

## Introduction:

HT is specialized in the designing and producing of all kinds of strain gauges and load cells.

We are not only supply the standard strain gauges, but also provide the customized strain gauges basic on the special application.

**These strain gauges are for stress analysis application.**

**Note:** The strain gauge is one sense organ which transforms the non-coulomb to coulomb, it has different configuration and made of different materials, which are for different use.

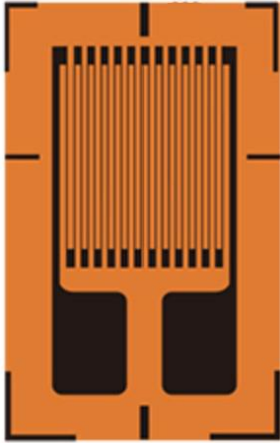
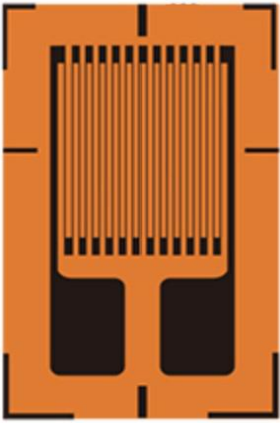
Before selecting the correct strain gauges, there should be many parameters to be considered. As the strain gauges are with many different performance. So please read the following technical information carefully before selecting the correct strain gauges basic on your application.

## The Performance and Quality Standard of Strain Gauge

specification	BE series Phenolic acetyl resin backing, constantan alloy, encapsulated gauges with self-temperature compensation good flexibility for installation used for 0.03% FS accuracy transducers and stress analysis.
nominal resistance	60,120,350,650,1000
tolerance of resistance	$<\pm 0.1\%$
gauge factor	2.00~2.20
gauge factor resistance	$<\pm 1\%$
strain limit	2.00%
fatigue life	$>10^7$
metal foil	constantan alloy
backing material	phenolic acetyl resin
cover material, or surface protection	phenolic acetyl cover
working temperature range	-30~+70°C

working performance	description	BE exactitude grade
strain gauge resistance	deviation $\pm\%$	1
	tolerance $\pm\%$	0.1
Mechanical hysteresis	room temperature $\mu\epsilon$	2
creep	room temperature one an hour $\mu\epsilon$	3
insulated resistance	room temperature $M\Omega$	50000
Transverse effect coefficient	room temperature %	$10^{-5}$
natural life	room temperature (Cyc time)	
Gauge factor with temperature change	average change $\mu\epsilon$ of working temperature $\mu\epsilon$ %100°C	2
	one time of average numerical value factor /%100°C	3
heat output	average heat output factor $\mu\epsilon$ /°C	1
	average heat output disperse	80

# The catalogue of strain gages for stress analysis application

Photo	Model	GRID DIM		BACKING DIM	
		L (mm)	W (mm)	L (mm)	W (mm)
	BE120-0.5AA-X-3cm	0.5	0.5	3	2.5
	BE120-1AA-X-3cm	1	0.5	3	2.5
	BE120-1AA-X-3cm	1	1	3	2.5
	BE120-2AA-X-3cm	2	1	4.5	2.4
	BE120-2AA-X-3cm	2	2	6	4
	BE120-3AA-X-3cm	3.0	2.0	6.6	3.2
	BE120-3AA-X-3cm	3.0	3.0	7.0	4.5
	BE120-4AA-X-3cm	4.0	2.0	9.0	4.0
	BE120-4AA-X-3cm	4.0	4.0	9.0	6.0
	BE120-5AA-X-3cm	5.0	1.0	8.5	2.8
	BE120-5AA-X-3cm	5.0	2.0	9.6	4.0
	BE120-5AA-X-3cm	5.0	3.0	9.4	5.3
	BE120-6AA-X-3cm	6.0	2.0	10.7	3.6
	BE120-6AA-X-3cm	6.0	4.0	10.5	6.3
	BE120-7AA-X-3cm	7.0	4.0	12.0	7.0
	BE120-8AA-X-3cm	8.0	3.0	13.0	5.0
	BE120-10AA-X-3cm	10.0	2.0	15.0	4.0
	BE120-10AA-X-3cm	10.0	5.0	18.0	7.0
	BE120-15AA-X-3cm	15.0	3.0	24.0	5.5
	BE120-20AA-X-3cm	20.0	3.0	26.0	5.1
BE120-30AA-X-3cm	30.0	3.0	35.0	5.0	
BE120-50AA-X-3cm	50.0	3.0	58.2	6.5	
BE120-80AA-X-3cm	80.0	3.0	90.5	7.0	
BE120-100AA-X-3cm	100.0	3.0	108.0	6.0	
	BE350-3AA( XX)	3	2	6.7	3.5
	BE350-3AA(XX)	3	3	7.5	4.5
	BE350-4AA(XX)	4	4	9	6
	BE350-5AA(XX)	5	3	9.5	4.5
	BE350-6AA(XX)	6	3	11	5
	BE350-6AA(XX)	6	4	11	6
	BE350-10AA(XX)	10	4	18	7
	BE650-4AA(XX)	4	4	9	6
	BE1000-3AA(XX)	3.2	3.2	7.6	4.5
	BE1000-6AA(XX)	6	4	11	6.2

# The catalogue of strain gages for stress analysis application

Photo	Model	GRID DIM		BACKING DIM	
		L (mm)	W (mm)	L (mm)	W (mm)
	BE120-1BB-X-3cm	1	1	7	5
	BE120-2BB-X-3cm	2	2	8	4.4
	BE120-3BB-X-3cm	3	3	9	7.5
	BE120-4BB-X-3cm	4	4	12	9
	BE350-3BB(XX)	2.9	3	8.6	6.8
	BE350-4BB(XX)	4	4	9.3	12.5
	BE350-3BB(XX)	3	3	9.2	7
	BE175-3BB(XX)	3	3	9	8
	BE350-3FB(XX)	3	3	9	8.5
	BE120-2HA	2	2	9	6
	BE120-4HA	4	3	11	9
	BE350-3HA(XX)	3	3	9.4	7
	BE650-3HA(XX)	3	3	9.4	7
	BE120-2BA-X-3cm	2	1	6.5	6.5
	BE120-3BA-X-3cm	3	2	10.5	10.5
	BE120-5BA-X-3cm	5	3	16.5	16.5
	BE120-2CA-X-3cm	2.0	1.0	6.6	6.6
	BE120-3CA-X-3cm	3.0	2.0	12	12
	BE120-5CA-X-3cm	5.0	3.0	17	17
	BE120-2CC-X-3cm	2	1	6.8	6.8
	BE120-3CC-X-3cm	3	2	10	10
	BE120-5CC-X-3cm	5	3	15	15
	BE120-2CD-X-3cm	2	1	9	9
	BE120-3CD-X-3cm	3	2	13	13
	BE120-5CD-X-3cm	5	3	18	17
	BE120-1CG-X-3cm	1.0	1.0	9.4	9.4

In the various installation methods of strain gauge, paste is common. The standard or quality of paste is one of the key factors that decide the success of strain test. So Paste must be in strict accordance with the paste technological process when operate.

## **I . Flows of paste and defend**

### **II. Introduction of paste strain gauge**

The quality of paste is laid on the quality of polishing the strain gauge bonding site, cleaning, pasting, pressing and solidifying. Brief introduction of pasting as below:

#### **1. Polishing and cleaning**

It is good for paste strain gauge by sandblast the strain gauge bonding site and best estate of surface stress, or it can use 220-400 sandpaper to polish according to the materials. Marking the 45° angle's cross stripes by the paste direction. Then wipe the bonding site in a single direction (must not reciprocated wiping) with absorbent cotton that dipping in or acetone till the absorbent cotton become white. The bonding site cannot be polluted again, like touched by hands, etc. After mark the strain gauge bonding position, use the same way to clean the surface.

#### **2. Paste strain gauge**

Paste strain gauge is the key step. First, strongly brush adhesive all over the bonding site and fundus site thin and equably with technical brush. Then pick up the strain gauge with forceps, paste it along with the axes and marked lines, cover with Polytetrafluoroethylene sheet, and roll press the strain gauge over the sheet with finger along with the axes direction, press out the protruding adhesive and air bubble, check the bonding situation, and adjust in the time if the strain gauge pasted in wrong position if the fundus broken, have air bubble, protrusion, then eliminate the strain gauge and paste another.

### 3. Solidify

The first solidify step is the key point of the solidify procedures, the adhesive will have crosslinking reaction on condition of heating and pressing. So pressure, temperature and time are the most important parameters that directly affect the adhesive. One of the most important conditions for the good load cell is rationally design pressure equipment. The factory of load cell must solidify according to the specification of adhesive, and can't stop electric during solidify. The adhesive solidify technics of H-610 in our company is: First solidify, increase pressure to 0.1~0.3Mpa, raise temperature to 135°C and keep in two hours before it return to room temperature. Last solidify, raise temperature to 165°C after decrease pressure and keep in two hours before it return to room temperature.

### 4. Paste quality inspection

After heating and curing, to inspect strain gauge paste quality seriously, items of Inspection:

- a. Resistance changes after Strain gauge paste;
- b. Insulation resistance;
- c. whether there is a piece of residuary bubbles inside the chips;
- d. Paste position accurate or not;
- e. Whether open circuit, short circuit or sensitive grid deformation.

### III. Group Bridge or Welding

If the strain gauge surface welding, before welding, waterproof abrasive paper and Contain arenaceous rubber should be used to wipe gently the glue and oxide residue in terminations surface, then clean enough, easy to weld, avoid the destruction of the terminations; The welding temperature cannot too high(normal temperature strain gauge cannot more than 250°C), welding time cannot too long, Should weld quickly, to avoid high temperature damage strain gauge's termination, reduce insulation intensity, etc. Welding lead should use wire that soft, material cannot be too hard, to avoid when long-term stress, wire damage or fall off; As far as possible allow Stress release ring between the strain gauge welding end and the terminals of the connections, to avoid when specimen or elastomer long-term stress or temperature has great change, form internal stress concentration in the connecting, cause lead snapped, then bringing bridge road or circuit broken. After welding, soldering flux should be cleaned, can't have remains, to avoid have impact on strain gauge insulation strength and resistance. After finished, deal with its insulation strength test again.

## **IV. Performance test (Mainly aimed at the sensor)**

### **1. Loading performance test**

Sensor clamped accurate, without shake phenomenon; loading point accurate, non-displaced, had better be point-to-point loading, Test instrument adopts automatic checking method, to reduce the influence of the artificial factor; circuit connection in good condition, no contact undesirable、rosin joint etc phenomenon.

### **2. Temperature performance test**

The simulation environment temperature equipment accuracy of control temperature should be high, meet sensor test requirement, no temperature gradient、transient phenomenon; Determine the time of heat according to the sensor size, must make the sensor internal temperature even and constant, to meet the requirements of temperature, avoid the sensor elastomer internal produce temperature level; humidity conditions of the test, must make the temperature and humidity of the surrounding environment to specified requirements.

### **3. Environmental requirement**

Indoor environment conditions must be up to national standards, to reduce the influence of environment on the sensor.

## **V. Preservative treatment**

The installed strain gauge should take reliable and practical measures of protection, is an effective way to guarantee the normal work, improve the strain gauge measuring precision. The basic way of Strain gauge protection, is using certain materials or medium to separate strain gauge together its attachment from severe environment. First, in the strain gauge installation and use process, carefully and cautiously operation, keep not contact directly with the hand is an effective protective measure; second, using coating layer for protection, the protection of strain gauge can be chosen commonly AZ-709 glue, to protect part of bare, required painted in uniform, then covers Ntu 703,704,D04 Silicone rubber.