POST-YIELD (Large strain) MEASUREMENT STRAIN GAUGES series YEF/YF/YHF

Self-temperature-compensation : Not available

metal

LARGE STRAIN MEASUREMENT

series YEF

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 ±1500×10^{-6} strain) like ordinary strain gauges. However, these are not applicable to the measurement of repeated strain in a large range.

CE

Operating temperature range

–20°C +80°C

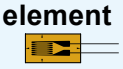
Applicable adhesives	
CN	–20 ~ +80ºC
CN-Y	–20 ~ +80ºC
Strain limit in room-temperature	10 ~ 15%

Example of type number designation

YEFLA-2 -3LJC-F

- -3LJC-F: Length in meter and type of integration leadwire CE compliant
- YEFLA-2: Basic strain gauge type, gauge length

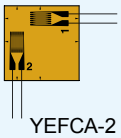
Single element



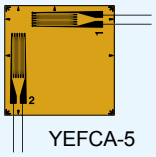
YEFLA-2

YEFLA-5

0°/90° 2-element plane Rosette

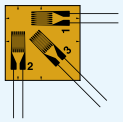


YEFCA-2

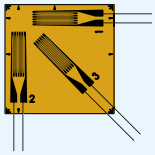


YEFCA-5

0°/45°/90° 3-element plane Rosette



YEFRA-2



YEFRA-5

Each package contains 10 gauges.

	Gauge pattern	Basic type	Gauge size L	Gauge size W	Backing L	Backing W	Resistance Ω
Single element		YEFLA-2	2	1.8	7.5	4	120
		YEFLA-5	5	1.9	12	4	120
0°/90° 2-element Rosette		YEFCA-2	2	1.8	10	10	120
		YEFCA-5	5	2	14.5	14.5	120
0°/45°/90° 3-element Rosette		YEFRA-2	2	1.8	10	10	120
		YEFRA-5	5	2	14.5	14.5	120

series YF

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.

CE

Operating temperature range

–20°C +80°C

Applicable adhesives	
CN	–20 ~ +80ºC
CN-Y	–20 ~ +80ºC
Strain limit in room-temperature	15 ~ 20%

Example of type number designation

YFLA-2 -3LJC-F

- -3LJC-F: CE compliant leadwire Length in meter and type of integration leadwire
- YFLA-2: Basic strain gauge type, gauge length

Single element

YFLA-2

YFLA-5

YFLA-10

YFLA-20

Each package contains 10 gauges.

	Gauge pattern	Basic type	Gauge size L	Gauge size W	Backing L	Backing W	Resistance Ω
Single element		YFLA-2	2	1.8	7.5	4	120
		YFLA-5	5	1.9	12	4	120
		YFLA-10	10	2.6	16.6	4.9	120
		YFLA-20	20	1.8	26	3.7	120

POST-YIELD (Large strain) MEASUREMENT STRAIN GAUGES series YEF/YF/YHF

LARGE STRAIN MEASUREMENT

Gauge pattern	Basic type	Gauge size L	Gauge size W	Backing L	Backing W	Resistance Ω

series YHF

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.

CE

Operating temperature range
–30°C +80°C

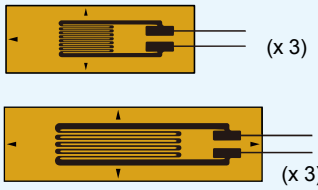
Applicable adhesives	CN	–30 ~ +80ºC
	CN-Y	–30 ~ +80ºC
Strain limit in room-temperature		30 ~ 40%

Example of type number designation
YHFLA-2 -3LJC-F
- YHFLA-2: Basic strain gauge type, gauge length
- -3LJC-F: Length in meter and type of integration leadwire, CE compliant

Single element

YHFLA-2

YHFLA-5



Each package contains 10 gauges.

YHFLA-2	2	1.5	8	2.7	120
YHFLA-5	5	1.7	11	3	120

Recommendable integral leadwire for YEF/YF/YHF series

Application	CE compliant Leadwires	Operating temperature (°C)	Leadwire code exampled
General use (temperature unchanged during measurement)	Paralleled vinyl LJC-F	-20~ +80	YEFLA-2-3LJC-F YFLA-2-3LJC-F
		-20~ +80	YHFLA-2-3LJC-F
General use	3-wire paralleled vinyl LJCT-F	-20~ +80	YEFLA-2-3LJCT-F YFLA-2-3LJCT-F
		-20~ +80	YHFLA-2-3LJCT-F

Point

Performance of YEF/YF/YHF

Series	Strain measurement	Fatigue limit at room temperature*1	Self-temperature compensation	Change of apparent strain due to cyclic loading of large strains*2	Applications
YEF	10~15%	5 x 10^5 cycles	Not available	2000 x 10^{-6} strain/10 cycles	Measurement of repeated strain in elastic range.
YF	15~20%	1 x 10^2 cycles	Not available	2000 x 10^{-6} strain/10 cycles	
YHF	30~40%	2 x 10^4 cycles	Not available	Not available	
F	5%	1 x 10^6 cycles	Effective	400 x 10^{-6} strain/10 cycles	Measurement of repeated strain in elastic range.

*1 : The number of repetitions at which the indicated strain value changes by 100x10^{-6} strain or more by applying repeated strain of approx. ±1,500x10^{-6} strain at 15Hz

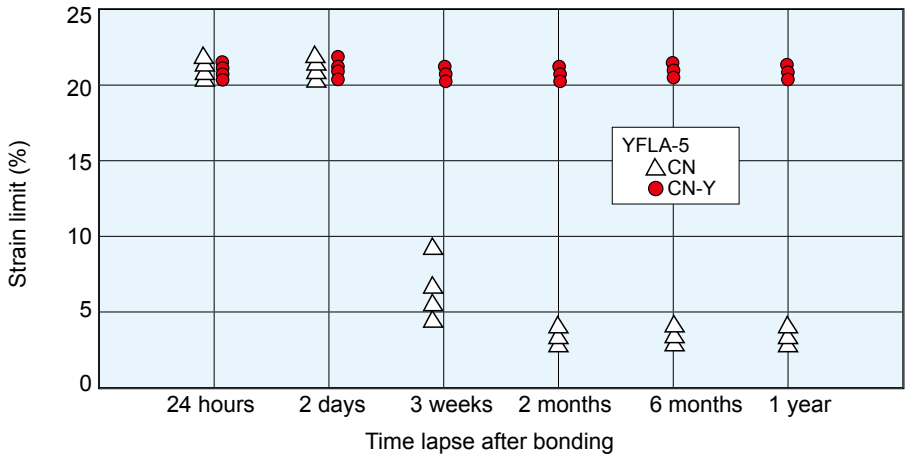
*2 : Change of indicated strain by applying a repeated strain of approx. ±10,000x10^{-6} strain at a speed of 4 minutes per cycle.

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 since 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 5000x 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 frequncy of strain.