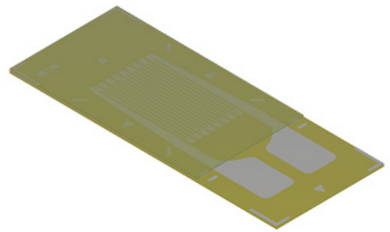
High Elongation Strain Gauge

Introduction

High elongation strain gauge is fabricated with perfectly annealed Constantan-sensitive grid materials and polyimide base materials. They have excellent high ductility and high elongation. They are the elastoplastic stress-strain analysis of materials and structures. They are the ideal test components.

Widely used to verify the structure of the rationalization of the limit design, reliability, aerospace, military and scientific research in areas such as plastic deformation of the material to provide a reliable means of measurement.

Past few years after the research and testing of the materials, the structure of a series of improvement, we design two high elongation strain gauges TY series and THY series based on original high elongation strain gauge TA series, specifically described below.



TY Series

TY series of strain gages can be used to test the material elastic region to the plastic region of the large strain measurement, related to the TA series strain gauges improve the material and structure to improve the material consistency and sensitivity between the grid and the substrate peel strength, reliability and accuracy. The tensile strain in the range of 5% to 10% will be measured.

THY series

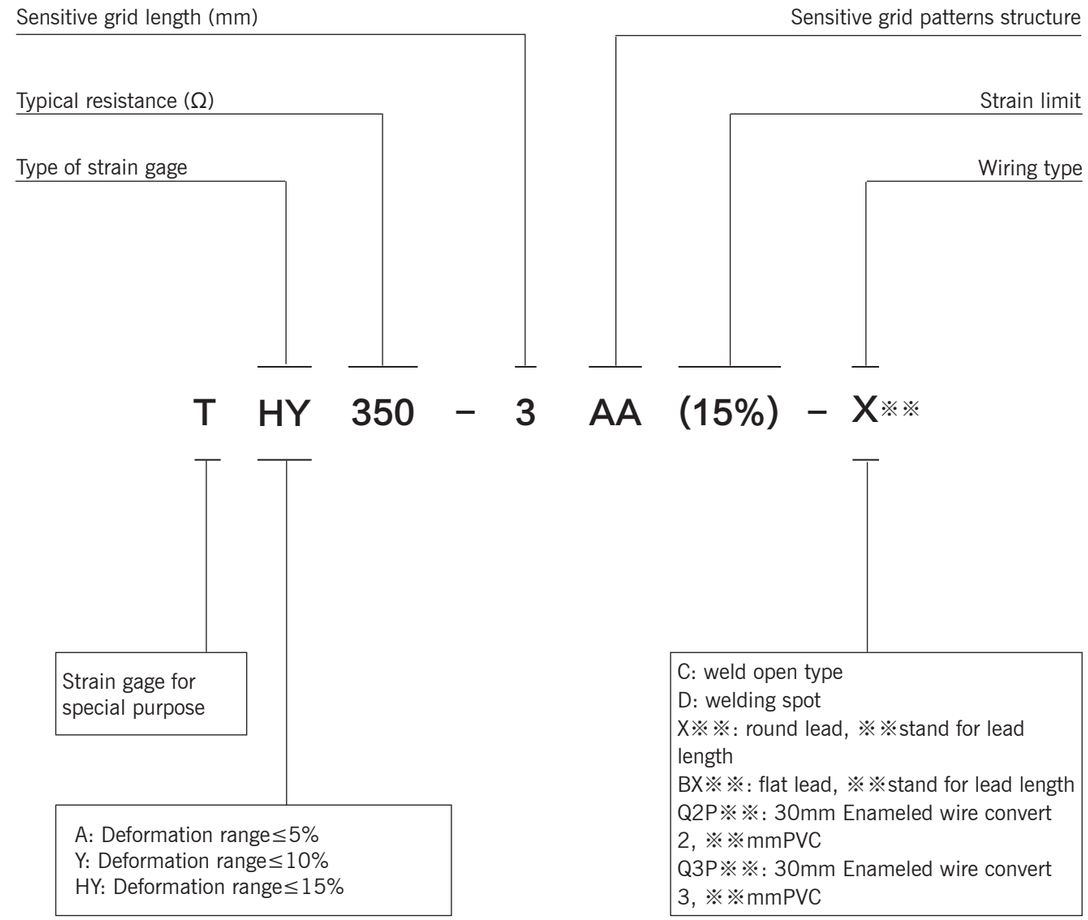
THY series of strain gauges for the test material from the elastic region to the plastic region of the large strain measurement developed products, mainly used in a variety of plastic strain measurement and breaking tensile test, related to the TY series strain gauge to further enhance the sensitive grid material ductility and elongation of the strain gage structure, which reduces the influence of the substrate shear stress and the stress concentration of the pad, improves the tensile properties of the strain gage, avoids the breakage at large strain, can measure 10% to 16% of the tensile strain.

Product performance

1. Strain limit: 10% (including 5%), 15%
2. Temperature range: -30 ~ +60 ℃
3. Typical resistance: 120Ω, 350Ω
4. Resistance range: nominal value ± 1%
5. Sensitivity coefficient ≥ 2.0

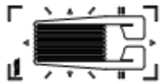
High Elongation Strain Gauge

Designation System for High Elongation Strain Gauge

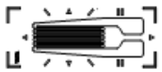
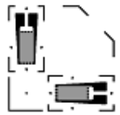
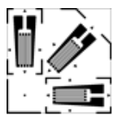


High Elongation Strain Gauge

1. THY series strain gage

Product form	Product Model	Sensitive grid size Long (L) × width (W) (mm)	Backing size Long (L) × Width (W) (mm)
	THY120-3AA(15%)-C	3.0×4.3	9.5×5.5
	THY120-5AA(15%)-C	5.0×3.6	11.5×5.0

2. TY series strain gage

Product form	Product Model	Sensitive grid size Long (L) × width (W) (mm)	Backing size Long (L) × Width (W) (mm)
	TY120-3AA(10%)-C	3.0×2.6	9.5×3.9
	TY120-5AA(10%)-C	5.0×2.6	11.5×4.0
	TY120-3BA(10%)-C	3.0×2.6	11.4×11.4
	TY120-5BA(10%)-C	5.0×2.6	13.5×13.5
	TY120-3CA(10%)-C	3.0×2.6	11.4×11.4
	TY120-5CA(10%)-C	5.0×2.6	13.5×13.5
	TY120-3CD-K(10%)-C	3.0×2.6	11.6×11.6

3. Terminals

Product form	Product Model	Backing size Long (L) × Width (W) (mm)
	DCA3-G1	6.0×6.0
	DCA6-G1	8.0×8.0

Note: Except the models listed in the table, we can design and processing based on the customer's pattern and other requirements.

Adhesives

The adhesive glue is used to install the strain gages. The High Elongation Strain Gauge installing could use our company's adhesive H-716. H-716 is a room-temperature curing adhesive with excellent mechanical properties, which is a different color two-component adhesive, in which the A component is brown and the B component is gray.

Strain Gauge Paste

1. Sample Processing

In order to firmly attach the strain gauges, it is necessary to treat the adhesive surface in a range of 3 to 5 times than the strain gauge area.

Frist, remove the oil, rust, oxide film, coating, paint on the surface of the test pieces. Based on the sample material, select the right sandpaper 220 ~ 400 # to grind to the stripes 45 °C angle cross with paste direction, then use dip buttered cotton balls with butanone or acetone to clean the polished parts and rinsed with absolute ethanol until no dirt was visible on the cotton balls. Note that scrubbing should be performed in a single direction and do not wipe back and forth alternately. Cleaned surface need to be avoid re-contamination and hand touch. Immediately paste the strain gage after the solvent evaporation surface is completely dry.

2. H−716 Paste Method

(1) Mix A and B components of H-716 fully in a cleaned container in the ratio of A:B=2:3. The inadequacy of the adhesive formulation may result in insufficient curing or insufficient adhesion, which may affect the test results.
(2) Apply a thin layer of mixed H-716 on the surface of the test piece, and attach the strain gauge to the right position, attach a Teflon film, then squeeze out the air bubbles and excess glue along the strain gauge axial.
(3) Cover with silicone rubber plate, metal pressure plate, pressure curing.
(4) Curing procedure

Condition	High Temperature		Room Temperature	
	Best	Fastest	Best	Fastest
Time	75℃/2h	150℃/20min	2 Week	72h
Pressure	0.1~0.2MPa	0.1~0.2MPa	0.1~0.2MPa	0.1~0.2MPa

Measuring Method

1. Direct Measuring Method

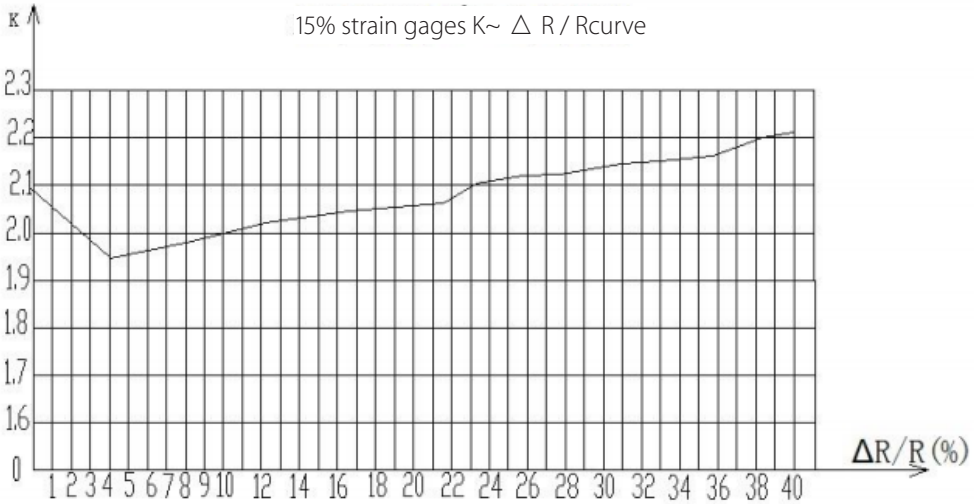
For manufacturers with testing equipment, the deformation of the strain gauge can be measured directly by material testing machines, electronic extensometers, strain machines, etc., resulting in deformation of the testing piece.

2. Measuring Resistance Method

For manufacturers that do not have direct testing equipment, they can test from the relationship between the strain coefficient K value of the strain gage and the resistance relative changes △ R / Rand the strain ε of the measured component. Users only need to measure the resistance changes in the loading component from the K~ △ R / Rcurve, to find the value of K. Then get the measured deformation fromε= (△ R / R) / K.

High Elongation Strain Gauge

K~ △ R / R Curve is shown as below



3. Strain Value Correction

The large strain test is the same as the general stress analysis test. It can be read by the strain machine, but it should be corrected when the actual strain is calculated. The specific correction method as below:

(1) Formula $\varepsilon' = \varepsilon \times K^* / K\varepsilon$

The ε in the formula is the strain machine indicated. ε' is the real strain. K* is sensitivity coefficient, which is generally 2.00. Kε is the strain gauge sensitivity coefficient indicated by the strain machine.

(2) The corresponding Kε can be found by comparing the average graph of K~ΔR/R. △ R/R corresponds to K1×ε. K1 is the normal temperature sensitivity coefficient of the strain gage. It is generally marked on the packaging shell.

Precautions

1. Check the resistance value and the strain gauge for damage of the test piece after curing. If there is no damage, the lead can be welded.
2. When welding the lead wire, use a 800-grit sandpaper to gently remove the oxide layer from the weld end of the strain gage. Note that the stress relief ring should not be too small.
3. When the test member is pulled to bending, in order to observe the deformation of the test piece, the loading should be loaded as slow and uniform as possible.
4. After the glue is used up, it should be sealed and stored in the refrigerator.
5. When pasting the large strain gauge, the adhesives must be choose a large strain gauge dedicated adhesives. Do not use 502 or B-711 and other adhesives. 502 or B-711 adhesives are brittle and cannot bear more than 5% deformation. The other adhesives may cause the gage falling off during the test, or measurement inaccuracies.
6. Adhesive H-716,A:B=2:3 is the weight ratio. When the ratio is matched, the ratio will be strictly proportioned, otherwise it will affect the firmness or curing effect.
7. When pasting the strain gauge, pay attention to the control of the environmental humidity, the ambient humidity should be controlled between 30% ~ 60%. High humidity will affect the paste effect.
8. For large components which can't be applied with the fixture to press, customized magnetic pressure tooling or sucker pressure tool for pressure can be made according to the component material.