GLOSSARY

A

accumulator A circuit or register device in a computer that receives, totals and stores numbers.

accuracy Precision in the measurement of quantities and in the statement of physical characteristics. Accuracy is expressed in terms of error as a percentage of the specified value (e.g., 10 volts ± 1%), as a percentage of a range (e.g., 2% of full scale), or as parts (e.g., 100 parts per million).

analog to digital (A/D) Conversion of continuously varying (analog) voltage levels to discrete binary-numbered (digital) values (e.g., a load cell output can be fed through an A/D convertor to produce a continuous stream of digitized information and sent to a digital indicator).

auto ignition temperature (AIT) The minimum temperature required for a substance to initiate or cause self-sustained combustion independently of the heating or heated equipment. Also referred to as ignition temperature.

ambient conditions The conditions (humidity, pressure, temperature, etc.) of the medium surrounding the load cell.

ampere Unit of electrical current intensity. One ampere of current is 6.24 x 1018 electrons passing a point in one second; often shortened to amp.

analog Anything that corresponds, point for point or value for value, to an otherwise unrelated quantity; data represented by continuous values rather than in discrete steps.

angular load, concentric (Common Center) A load applied concentric with the primary axis at the point of application, and at some angle with respect to the primary axis.

angular load, eccentric (Off Center) A load applied eccentric with the primary axis at the point of application and at some angle with respect to the primary axis.

aperture The total range (in percentage) of full scale capacity over which a digital weight indicator "Automatic Zero Maintenance" (AZM) and "Push-button Auto Zero" (PAZ) functions will operate; Handbook 44.

approved Acceptable to the authority having jurisdiction over the area for in which a system or equipment will be used.

ASCII (American standard code for information interchange) Pronounced "askee". A seven-bit plus parity code established by the American National Standards Institute (ANSI) to achieve compatibility between data services.

associated apparatus Apparatus in which the circuits are not necessarily intrinsically safe themselves, but may affect the energy in the intrinsically safe circuits and are relied upon to maintain intrinsic safety.

asynchronous transmission Data transmission in which time intervals between transmitted characters may be of unequal length. Transmission is controlled by start bits at the beginning of each character and stop bits at the end of each character.

authority having jurisdiction Where public safety is primary, the "Authority Having Jurisdiction" may be a federal, state, local or other regional institution, department or individual. Some examples are a fire chief, fire marshal, chief of a fire protection bureau, labor.

automatic zero maintenance (AZM) An electronic means of providing "true zero" at all times on a digital scale. AZM compensates for such conditions as indicator or load cell drift or debris on a scale platform by electronically tracking out minor variations around zero.

auto shut off The unit turns off after a pre-set time if no active weighing is occurring.

average piece weight (APW) On a counting scale, the amount of weight divided by the number of samples which comprised that weight. APW is used by the counting scale to count pieces during normal operation.

axial load A load applied along a line concentric with the primary axis.

B

baud A unit of communications processing speed in digital data communications systems. The speed in baud is the number of discrete conditions of signal events per second. If each signal event represents only one bit condition, baud rate equals bits per second (BPS).

beam The indicating device of a lever scale.

bezel A holder designed to receive and position the edges of a lens, meter, window or display.

bi-directional Data flow in either direction on a wire between pieces of equipment. Each equipment item can both receive and transmit data.

binary coded decimal (BCD) A data coding system in which four binary bits represent the decimal numbers 0 through 9. The BCD equivalent of the decimal number 187 is 0001 1000 0111.

bit The smallest unit of information in a binary system, consisting of a "0" or a "1" (formed from Binary Digit).

blackout A sudden loss of AC line power usually as a result of an overload or other power failure.

board of governors National Conference on Weights and Measures body of officials that sets NTEP policy and has final say in disputes.

bridge circuit A network of four "leg" components connected so that the input signal may be applied across two branches in parallel and the output signal taken between two points, one on each side of the parallel branches. At some ratio of the resultant four arms of the circuit, the output points are at the same potential, and the output voltage is zero. The bridge then is said to be balanced or set to null.

brownout A deliberate lowering of line voltage by a power company to reduce load demands.

C

calibration The comparison of load cell outputs against standard test loads.

calibration curve A record (graph) of the comparison of load cell outputs against standard test loads.

calibration error The difference of what the instrument reads on the display and the items true mass.

cantilever beam A beam-type load cell that has a machined-out center. The load sensing elements (strain gauges) are mounted on the inside perimeter of this machined center.

capacitance The ability of a component or material to store an electrostatic charge; measured in farads. Because the farad is a very large quantity, capacitance in electronic applications is usually expressed in millionths of a farad (microfarads) or millionths of a millionth of a farad (pico farads).

capacity The amount of weight the scale is capable of weighing accurately.

CC (NTEP Certificate of Conformance) Certification that a device meets all applicable requirements of Handbook 44.

central processing unit (CPU) The computer module or chip that controls fetching, decoding and executing instructions; controls processing operations for the device.

challan A receipt for payment or delivery.

check rods Rods installed to prevent a vessel or other weighing system component from gross tipping or extended travel. They do not interfere with normal travel or expansion.

checkweigher A scale used to verify predetermined weight within prescribed limits.

class III Classes of scales used in commercial weighing not otherwise specified; grain test scales, retail precious metals and semiprecious gem weighing, animal scales, postal scales, and scales used to determine laundry charges.

class IIIL Vehicle, axle-load, livestock, railway track scales, crane and hopper (other than grain hopper) scales.

complementary metal oxide semiconductor (CMOS) Chip technology characterized by a low power requirement and high noise immunity. CMOS chips are susceptible to damage by electrostatic discharge (ESD).

combined error (non-linearity and hysteresis) The maximum deviation from the straight line drawn between the original no-load and rated load outputs expressed as a percentage of the rated output and measured on both increasing and decreasing loads.

compensation The utilization of supplementary devices, materials or processes to minimize known sources of error.

compression A force applied to a strain gauge that causes the gauge wires to compress and their cross-sectional area to increase, thus decreasing the gauge resistance.

concentrated load capacity (CLC) Maximum load designated by the manufacturer that can be placed anywhere on the platform of a vehicle, axle-load or livestock scale using the prescribed test pattern (an area at least 4 feet long and as wide as the scale platform).

conformally coated Refers to load cells that have a protective coating applied over the strain gauges, terminal strip, etc., within the gauged cavity. The cavity opening may additionally be covered with side plates to protect against physical damage. These cells are suitable for normal indoor applications; they should not be used in wet or washdown applications.

continuous mode Transmission of serial output data in which the data is transmitted automatically following each indicator display update; usually used to interface indicators to computers, score boards and other remote devices requiring constant data updating.

control drawing A drawing or document provided by the manufacturer of the intrinsically safe or associated apparatus that details the allowed interconnections between the intrinsically safe and associated apparatus.

cornerload The ability of an instrument to deliver the same weight reading for a given object on the corners of the weighing pan.

cornerload error Variations in the weight of an object that is moved to corner positions on the weighing pan.

count The smallest increment of weight displayed.

creep The change in load cell output occurring with time, while under load, and with all environmental conditions and other variables remaining constant; usually measured with Rated Load applied and expressed as a percent of Rated Output over a specific period of time.

creep recovery The change in no-load output occurring with time, after removal of a load which has been applied for a specific period of time; usually measured over a specified time period immediately following removal of rated load and expressed as a percent of rated output.

current Flow of electrons past a point in a specified period of time; measured in amperes.

current loop A current-based method of serial communications between digital devices; a logic high is represented by current flowing in the loop; a logic "low" is represented by a lack of current flowing in the loop.

D

d (division) Value of the smallest increment indicated (displayed) by a scale.

dash pot A dampening device used to reduce scale oscillations.

dead load The fixed force of the weigh bridge, platform, and other load-supporting structures of the scale, the value of which is to be permanently balanced or cancelled out in the weight or measuring system.

decimal point Determines the location of the decimal point or number of dummy zeros for the graduation size. Example: 8888.88 would have two places to the right of the decimal point, 888880 would have one dummy zero.

deflection The change in length along the Primary Axis of the load cell between no-load and Rated Load conditions.

demand mode Transmission of serial output data which requires a manual "Print" command to initiate the output data. Usually used to interface indicators to printers.

digit The smallest increment of weight that the indicator resolves.

digital System of signal representation employing discrete rather than continuously variable (analog) values.

digital averaging The ability of a digital indicator to smooth bouncy or erratic readings by taking several readings and averaging them together before sending the signal to the display. Increasing the digital averaging slows the indicators update rate.

digital filtering Is used to stabilize the readout of the indicator. The more digital filtering applied, the more accurate display reading, but a longer settling time is required.

display divisions Determines if the count by will be 1, 2, or 5.

divisions Determines the amount of increments a scale offers.

dormant scale A built-in scale having a self-contained under structure.

dot matrix A method of printing in which a rectangular array (matrix) of spaces are filled in to form alphanumeric and punctuation characters.

dribble In filling operations, the weight value over which material is slowly handled to provide a more accurate cutoff.

drift A continuously upward or downward change in the number displayed on the digital readout. This could be due to temperature, static electricity or RFI (radio frequency interference).

dropout A temporary loss of electrical power normally caused by utility and maintenance switching functions where break-before-make switching strategies are used.

dual inline package (DIP) An integrated circuit contained within a standard housing characterized by its low profile, rectangular body, and symmetrical placement of leads along two opposing sides the device.

E

e (verification scale division) Value of a verification scale division specified by the manufacturer; sets value for tolerances and accuracy class.

e_{min} (minimum verification scale divisions) The minimum scale division or value for which a device complies with applicable requirements, e.g., bench or counter scale.

eccentric load Any load applied parallel to, but not concentric with, the Primary Axis.

electrical noise Extraneous undesirable currents or voltages that interfere with desirable electrical quantities. Some causes are distant lightning, radio transmitters, welding equipment, electrical switching equipment, poor brush contact on motors, and other electronic devices utilizing switching power supplies.

electrically erasable programmable read only memory (EEPROM) A data storage component whose data can be repeatedly read out; the stored data can be erased by an electrical signal and new data then can be programmed into the component.

electromagnetic interference (EMI) Interference caused by electrical fields due to capacitive coupling, or magnetic fields due to mutual inductance of electromagnetic fields (radio waves).

electron A negatively charged subatomic particle that orbits the nucleus of an atom. Electrical current is the flow of electrons.

electrostatic charge An electric charge on the surface of an insulated object.

electrostatic discharge (ESD) A rapid discharge of an electrostatic potential that can cause damage to integrated circuits.

environmentally protected Refers to load cells that have a strain gauge cavity filled with a potting compound. The cavity opening is also generally protected with loose-fitting side plates or molded plastic to protect against physical damage. These cells are protected from normal environmental factors in indoor or outdoor applications. They should not be submersed or washed down.

erasable programmable read only memory (EPROM) A data storage component whose data can be repeatedly read out; the stored data can be erased by applying ultraviolet light, and new data then can be programmed into the component.

error The algebraic difference between the indicated and true value of the load being measured.

excitation The voltage or current applied to the input terminals of the load cell.

excitation trim Method of matching load cell outputs in a multicell system by adjusting the excitation voltage to each individual load cell. Adjustment is made by changing the setting of a variable resistor in series with the excitation input.

explosion proof enclosure An enclosure that is capable of withstanding an explosion of a specified gas or vapor which may occur within it and of preventing the ignition of the gas surrounding the enclosure. The enclosure also must operate at such an external temperature so that it is incapable of igniting its surrounding atmosphere.

F

factory mutual (fm) system approved All products displaying this symbol have been approved for use in hazardous (classified) locations when following the proper installation procedures and drawings, and utilizing intrinsic safety barriers.

ferrite core A passive electric component used to suppress high frequency noise in electronic circuits. Also called ferrite blocks, ferrite beads, ferrite rings, ferrite EMI filters, or a ferrite choke.

filtering cutout sensitivity Specifies the number of consecutive readings that must fall outside the filter threshold setting before filtering is suspended. If set to none digital filtering is always enabled.

filtering threshold Specifies the filter threshold in display divisions. When a specified number of consecutive readings fall outside the threshold filtering is suspended. This helps settling times when high filtering rates are used.

flexures Thin steel or plastic bands or plates that replace the pivots and bearings of a conventional scale, allowing less movement and reducing friction.

fulcrum A pivot point for a lever.

full duplex Simultaneous, two-way, independent data transmission in both directions.

G

gated power supply A power supply that allows conduction only when signal magnitude is within specified limits.

grads Specifies the number of full scale graduations. Capacity = Grads X Count By.

graduation A mark on an instrument or vessel indicating degrees or quantity.

H

half duplex Data transmission in both directions, but not simultaneously. See “full duplex” on page 5.

handbook 44 (H-44) A comprehensive set of requirements for weighing and measuring devices that are used in commerce and law enforcement activities; not a federal law, but developed and updated annually by the National Conference on Weights and Measures. Its complete title is "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices".

handshaking Exchange of predetermined signals between two devices for purpose of control.

hazardous (classified) location A location where fire or explosion hazards may exist due to the presence of flammable gases or vapors, flammable liquids, combustible dust or easily-ignitable fibers or flyings.

hermetically sealed Refers to load cells that have a metallic protective cover welded or soldered in place to protect the strain gauge cavity. Some cells of this type have additional protection at the cable entry such as a glass-to-metal seal. These load cells provide the best possible protection in harsh chemical or washdown environments.

high pass filter A filter passing frequency components above a designated frequency and rejecting components below that frequency.

hysteresis The maximum difference between load cell output readings for the same applied load. One reading is obtained by increasing the load from zero and the other reading is obtained by decreasing the load from rated load. Measurements should be taken as rapidly as possible to minimize creep.

hysteresis error Obtaining different readings for the same object.

I

I/O (input/output) The circuits or devices that allow a digital unit to send (output) data and receive (input) data.

influence factors Environmental elements that may alter or interrupt an electronic or mechanical indication (e.g., temperature, humidity, radio frequency interference, barometric pressure, electric power).

instability The displayed number continues to vary randomly instead of progressively. See “drift” on page 4.

insulation resistance The DC resistance measured between the load cell circuit and the load cell structure; normally measured at fifty volts DC and under standard test conditions.

interface A device or circuit that allows two units to communicate. Some of the standard interfaces used in the scale industry are 20 mA current loop, BCD, RS-232, RS-422 and RS-485.

internal resolution The smallest increment of the A/D converter.

international protection (ip) rating A rating system that defines a products or enclosures protection against the ingress of solid objects and liquids.

intrinsic safety barrier A network designed to limit the energy (voltage and current) available to the protected circuit in the hazardous (classified) location under specified fault conditions.

intrinsic safety ground bus A grounding system that has a dedicated conductor, separate from the power system, so ground currents will not normally flow, and which is reliably connected to a ground electrode in accordance with Article 200 of the NEC.

intrinsically safe circuit A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions in its most easily ignitable concentration.

intrinsically safe system An assembly of interconnected intrinsically safe apparatus, associated apparatus and interconnecting cables in which the parts of the system, which may be used in hazardous (classified) locations, are intrinsically safe circuits; may include more than one intrinsically safe circuit.

IP ratings (ingress protection rating) Consists of the letters IP followed by two digits and an optional letter. As defined in international standard IEC 60529, it classifies the degrees of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact, and water in electrical enclosures.

J

j-box (junction box) A box or enclosure used to join different runs of cable or wiring; it contains space and terminals for connecting and branching the enclosed conductors and adjustments to provide load cell trimming.

L

latch To maintain a closed (energized) state in a pair of relay contacts after initial energization from a single electrical pulse.

latching relay A relay which locks into the mode for which it is energized (On or Off); requires a start-stop button; once activated it stays activated until the setpoint is reached or the stop button is pushed.

lever A tool that transfers force equally with reduction or multiplication.

light emitting diode (LED) A semiconductor light source that emits visible light or invisible infrared radiation.

linearity Refers to the quality of delivering identical sensitivity throughout the weighing capacity of a scale or balance.

linearity calibration This method minimizes deviation between actual and displayed weights within the scale weighing range. It utilizes three calibration points, one at zero, center span and full span.

linearity test This test measures the ability of an instrument to have consistent sensitivity throughout the weighing range.

liquid crystal display (LCD) A thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly.

live load The load applied to a scale base that is actually being measured by the weighing system.

load The weight or force applied to the load cell.

load cell A device that produces an output signal proportional to the applied weight or force. Types of load cells include beam, S-beam, platform, compression and tension.

low pass filter A filter that passes frequency components below a designated frequency and rejecting components above that frequency.

M

mass The quantity of matter in a body.

megohmmeter A special ohmmeter for measuring resistances in the megohm (106 ohms) range; also called a megger.

metal film resistor A fixed or variable resistor in which the resistance element is a thin or thick film of a metal alloy deposited on a substrate made of plastic or ceramic material.

metal oxide varistor (MOV) A voltage-dependent resistor whose resistance predictably changes with voltage applied; used in transient protectors as a shunt protection device.

micro A prefix meaning millionths (10-6); symbol is "m".

microvolts per graduation The number of microvolts of live load signal that are needed to change the display.

minimum dead load - load cells Minimum dead load is specified for NTEP load cells. In a given application, the dead load applied to each cell must be greater than or equal to the minimum dead load specified by the load cell manufacturer.

minimum weight Usually used with counting scales. Refers to the piece weight required in counting mode.

motion band Sets the level in display divisions that motion is detected. If motion is not detected for 1 second the standstill annunciator lights. Certain functions like Tare, Zero, and Print are prohibited while the scale is in motion.

motion detection A circuit used in an indicator to sense when the displayed weight data is changing at a greater rate than preset limits (or is unstable) and to inhibit certain functions during this time. Functions inhibited may be data output, entry of a push-button auto zero, entry of an auto tare value or activation of zero tracking.

N

n_{max} (maximum number of scale divisions) The maximum number of scale divisions for which a product has been approved. The nmax must be greater than or equal to the number of divisions for which the scale will be configured.

National Conference on Weights and Measures (NCWM) An association of state and local officials. Federal and industry representatives that adopt uniform (model) laws and regulations (e.g., NIST Handbook 44).

National Institute for Standards and Technology (NIST) An agency of the federal government to which all precision measurements are traceable. Formerly the National Bureau of Standards (NBS).

National Type Evaluation Program (NTEP) A program of cooperation between the National Conference On Weights & Measures, NIST, state weights and measures officials and the private sector for determining conformance of weighing equipment with the provisions of H-44.

negative logic Binary logic in which a high negative state represents a "1" condition and a low negative state represents a "0" state.

negative value After an item is removed from the scale, any tared value will be displayed as a negative number. See “tare” on page 10.

NEMA National Electrical Manufacturers Association.

nominal load capacity The designed normal maximum load cell capacity. Output load cell sensitivity is based on this capacity unless otherwise specified.

non-latching relays Relays that will stay at the logic level based on the current setpoint data. These relays will "toggle" from energized to de-energized states depending on the signal sent to them.

non-linearity The maximum deviation of the calibration curve from a straight line drawn between the no-load and rated load outputs, expressed as a percentage of the rated output and measured on increasing load only.

nonvolatile memory A computer storage medium whose contents remain unaltered when the power is switched off; contents are available when power is switched on again.

O

Office of Weights and Measures (OWM) Office of Weights and Measures at NIST.

ohm The unit of electrical resistance. The resistance through which a current of one ampere will flow when a voltage of one volt is applied.

ohm's law The relationship between current, voltage and resistance. Current varies directly with voltage, and inversely with resistance (I = E/R, where I = Current, E = Voltage and R = Resistance).

OIML (International Organization of Legal Metrology) Treaty organization that recommends technical requirements for weighing and measuring equipment prior to the sale or distribution of a model or type within the state, nation, etc.

original equipment manufacturer (OEM) A manufacturer who produces equipment for use or inclusion by another manufacturer in its product.

output The signal (voltage, current, pressure, etc.) produced by a load cell. Where the output is directly proportional to excitation, the signal must be expressed in terms such as Volts per Volt, Millivolts per Volt, or Volts per Ampere, etc., of excitation.

output, rated The algebraic difference between the Outputs at no-load and at Rated Load.

overload rating, safe The maximum load, in percent of Rated Capacity, which can be applied without producing a permanent shift in performance characteristics beyond those specified.

overload rating, ultimate The maximum load, in percent of Rated Capacity, which can be applied without producing a structural failure.

P

parallel circuit A circuit in which the components are connected across each other. The voltage applied to each component is the same.

parallel communications Type of data communication in which all elements in an information item (bits in a word) are acted upon simultaneously, rather than one at a time as in serial communications.

parity A method of error checking where an extra bit is sent to establish an even or odd number of ones in the data of a character.

poise A moveable weight that counterbalances the load on a scale.

port A point at which signals may be introduced to or extracted from a circuit, device, or system.

potentiometer A variable resistor employed as a voltage divider.

potted cell A load cell that is environmentally sealed by filling the strain gauge cavity with a material that protects the gauges from environmental hazards such as moisture. The potting material must not interfere with normal strain gauge movement, and allow the gauges to return to their normal zero output position.

preact Weight value which is set to allow for material in suspension during a filling operation.

pressurization The process of supplying an enclosure with clean air or an inert gas with or without continuous flow at sufficient pressure to prevent the entrance of combustible dust.

primary axis The axis along which the load cell is designed to be loaded; normally its geometric centerline.

protective component A component or assembly that is so unlikely to become defective in a manner that will lower the intrinsic safety of the circuit that it may be considered not subject to fault when analysis or tests for intrinsic safety are made.

purging The process of supplying an enclosure with clean air or an inert gas at sufficient flow and positive pressure to reduce, to an acceptable safe level, the concentration of any flammable gases or vapors initially present, and to maintain this safe level by positive pressure with or without continuous flow.

push-button auto zero (PAZ) Extension of the AZM function of a digital weight indicator through the use of a front panel push-button.

raceway An enclosed channel designed for holding wires, cables, or busbars.

radio frequency interference (RFI) Radio frequency energy of sufficient magnitude to possibly affect operation of other electrical equipment.

rainproof An enclosure so constructed, protected, or treated, as to prevent rain from interfering with the successful operation of the apparatus under specified test conditions.

raintight An enclosure so constructed or protected that exposure to a beating rain will not result in the entrance of water under specified test conditions.

RAM A data storage device that can be accessed in any order. It is known as a read/write memory, as information can be written into the memory, then read out when needed by the microprocessor. The contents of RAM are lost when the system is powered down.

readability Smallest division increments display.

reactance The opposition offered to the flow of alternating current by pure capacitance, pure inductance, or a combination of the two. Its unit is the "ohm".

read only memory (ROM) A memory unit in which instructions or data are permanently stored for use by the machine or for reference by the user. The stored information is read out non-destructively and no information can subsequently be written into the memory.

reference standard A force-measuring device whose characteristics are precisely known relative to a primary standard.

remote sensing A method of regulating the excitation voltage to the load cells. Some indicators compensate for voltage drops occurring between the indicator and load cells by increasing the indicator excitation output voltage; other indicators compensate for this voltage drop by amplifying the load cell return signal.

repeatability The maximum difference between load cell output readings for repeated loadings under identical loading and environmental conditions; the ability of an instrument, system, or method to give identical performance or results in successive instances.

resistance Opposition to current flow offered by a purely resistive component; simple opposition to current flow. Measured in ohms. See “reactance” on page 9.

resistivity The electrical resistance offered by a unit cube of material to the flow of direct current between opposite faces of the cube. It is measured in "ohm-centimeters".

resolution The smallest change in mechanical input that produces a detectable change in the output signal.

RS-232 A voltage-based serial method of data communication used to transfer data between digital devices. Two wires carry the data; one wire is signal ground, and several control wires may be used for handshaking. A logic "high" is from -3 to -25 volts and a logic "low" is from +3 to +25 volts. Transmission distance should be restricted to 50 feet.

RS-422 It provides for data transmission, using balanced or differential signaling, with unidirectional/non-eversible, terminated or non-terminated transmission lines, point to point, or multi-drop. In contrast to RS-485 (which is multi-point instead of multi-drop) RS-422 does not allow multiple drivers but only multiple receivers.

RS-485 Can be used effectively over long distances and in electrically noisy environments. Multiple receivers may be connected to such a network in a linear, multi-drop configuration. These characteristics make such networks useful in industrial environments and similar applications.

S

safety factor A figure denoting the overload (and allowance thereof) a device can withstand before breaking down.

sample rate Measurement rate, in samples per second, that the A/D converter updates. Lower values are more immune to noise.

scale A device for weighing, comparing and determining weight or mass.

sense Compensates for the resistance changes in the copper wiring. Sensing compares the supplied excitation voltage to the applied excitation voltage at the load cell.

sensitivity The ratio of the change in output to the change in mechanical input.

sensitivity drift Refers to how the change in temperature can affect the performance of the balance.

serial transmission A method of data transmission in which each bit of information is sent sequentially on a single channel.

setpoint In a feedback control loop, the point which determines the desired value of the quantity being controlled.

shear beam A bending beam load cell in which the strain gauges are mounted on a thin web of material in a machined-out cavity in the load cell.

shield The shield is used to protect the signal from RFI/EMI and needs to be grounded at one end. The shield wire is not connected to the load cell housing, but instead terminated at the indicator.

shift test A test intended to disclose the weighing performance of a scale under off-center loading.

side load Any load acting 90° to the primary axis at the point of axial load applications.

signal This is the actual millivolt output of the load cell. The signal wires are connected to the A/D of the indicator. It is here where the analog signal is converted to digital. Signal strength is references in microvolts per graduation.

signal in-line package (SIP) A flat, molded component package having terminal lugs along one side; half of a dual inline package (DIP).

signal trim A method of matching load cell outputs in a multicell system by adjusting the output signal voltage through a variable resistor placed across the signal leads.

span The difference between the highest value and the lowest value.

span calibration Utilizing two calibration points; one at zero and a choice of either half capacity or full capacity.

stabilization period The time required to ensure that any further change in the parameter being measured is tolerable.

stack A temporary storage area in a computer memory consisting of a small group of registers. Data stored in the stack is retrieved from the stack in reverse order in which it is stored.

standard test conditions The environmental conditions under which measurements should be made, when measurements under any other conditions may result in disagreement between various observers at different times and places. The conditions are as follows: Temperature: 72 degrees plus 3.6 degrees F (23 degrees plus or minus 2 degrees C) Barometric Pressure: 28 to 32 inches Hg.

static overload capacity Capacity as a percentage of nominal load limit capacity, in which the load cell can safely be loaded to this limit with no adverse affect on the performance or any change in its zero balance or other specifications.

stay rods Rods installed to rigidly restrain a vessel or other weighing system component in the horizontal position. They will have little effect on the accuracy of the system when installed properly.

strain gauge A device for detecting the strain that a certain force produces on a body. The gauge consists of one or more fine wires cemented to the surface under test. As the surface becomes strained, the wires stretch or compress, changing their resistance. Several strain gauges are used to make up a load cell.

T

tare The weight of an empty container or vehicle, or the allowance or deduction from gross weight made on account thereof.

temperature coefficient A figure that states the extent to which a quantity drifts under the influence of temperature.

temperature effect, on rated output The change in rated output due to a change in ambient temperature. Usually expressed as the percentage change in rated output per 100°F change in ambient temperature.

temperature effect, on zero balance The change in zero balance due to a change in ambient temperature. Usually expressed as the change in zero balance in percent of rated output per 100°F change in ambient temperature.

temperature range, compensated The range of temperatures over which the load cell is compensated to maintain rated output and zero balance within specific limits.

temperature range, safe The extremes of temperatures within which the load cell will operate without permanent adverse change to any of its performance characteristics.

terminal resistance, corner to corner The resistance of the load cell circuit measured at specific adjacent bridge terminals at standard temperature with no load applied and with the excitation and output terminals open-circuited.

terminal resistance, input (excitation) The resistance of the load cell circuit measured at the excitation terminals at standard temperature with no load applied and with the output (signal) terminals open-circuited.

terminal resistance, output (signal) The resistance of the load cell circuit measured at the output signal terminals at standard temperature with no load applied and with the excitation terminals open-circuited.

tolerance The amount of error that is allowed in a value. It is usually expressed as a percent of nominal value, plus or minus so many units of measurement.

traceability The step-by-step transfer process by which the load cell calibration can be related to primary standards.

transducer A device that converts energy from one form to another.

transient A momentary surge on a signal or power line. It may produce false signals or triggering impulses and cause insulation or component breakdowns and failures.

triac A three-terminal, gate controlled, bidirectional silicon switching device that can switch either alternating or direct currents.

trim To make a fine adjustment, as of load cell outputs in a multicell system.

U

units The unit of measure that is to be represented. lb, kg, oz, etc.

universal serial bus (USB) A specification to establish communication between devices and a host controller (usually personal computers).

V

v_{min} (minimum verification scale division/ load cell) A parameter used to select load cells for NTEP approved applications. For single cell applications, vmin must be less than or equal to the scale division size; for mechanical scale conversions using one load cell, vmin must be less than or equal to the scale division size divided by the scale multiple. For a scale using more than one load cell, vmin must be less than or equal to the scale division divided by the square root of the number of cells.

volatile memory A computer storage medium whose contents are lost when there is a loss of power.

volt The unit of voltage, potential difference and electromotive force. One volt will send a current of one ampere through a resistance of one ohm.

voltage The electrical potential difference that exists between two points and is capable of producing a flow of current when a closed circuit is connected between the two points.

voltage dip A temporary decrease in voltage level lasting at least one alternating current cycle.

voltage spike Large damaging voltage pulse caused when lightning strikes a power line, communication line, a signal or sensing line, or even the ground nearby.

voltage surge A temporary rise in voltage level lasting at least one alternating current cycle.

W

water-pipe ground An earth connection made by running a strong wire to the nearest cold water pipe.

water tight An enclosure so constructed that moisture will not enter the enclosure under specified test conditions.

weather proof An enclosure so constructed or protected that exposure to the weather will not interfere with successful operation of its contained equipment.

weight The force or amount of gravitational pull by which an object or body is attracted toward the center of the earth.

Z

zener diode A semiconductor diode which is used in the reverse biased condition. It exhibits a nondestructive breakdown at a predetermined reverse voltage, so while the diode is operating in this breakdown region, an increase in current flow through the diode will not result in increased voltage drop across the diode. It is used in voltage regulation circuits and as a voltage limiting device in intrinsic safety barriers.

zero balance The output signal of the load cell with rated Excitation and with no load applied, usually expressed in percent of Rated Output.

zero function By pressing the tare key, the scale display returns to zero.

zero range This is the range in which the scale can be zeroed. A selection of 1.9% means that the scale will zero off any weight within + or - 1.9% of the calibrated zero point.

zero return The difference in Zero Balance measured immediately before Rated Load application of specified duration, measured after removal of the load, and when the output has stabilized.

zero shift, permanent A permanent change in no-load output.

zero stability The degree to which the load cell maintains its Zero Balance with all environmental conditions and other variables remaining constant.

zero track band Automatically zeros off the scale within the specified range. Zero track band is most commonly used to zero off the buildup of water, ice, and snow on a scale.