Group Four Transducers Inc

The Group Four Technical Vernacular

The following presents the Group Four Technical Vernacular in the interest of encouraging everyone in the Group family to use the same terminology when communicating with others on technical matters. This will promote a better understanding of what is being communicated.

Commonly used technical terms and abbreviations are presented in what follows in alphabetical order, occasionally including a brief explanation or comment.

Terms like "mean", "standard deviation", "max-min", etc. are omitted because they are universally understood.

The word VERNACULAR ("expressed or written in the native language of a place") is purposely used to emphasize that this is Group Four's "native language". This document is not intended to develop a set of "Terminology and Definitions" of which many already exist..

The following should be considered a "living document" with terms being added which may have been overlooked in the original preparation and subsequent revisions.

The Technical Vernacular:

APPARENT STRAIN

The net effect of the differential expansion with temperature between the strain gage foil and the alloy steel, stainless steel or aluminum sensing element to which the strain gage is bonded, the temperature effect on the strain gage resistance and the temperature effect on the strain gage's gage factor.

COMBINED ERROR

The maximum deviation of the upscale and downscale loading curves from the straight line connecting the zero load and rated load end points.

CREEP AT LOAD, XX MINUTES

The creep at load over the specified (XX) time period.

CREEP RECOVERY, XX MINUTES

The creep over the period 10 seconds after load removal to the expiration of the specified (XX) timer period. If the readings after 10 seconds decrease with time the sign of the creep is positive and vice versa.

EXERCISE

The process of loading a load cell to 150 % (usually) of rated capacity several times before the calibration operation is performed. This term should be distinguished from "Prestress".

FULLY ACTIVE STRAIN GAGE BRIDGE

A strain gage bridge wherein each of the four strain gages are subjected to roughly the same absolute strain value.

FULL SCALE OUTPUT, FSO

The Full Scale Output of the load cell in mV/V or mV/V/ohm, determined with rated load applied.

HYSTERESIS

The maximum difference between the upscale and down scale readings when loading a load cell or scale from zero load to rated load and back to zero load, expressed in per cent of full scale output.

LOAD INTRODUCTION

The type of load introduction used in applying loads to load cells under test: (1) male and female cones, (2) spherical load button and cup or integral recess, (3) wire rope and ball fitting into loading hole, (4) wire rope and nut on threaded fitting. Loading methods are shown in decreasing order of preference.

MASS

Mass should always be referred to in units of grams (g), kilograms (kg) or "pounds, mass".

NONLINEARITY

The maximum deviation of the up scale loading curve or readings from the straight line connecting the zero load and rated load end points, usually occurring at mid load, expressed in per cent of full scale output.

OFF CENTER LOAD ERROR, OCLE

For OIML and some NTEP scales, the difference in scale output with one third of the scale's rated load applied at the center of the scale deck and the same load applied at the center of the scale quadrants. This error is expressed as "per cent of reading" or as "d".

For some NTEP scales, the difference in scale output with one half of the scale's rated load applied at the center of the scale deck and the same load applied at half

way between the center of the scale deck and any deck edge. This error is expressed as "per cent of reading" or as "d".

For load cells, the difference in load cell output with an arbitrary load applied at the center of the load cell loading surface and the same load applied at a certain distance from the central loading position, fore and aft and side to side. This error is expressed as "per cent of reading per one eighth inch" or "per cent of reading per three mm".

OFFSET LOAD ERROR

The difference between the rocker column load cell output when it is loaded in the vertical position and when it is loaded when oriented at a small angle with respect to the vertical orientation.

PARTIALLY ACTIVE STRAIN GAGE BRIDGE

A strain gage bridge wherein two of the four strain gages are subjected to the primary strains (e.g. compression strains in a rocker column load cell).and the other two strain gages are subjected to the Poisson strains.

POUNDS, FORCE

This term is applied to masses which have been adjusted to produce a gravitational force in "Pounds, Force" at the "local" acceleration of gravity.

The term is also applied to secondary standard calibrations which are performed in" Pounds, Force".

POUNDS, MASS

A mass expressed in pounds.

PRESTRESS

The process of loading a load cell to loads well beyond any load it will experience in field applications, usually close to the yield point of the sensing element material. This term should be distinguished from "Exercise".

RATED LOAD

The capacity of the load cell in kg, Newtons or pounds.

RATED OUTPUT

The output of the load cell in mV/V or mV/V/ohm with rated load applied.

REGISTRATION

In scales, the match between the load introduction features and the holes in the weighing plate. Large mismatches cause scale performance problems.

REPEATABILITY

The difference between the highest and lowest reading at a particular load value taken during a number of loading runs with the same load applied in exactly the same manner and location, the reading taken after the same elapsed time after load application under constant temperature conditions. This error should be expressed

as "per cent of reading". The commonly used "percent of rated output" is wrong and should never be used.

ROOM RETURN

The zero unbalance existing upon returning to room temperature (from the elevated temperature) during a TC Zero Compensation run. It is essential that the original and room return zero readings do not differ by more that 20 counts for a 2 mV/V load cell.

ROOM TO ROOM RETURN

The difference between the original and room return readings taken during a TCZ compensation run. It is essential that the original and room return zero readings do not differ by more that 20 counts for a 2 mV/V load cell.

SPAN

The difference between the mV/V outputs at zero applied load and rated applied load.

TCR

Temperature Coefficient of Resistance: Usually applied to the metal film resistors used in Group Four load cells and expressed as ppm/degrees C.

TC SPAN

Temperature Coefficient of Span: Used to express the TCS as a coefficient in "percent per 50 C (90 F)" or per cent per 100 F (55.0 C).

TC SPAN COMPENSATION

The process by which a prescribed TCS values is attained within certain limits.

TC ZERO

Temperature Coefficient of Zero: Used to express the TCZ as a coefficient in "per cent per 50 C (90 F)" or per cent per 100 F 55.0 C).

TC ZERO COMPENSATION

The process by which a prescribed TCZ values are attained within certain limits..

ZERO BALANCE OR ZERO UNBALANCE

The zero balance or zero unbalance of the load cell with no load applied. Also, the zero balance or unbalance of a scale with a weighing platter or deck installed but no load applied to the platter or deck.

ZERO RETURN OR NON RETURN TO ZERO

The degree (usually in counts) to which the load cell does not return to zero after load removal during a loading test.

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