gage installation via silicone rubber or other cushion. (Adhesive tape may be used to give this pressure.)

d. The strain gage installation will be ready for use after 24 hours' curing at a room temperature (25°C), generally.

When cementing the strain gage to a conductive composite material, keep the gage-leads out of contact with the measurement object by sticking insulating tape to the area underneath the gage-leads.

3. General handling precautions

3.1 Effect of self-heating caused by gage current

If the thermal conductivity of a measurement object is small, current drift occurs due to the effect of Joule heat generated by gage current. The KFRP gage's special gage pattern can reduce this current drift.

Take, however, the following cares for better measurement results.

a. Use a low bridge-excitation voltage if it is allowed on the measuring instrument in use.
(For example, the DPM-600 dynamic strain amplifier permits shifting from 5V to 2V, and Joule heat is thereby reduced to 1/16.)

b. Use the 2-gage method as much as possible.
Note however that if one dummy gage is used in common to several active gages, the method has little effect (except the case in which a common dummy is used with the UCAM-10B which is set at the "02" measuring mode).

c. Use a strain gage of high resistance, i.e. 350Ω.
(Against a same bridge excitation voltage, Jouel heat of a 350Ω gage is about 1/3 of a 120Ω gage.)

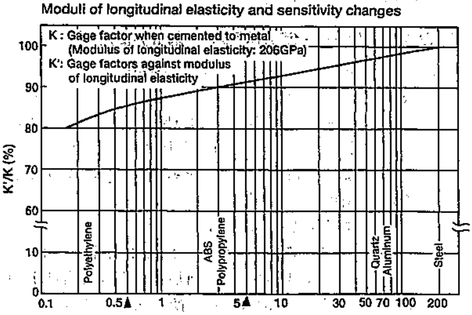
3.2 Moduli of longitudinal elasticity and sensitivity changes

The sensitivity of a strain gage cemented to a composite plastic material varies due to the material's modulus of longitudinal elasticity as shown below. Kyowa gage's gage factor is expressed by the value which is available when cemented to a metal (whose modulus of longitudinal elasticity is 206GPa.) To meet the material's modulus of longitudinal elasticity, correct the gage factor using the equation below.

$$\varepsilon = \frac{100}{\left(\frac{K'}{K}\right)} \times \varepsilon_0$$

where ε = true strain ($\times 10^{-6}$strain)
ε_0 = strain reading ($\times 10^{-6}$strain)

Moduli of longitudinal elasticity and sensitivity changes



*1 A 3-axis gage (D22) having different coefficients of linear expansion on the respective axes can be manufactured upon request.

*2 Data of thermal effect on apparent strain and gage factor are available upon request.

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