



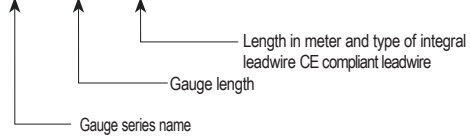
Post-yield Strain Gauges YEF series



These gauges are applicable to the measurement of large strain up to 10~15%. Also these withstand the repeated strain in elastic range (at strain level $\pm 1500 \times 10^{-6}$ strain) like ordinary strain gauges. However, these are not applicable to the measurement of repeated strain in a large range. Integral leadwires using lead-free solder are available with option -F. This strain gauge is CE marked (compliant to RoHS2 Directive) and has joined to our "GOBLET" series.

Please specify the type number as shown in the example below.

YEFLAB -2 -3LJC-F



Operating temperature range	-30~+80°C	Applicable adhesives	
Strain limit in room-temperature	10~15%	CN	-30~+80°C
		CN-Y	-30~+80°C

Gauge pattern	Type	Gauge size(mm)		Backing size(mm)		Resist- ance Ω
		Length	Width	Length	Width	
<p>● Single axis</p>	YEFLAB-2 YEFLAB-5	2 5	1.8 2	7 10.5	4 4	120 120
<p>● 0° /90° 2-axis Plane type</p>	0°/90° 2-axis Plane type YEFCAB-2 YEFCAB-5	2 5	1.8 2	9.5 13.5	9.5 13.5	120 120
<p>● 0° /45° /90° 3-axis Plane type</p>	0°/45°/90° 3-axis Plane type YEFRAB-2 YEFRAB-5	2 5	1.8 2	9.5 13.5	9.5 13.5	120 120

Minimum order quantity is 10 strain gauges.
These strain gauges are available with integral leadwires attached. (made to order)

Dedicated leadwires recommendable for YEF series strain gauge (made to order)

We supply various leadwires dedicated to strain gauges so as to meet our customers' requirements. Please refer to page 30 to 38 for the details of combination of a strain gauge and a leadwire. For CE marked GOBLET series strain gauges, only the leadwires using lead-free solder are available.

Type and designation of leadwires

Usage	Leadwire name	Operating temperature range of leadwire (°C)	Type number example
General purpose (without temperature change)	Parallel vinyl leadwire LJC-F	-20~+80	YEFLAB-2-3 LJC-F
General purpose	3-wire parallel vinyl leadwire LJCT-F	-20~+80	YEFLAB-2-3 LJCT-F



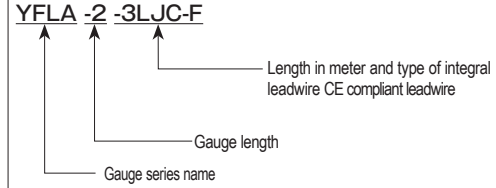
POST-YIELD (Large strain)

Post-yield Strain Gauges YF series

These gauges are applicable to the measurement of large strain up to 15 to 20%. These are not applicable to the measurement of repeated strain in elastic range as well as in large range.

Operating temperature range -20~+80°C	Applicable adhesives
Strain limit in room-temperature 15~20%	CN -20~+80°C CN-Y -20~+80°C

Please specify the type number as shown in the example below.



Gauge pattern	Type	Gauge size(mm)		Backing size(mm)		Resistance Ω
		Length	Width	Length	Width	
●Single axis						
YFLA-2-F	YFLA-2-F	2	1.8	7.5	4	120
YFLA-5-F	YFLA-5-F	5	1.9	12	4	120
YFLA-10-F	YFLA-10-F	10	2.6	16.6	4.9	120
YFLA-20-F	YFLA-20-F	20	1.8	26	3.7	120

Minimum order quantity is 10 strain gauges.
These strain gauges are available with integral leadwires attached. (made to order)



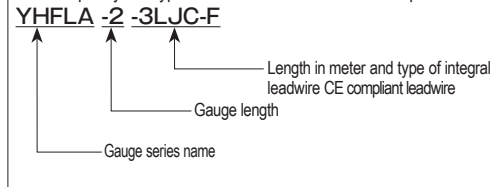
POST-YIELD (Large strain)

Post-yield Strain Gauges YHF series

These gauges are developed for the measurement of very large strain up to 30~40%. These are not applicable to the measurement of repeated strain in elastic range as well as in large range.

Operating temperature range -30~+80°C	Applicable adhesives
Strain limit in room-temperature 30~40%	CN -30~+80°C CN-Y -30~+80°C

Please specify the type number as shown in the example below.



Gauge pattern	Type	Gauge size(mm)		Backing size(mm)		Resistance Ω
		Length	Width	Length	Width	
●Single axis						
YHFLA-2	YHFLA-2	2	1.5	8	2.7	120
YHFLA-5	YHFLA-5	5	1.7	11	3	120

Minimum order quantity is 10 strain gauges.
These strain gauges are available with integral leadwires attached. (made to order)



Important point

●Strain compensation method for YHF series plastic range gauges

When a tensile test is conducted using the YHF series, the gage factor after temperature change and the strain correction factor described in "TML STRAIN GAUGE TEST DATA" are required as correction values for the measured values in the data arrangement.

In this case, the test temperature range is 0 to +40°C.

For the calculation of true strain, refer to the instruction manual supplied with the YHF plastic range gauge.



Post-yield Strain Gauges

Dedicated leadwire recommended for YEF/YF/YHF series strain gauges

We supply various leadwires dedicated to strain gauges so as to meet our customers' requirements. Please refer to page 30 to 38 for the details of combination of a strain gauge and a leadwire.

Type and designation of leadwires

Usage	Leadwire name	Operating temperature range of leadwire (°C)	Type number example
General purpose (without temperature change)	Paralleled vinyl LJC-F	-20 ~ +80	YEFLAB-2-3LJC-F YFLA-2-3LJC-F YHFLA-2-3LJC-F
General use	3-wire paralleled vinyl LJCT-F	-20 ~ +80	YEFLAB-2-3LJCT-F YFLA-2-3LJCT-F YHFLA-2-3LJCT-F



Important point

Performance of YEF/YF/YHF

Series	Strain measurement	Fatigue limit at room temperature*1	Change of apparent strain due to cyclic loading of large strains*2	Self-temperature compensation	Applications
YEF	10~15%	5×10^5 cycles	2000×10^{-6} strain/10 cycles	No	<ul style="list-style-type: none"> Measurement of 10 to 15% elongation Measurement of repeated strain in elastic range.
YF	15~20%	1×10^2 cycles	2000×10^{-6} strain/10 cycles	No	<ul style="list-style-type: none"> Measurement of 15 to 20% elongation
YHF	30~40%	2×10^4 cycles	N/A	No	<ul style="list-style-type: none"> Measurement of 30 to 40% elongation
F	5%	1×10^6 cycles	400×10^{-6} strain/10 cycles	Yes	<ul style="list-style-type: none"> Measurement of repeated strain in elastic range. Measurement of 5% elongation

*1: The number of repetitions at which the indicated strain value changes by 100×10^{-6} strain or more by applying repeated strain of approx. $\pm 1,500 \times 10^{-6}$ strain at 15Hz

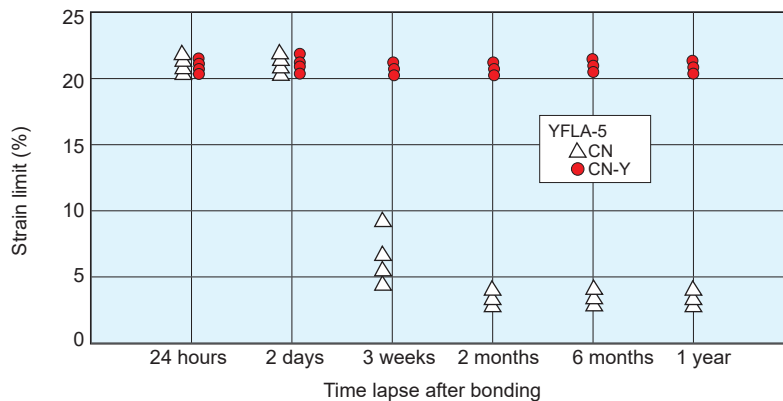
*2: Change of indicated strain by applying a repeated strain of approx. $\pm 10,000 \times 10^{-6}$ strain at a speed of 4 minutes per cycle.

Adhesive for YEF/YF/YHF series gauges

These strain gauges should be bonded with CN or CN-Y adhesive. If measurement is made a few days or longer after the strain gauge bonding, the CN-Y should be used. Measurement of large strain is possible even after one year of bonding the strain gauge with the CN-Y adhesive, provided that the specimens are stored at room temperature without any unfavorable conditions (moisture, direct sunlight, etc.).

CN adhesive variation with time

Though CN adhesive is normally used for large elongation strain measurement, the strain limit gradually decreases with the number of days following strain gauge installation. This variation with time occurs as a consequence of exposure to direct sunlight (UV), temperature and humidity, as well as the number of days after installation. The following shows an example of the results of testing performed by TML for the effects of adhesive variation with time. While these results show marked differences due to the exposure conditions of the test specimens (temperature and humidity), they also show that the strain limits for strain gauges decrease as time passes after installation. While this does not pose a problem in ordinary strain measurement, TML recommends that the measurement ends in 1 or 2 days after installation in the case of large elongation strain measurement. If the strain gauge is to be left for a long period after being installed, use the CN-Y adhesive.



Countermeasure in case there is a span between gauge installation and start of measurement

Store the test specimen with the attached strain gauge in a cool, dark and dry location.
Use the CN-Y adhesive. (Refer to the instructions provided).

Repeatability of Post-Yield strain gauges

Post-Yield strain gauges can be used once to measure large elongation strain, but cannot be used for measurement of repeated large elongation strain. When repeated testing is performed in a strain range exceeding 5000×10^{-6} , the strain gauge experiences zero drift. Note that the amount of drift varies depending on factors such as the type of strain gauges and the level and frequency of strain.